



CRANFIELD UNIVERSITY

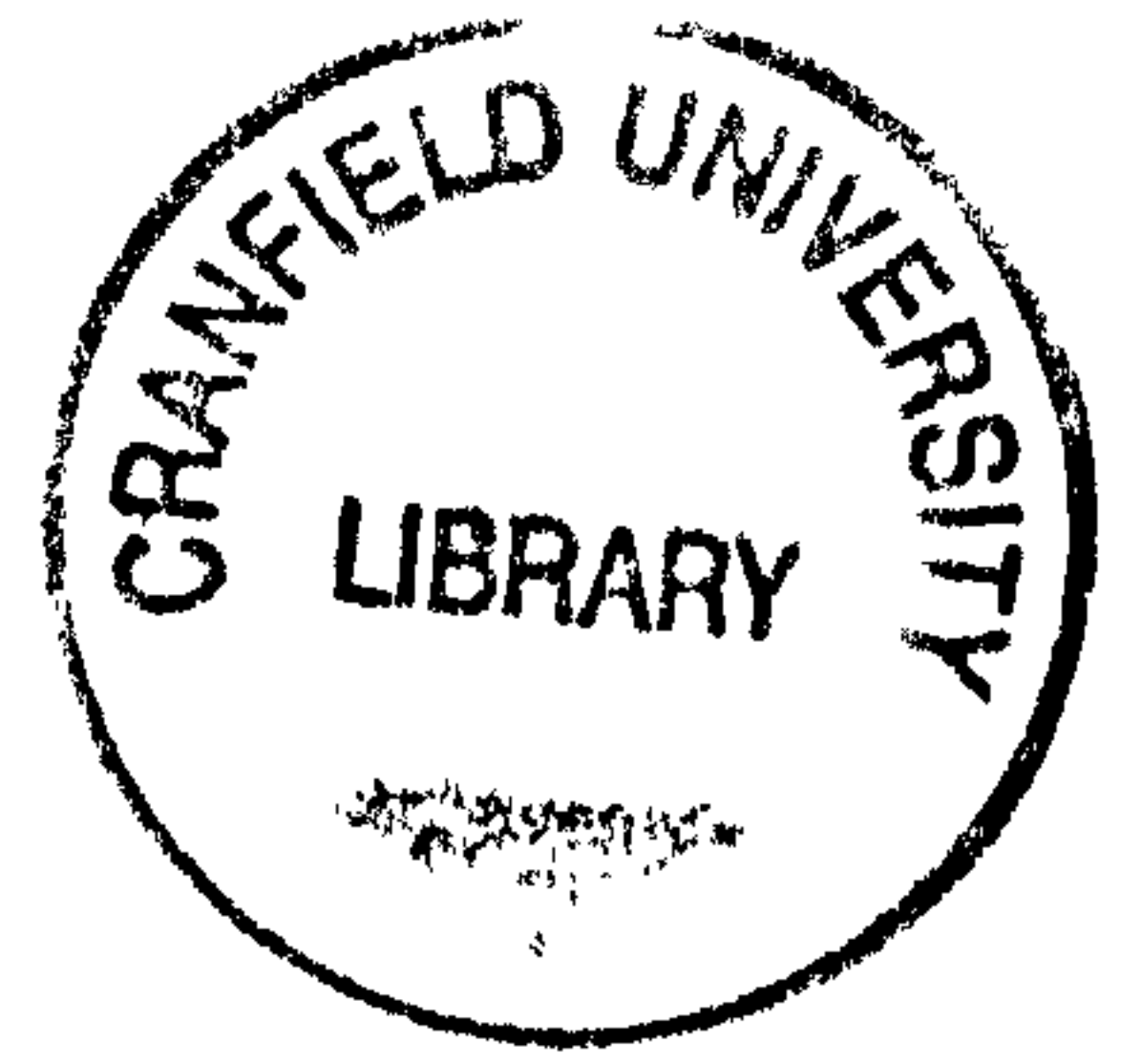
INNOVATION AND TECHNOLOGY ASSESSMENT UNIT

**MAPPING THE PROCESS OF PRODUCT INNOVATION:
CONTEXTUALISING THE 'BLACK BOX' OF COMPUTER AND
VIDEO GAMES DESIGN**

ERIC M. LAKE

PhD Thesis.

2000



CRANFIELD UNIVERSITY

INNOVATION AND TECHNOLOGY ASSESSMENT UNIT

**MAPPING THE PROCESS OF PRODUCT INNOVATION:
CONTEXTUALISING THE 'BLACK BOX' OF COMPUTER AND VIDEO
GAMES DESIGN**

ERIC M. LAKE

PhD Thesis. Academic Year 1999/2000

Supervisor: Dr. M. Lemon

January 2000

Abstract

The academic literature hitherto has mainly addressed the 'effects' of video games and not their creation. The thesis seeks to gain an understanding of the motivations behind the design choices in creating home computer and video games software in light of this 'gap'.

The research sought to understand the process of constructing games by examining: (i) the individual designer's aims and how these were mediated by the contexts of: (ii) the development team and organisation; (iii) the needs of the audience and their presence in the innovation process and (iv) the impact of the hardware manufacturer's quality assessment upon the game's design.

These aims were met by outlining the industry structure operating in the video games' market from the period between the early 1980s to mid-1990s. This was performed with reference to the rise of Sega and Nintendo's hardware and software strategy, covering their diffusion from Japan to the US and UK. This highlighted the context surrounding the creation of three computer games from initial concept to actual commodity that served as the subject of case study analysis.

The discussion seeks to explore the implications of the choices made in designing the games and widens the debate to the creation of other games. It is argued that the design of games mirrors aspects similar to the creation of other entertainment media but possess certain problems associated with aesthetic conventions, labour, industry and technical issues unique to this medium.

Consequently the thesis outlines certain dimensions that impinge upon the process of product innovation in entertainment software. From a theoretical perspective the application of a social constructivist approach to the emergence of a leisure technology is a novel one and demonstrates the contingent nature of game design.

Acknowledgements

The network of help given to me to complete the work deserves much thanks and includes:

Academia

The ESRC.

Dr. Mark Lemon.

Professor Martyn Cordey-Hayes.

Dr. Leslie Haddon.

Dr. Doug Benson.

Bill Mayon-White.

Professor Peter Allen.

Professor Steve Woolgar.

Dr. Richard Andrews.

[Departments]

The Main Library Staff.

The School of Management Library Staff.

[Industry]

All those who I interviewed and spoke to.

[Colleagues, Friends and, Family]

Brigid Browne

Paul Macey

Thomas Buchendorfer.

Peter Hiatt.

Nenia Blatsu.

Frank, Alan, Mum, Mary, Mike and in memory of Dad.

**PAGE
NUMBERING
AS ORIGINAL**

1 Origins of the Thesis

1.1 Introduction

1.1.1 Background

The initial decision to make video games the subject of analysis for a thesis had been motivated by the rise in popularity of home based video games machines. By the 1990s these penetrated many households in the UK and had become the subject of media attention. For example the Sunday Times Magazine had devoted its front cover and lead article to the two firms, Sega and Nintendo, who were mainly behind the resurgence of the market, (Guilliatt 1992). Further to this, the release of one game with the character 'Sonic the Hedgehog' had been made into a media event, with air time provided in the news about the rise in popularity of these games and reports of controversy made at the House of Commons about these goods. The latter was dealt with by the Department of Trade and Industry and subsequently the Monopolies and Mergers Commission.

What was unusual about the rise of popularity of the game playing technology was that one firm, Nintendo had been specifically associated with building the market up after the 'remains' of an industry slump and seen as the main driving force behind a new 'craze'. Populist explanations for this had used exploitative phrases such as 'kiddie cocaine' to make an issue of the 'addiction' as an explanation for the success of the technology's diffusion.

An indication of the popularity and diffusion of the Nintendo and Sega machines is given in Figures (1.1) and (1.2).

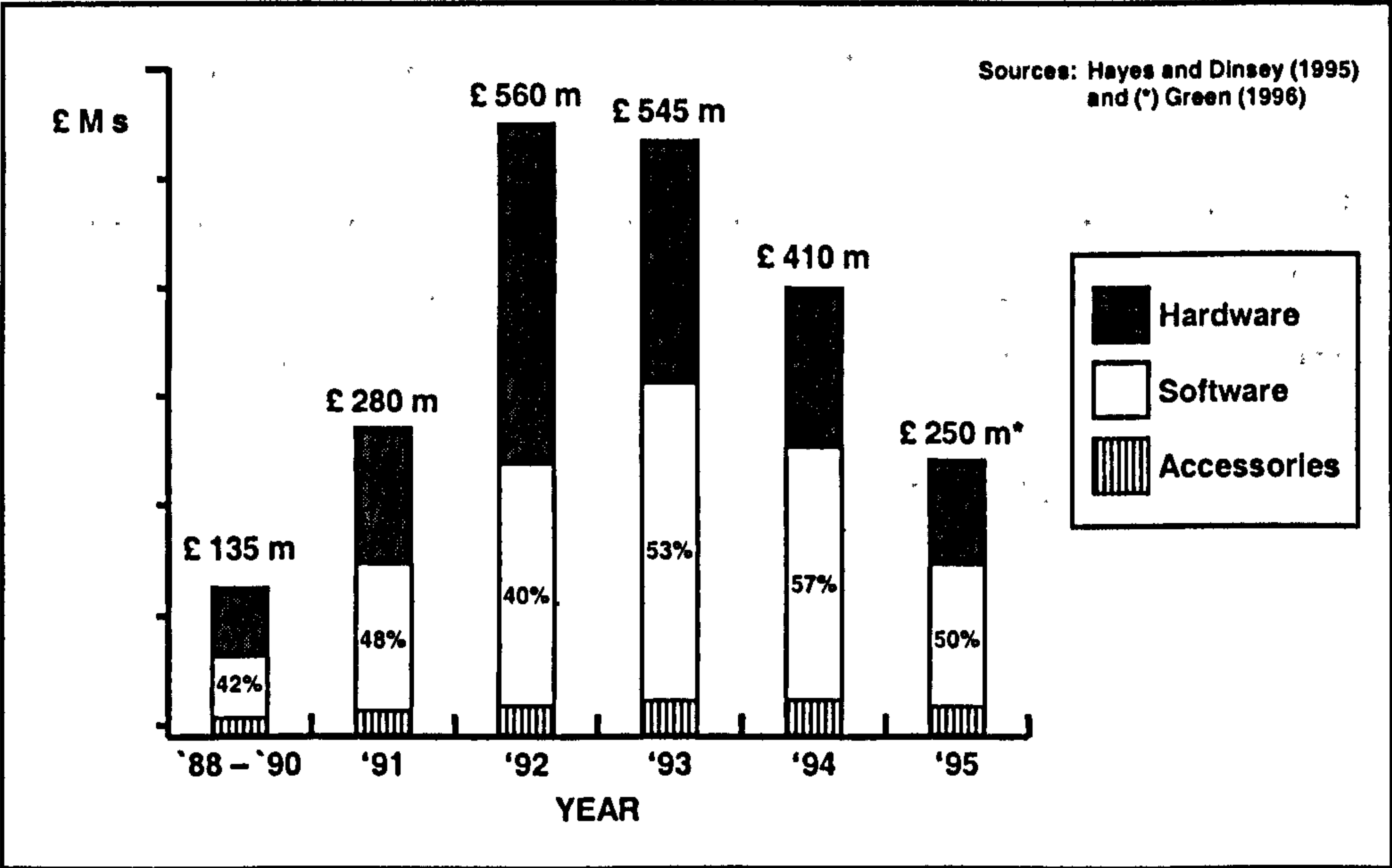


Figure 1.1: Value Progression of UK Video Games Market
(Excluding PC hardware & software)

In conjunction with this, by the end of 1992 and 1993, accounts of the rise of virtual reality, interactive television, the Internet or 'information super highway' and the 'convergence' of these media into multimedia technologies were also gaining popular currency in media reports. The populist accounts of the leisure and communication

9.4.6	<i>Reproduction and Recreation. Developer Firm Attempts to Re-release 'New' Designs</i>	242
9.4.7	<i>The Legal Basis for Games in the Product Space to Share Design Conventions</i>	242
9.4.8	<i>Conclusion of Phase 3 and Overall Conclusion</i>	243
9.5	SUMMARY	245
10	CONCLUSION	247
10.1	ATTAINMENT OF THE RESEARCH OBJECTIVES	247
10.1.1	<i>Introduction</i>	247
10.1.2	<i>Objective 1: Understanding the Motivations of the Designer's Content Choice. The Significance of the Research Findings</i>	248
10.1.3	<i>Valuing Graphical Simulation</i>	249
10.1.4	<i>Objective 2: The Influence of the Development Context in Relation to Technology, Group and Organisational Impacts</i>	250
10.1.5	<i>Objective 3: The Influence of the Console Manufacturer's Licensing Conditions and the Software Quality Control or Approval Process</i>	252
10.1.6	<i>Objective 4: Identify Where the User or Player Entered into the Development Process and How Their 'Needs' were Considered in Design</i>	253
10.2	WIDER ACHIEVEMENTS	254
10.2.1	<i>Contribution to Knowledge and Relevance to Theory</i>	254
10.2.2	<i>Methodological Contributions</i>	259
10.2.3	<i>Weakness in the Research and Further Work</i>	259
10.2.4	<i>Accounting for Consumption</i>	260
11	REFERENCES	261
	APPENDIX	283
A.1	INITIAL FACT FINDING SOURCES OF INFORMATION AND INFORMAL INTERVIEWS	283
A.2	QUESTIONS FOR DEVELOPERS	286
A.3	CASE STUDY QUESTIONS	290
A.4	MAIN RESEARCH INTERVIEWS:	293

9.3.1	<i>Introduction.....</i>	219
9.3.2	<i>Communication by Design in the Game's Design. The Intentional Design Aims of the Games Content.</i>	220
9.3.3	<i>The Emerging Game: Bloodshot and the Meaning of the Display in Games. Aesthetic Issues in Design.....</i>	220
9.3.4	<i>Further Dimensions of the Product Space - Defining a 'Video Game' and in Turn Defining Specific Products.....</i>	222
9.3.5	<i>The Value of Graphics.....</i>	222
9.3.6	<i>The Value of the Game's Rules in Defining its Meaning.....</i>	223
9.3.7	<i>Redesigning Bloodshot's Intended User.....</i>	224
9.3.8	<i>Silly Putty Phase 2.....</i>	224
9.3.9	<i>The Labour Process as a Source of Design Choice.....</i>	225
9.3.10	<i>Who is the Designer?</i>	225
9.3.11	<i>Silly Putty's Design Flexibility.....</i>	226
9.3.12	<i>Phase 2 - Putty Squad. Questioning the 'Need' for Novelty and its Interpretation in Design.....</i>	227
9.3.13	<i>Interpreting 'Novelty' in Defining 'The New' in the Product Space. Design Examples of Other Games.....</i>	228
9.3.14	<i>Questioning the Need for Alternative Designs Choices.....</i>	229
9.3.15	<i>Institutional 'Barriers' to Novelty in Design Configurations in Historical Perspective</i>	230
9.3.16	<i>Voluntarist Repetition as a Source of 'The New' in Product Innovation..</i>	231
9.3.17	<i>Should There Be Innovation?.....</i>	232
9.3.18	<i>Putty Squad. Emergent Design Choices in the Changing Contexts of the Organisation of Development</i>	233
9.3.19	<i>Autonomous Labour Impacts on Design.....</i>	234
9.3.20	<i>Finalising the Game's Operation.....</i>	234
9.3.21	<i>Constructing the 'Problem' of Difficulty in Games.....</i>	235
9.3.22	<i>Organisational Changes and the 'Problem' of Supply.....</i>	236
9.3.23	<i>Phase 2: Conclusions.....</i>	238
9.4	<i>PHASE 3 - THE RELEASED GAME.....</i>	238
9.4.1	<i>Introduction.....</i>	238
9.4.2	<i>Publishing the Games. The Games Emerge into the 'Meso-Social' Environment.</i>	239
9.4.3	<i>The Relations Between Software and the Product Space of the Home Microcomputer.....</i>	239
9.4.4	<i>'Inevitable' Media Crossovers and Synergy?</i>	240
9.4.5	<i>Magazines as a Relevant Social Group and the Problem of Objectivity..</i>	241

8.3.1	<i>Managing the Diffusion of Putty Squad. Media Tie-ins.....</i>	186
8.3.2	<i>Publishing Putty Squad.....</i>	188
8.3.3	<i>The Amiga as a Target Platform for Putty Squad in 1994.....</i>	189
8.3.4	<i>Finding the User.....</i>	190
8.3.5	<i>Magazines. The Relevance of the Games' Review Press to Product Diffusion.....</i>	190
8.3.6	<i>Reviews of Putty Squad.....</i>	192
8.4	AFTERMATH.....	193
8.4.1	<i>The Post Release Feedback of the Game and its Interpretation. The 'Problem of the Audience'.....</i>	193
8.4.2	<i>Putty Squad and the Market Environment.....</i>	195
8.4.3	<i>Summary.....</i>	195
9	DISCUSSION.....	197
9.1	INTRODUCTION.....	197
9.1.1	<i>Objectives of the Discussion.....</i>	197
9.1.2	<i>Structure of the Chapter.....</i>	197
9.2	PHASE 1 OF THE PROCESS OF PRODUCT INNOVATION IN GAME CREATION: THE IMAGINED GAME.....	198
9.2.1	<i>Product Initiation.....</i>	198
9.2.2	<i>CyberPunk, (Bloodshot) as an Imagined Game - Phase 1.....</i>	199
9.2.3	<i>Organisational Alliances - Preconditions.....</i>	199
9.2.4	<i>Phase 1 Preconditions of Silly Putty as an Imagined Game: The Emergence of the Game's Concept.....</i>	200
9.2.5	<i>Organisation Acceptance and Rejection of Concepts.....</i>	202
9.2.6	<i>Phase 1: Putty Squad as an Imagined Game.....</i>	203
9.2.7	<i>Putty Squad. Constructing Consumption in Design. The Imagined User.....</i>	205
9.2.8	<i>The Imagined User for the Imagined Game of CyberPunk.....</i>	207
9.2.9	<i>Intertextuality and Media Convergence. The Attempt to Transfer Film Entertainment Conventions into Software.....</i>	207
9.2.10	<i>Other Film to Game Examples.....</i>	208
9.2.11	<i>Defining the Boundaries of the Product Space for Video Games.....</i>	209
9.2.12	<i>Production Conventions. Where Does Knowledge of Game Design Lie in Development?.....</i>	213
9.2.13	<i>The Impact of an Industry Landmark Game - How Games Interact with Each Other.....</i>	215
9.2.14	<i>Conclusions of Phase One.....</i>	218
9.3	PHASE 2 - THE CRAFTED GAME.....	219

6.5.8	<i>Magazine Reviews: Defining the Artefact.....</i>	148
6.5.9	<i>Summary and Conclusion.....</i>	150
7	THE MAKING OF AN ORIGINAL GAME - PUTTY.....	151
7.1	INTRODUCTION	151
7.1.1	<i>Aims of the Chapter.....</i>	151
7.1.2	<i>A Brief Market Background</i>	151
7.1.3	<i>Game Concept Origins. The Career of a Game Concept</i>	152
7.1.4	<i>Accepting the Initial Concept and the Development Firm's Organisational Background.</i>	153
7.1.5	<i>Forging the Game's Identity. Implications of Genre</i>	154
7.2	IMPLEMENTATION.....	155
7.2.1	<i>Implementing the Game - Design Aims and Evolution. The Labour Process and Design.....</i>	155
7.2.2	<i>Diffusing the Game into the Public Domain.....</i>	159
7.2.3	<i>The Commodore Amiga as a 'Games' Machine'. An Alternative Development Pathway to Consoles.....</i>	159
7.3	OTHER FACTORS.....	162
7.3.1	<i>Competing Games Designs. Constructing the Artefact's Relative Merits as a Commodity</i>	162
7.3.2	<i>Reproducing the Game.....</i>	163
7.3.3	<i>The Costs of Game Redesign.....</i>	165
7.3.4	<i>The Silly Putty Game Design as a Consumer Good.....</i>	167
7.3.5	<i>Summary.....</i>	170
8	PUTTY SQUAD - A GAME AS A SEQUEL.....	171
8.1	INTRODUCTION	171
8.1.1	<i>Aims of the Chapter.....</i>	171
8.1.2	<i>Choosing a Game to Develop.....</i>	171
8.1.3	<i>The Influence of Potential Markets.....</i>	172
8.1.4	<i>Specific Details of Implementation. Negotiating the Continuity for a 'Sequel'.....</i>	173
8.2	DEVELOPMENT.....	175
8.2.1	<i>The Labour Process. From Ideas to Software.....</i>	175
8.2.2	<i>Programming. The Boundaries between Development and Design</i>	177
8.2.3	<i>Including Music for the Game.....</i>	179
8.2.4	<i>Testing the Game.....</i>	181
8.2.5	<i>The Input/Output Device: Playing and Controlling the Game</i>	185
8.3	TO THE MARKETPLACE.....	186

6.2.1	<i>Beginnings.....</i>	112
6.2.2	<i>Translating a Film into a Game.....</i>	113
6.2.3	<i>The Flexible Game Design. A Conjunction of 'Problems'.....</i>	117
6.2.4	<i>The Meaning of the MegaDrive as a Design Issue. The Hardware's Situated Context</i>	117
6.2.5	<i>Impact of Other Game Designs. The Valuing of Design Precedence</i>	118
6.2.6	<i>The Display's Significance.....</i>	119
6.2.7	<i>A 'New' Game</i>	121
6.3	PART 2: BLOODSHOT AS A 3D-MAZE GAME	122
6.3.1	<i>Introduction.....</i>	122
6.3.2	<i>The Game's Intended Content Choice</i>	123
6.3.3	<i>Intra-Organisational Influence upon the Game's Design.....</i>	126
6.3.4	<i>Labour Process of Implementing the Design of the Game. Aspects of Authority, Influence and Autonomy.....</i>	127
6.3.5	<i>The Impact of Competition.....</i>	130
6.3.6	<i>Magazine Influence</i>	131
6.3.7	<i>Extra-Organisational Influence upon Content Choice</i>	131
6.4	PART 3: PRODUCTION HURDLES	135
6.4.1	<i>The Sega Test and Approval Process.....</i>	135
6.4.2	<i>Formal Procedure of Sega Approval of Third Party Games. Faxed Communication</i>	135
6.4.3	<i>The Third party Test Procedure.....</i>	136
6.4.4	<i>Specific Aspects of Quality Control</i>	137
6.4.5	<i>The Actual Evaluation of Bloodshot as a Game - Examining the Faxes ..</i>	138
6.4.6	<i>The Official Sega Test Report</i>	138
6.4.7	<i>Conclusion of the Sega Faxed Communication</i>	140
6.4.8	<i>Implications of the Sega Test Report for the Development Firm and the Design of the Game.....</i>	140
6.5	DEVELOPMENTS IN THE LONGER TERM	143
6.5.1	<i>Economic Influence on the Development Organisation's Publishing Strategy.....</i>	143
6.5.2	<i>Rocket Software's Strategy.....</i>	143
6.5.3	<i>Acclaim's Acquisition of Bloodshot.....</i>	144
6.5.4	<i>Bloodshot as Part of Publisher Strategy.....</i>	144
6.5.5	<i>The Mega CD. Delivery Media and the Promise of Product Innovation..</i>	145
6.5.6	<i>The Game on CD. Delivery Medium and Design.....</i>	145
6.5.7	<i>Getting the Game to Market.....</i>	147

5.3.5	<i>U.S. Controversy Over the Diffusion of the Nintendo Entertainment System</i>	90
5.3.6	<i>Retail</i>	90
5.3.7	<i>The Influence of the Environment on Games Development</i>	90
5.3.8	<i>State Level Regulation and Scrutiny of Nintendo's Operation. Design Becomes a Political Issue</i>	92
5.3.9	<i>Conclusion to US Section</i>	94
5.3.10	<i>The Emergence of Competition. Sega and the MegaDrive as an Alternative Relevant Social Group</i>	94
5.3.11	<i>Nintendo's Design Strategy. Building a Constituency to Support Technology Change</i>	95
5.4	DIFFUSION TO THE UK AND EUROPE	96
5.4.1	<i>The Diffusion of the Two Cartridge Machines to the UK and Turbulence in the Cartridge-Based Console Industry</i>	96
5.4.2	<i>Building an Infrastructure to Support Technology Transfer</i>	96
5.4.3	<i>Market Success. Coming to the UK - Building Support for Sega and Nintendo</i>	96
5.4.4	<i>Conditions of the Market. The Meso-Social Level basis of Demand for Games</i>	98
5.4.5	<i>The Uncertain Nature of Demand for a Game</i>	98
5.4.6	<i>Market 'Crash' and Technology Change</i>	99
5.4.7	<i>Retail Issues</i>	100
5.4.8	<i>Weaknesses in the Production Strategy</i>	101
5.4.9	<i>The Problems of Advertising to Manage Demand</i>	102
5.4.10	<i>The Incentive to Over-supply Games</i>	102
5.4.11	<i>UK Response to the Successful Diffusion of Video Games and Attempts at Regulation of their Supply</i>	103
5.4.12	<i>The Case against Sega's and Nintendo's Practices. The UK Response to the Effects of Sega's and Nintendo's Attempts at Technology Management</i>	104
5.4.13	<i>The Commissions Ruling - Providing an Alternative Scenario</i>	106
5.4.14	<i>The Commission's Recommendations</i>	108
5.4.15	<i>Summary and Conclusion</i>	109
6	CREATING A VIDEO GAME – CYBERPUNK AND BLOODSHOT'S INCEPTION	111
6.1	THE CREATION OF A VIDEO GAME	111
6.1.1	<i>Introduction</i>	111
6.1.2	<i>A Brief History of Rocket Software</i>	112
6.2	PART 1: THE GAME AS CYBERPUNK	112

4.2.3	<i>Construction of Questions.....</i>	64
4.2.4	<i>Gaining Access and Asking the General Questions.....</i>	66
4.2.5	<i>Conducting the Case Studies.....</i>	68
4.3	SUPPLEMENTARY DATA SOURCES	69
4.3.1	<i>Introduction.....</i>	69
4.3.2	<i>In-house Design Materials.....</i>	69
4.3.3	<i>Written Sources.....</i>	70
4.3.4	<i>The Video Camera.....</i>	72
4.3.5	<i>Acquiring the Case Study Games.....</i>	72
4.3.6	<i>L. Haddon's (1988a) Research.....</i>	73
4.3.7	<i>Utilisation of the Internet.....</i>	73
4.3.8	<i>E-mail.....</i>	73
4.4	ANALYSING THE DATA	74
4.4.1	<i>Phase 1: Data Management.....</i>	74
4.4.2	<i>Phase 2: Analysis Strategy.....</i>	74
4.4.3	<i>Data Presentation</i>	77
4.5	SUMMARY.....	77
5	INDUSTRY STRUCTURE - THE PROBLEM OF PRODUCTION	79
5.1	INTRODUCTION	79
5.1.1	<i>Chapter Contents</i>	79
5.2	STRATEGIES OF DESIGN	80
5.2.1	<i>Introduction.....</i>	80
5.2.2	<i>Hardware Firm History</i>	80
5.2.3	<i>The Famicom. The Strategic Issues Behind the Artefact's Definition in Japan</i>	81
5.2.4	<i>The Strategic Role of Software for the 'FamiCom' and its Design</i>	82
5.2.5	<i>Changing the Strategy of Software Support.....</i>	83
5.2.6	<i>Backlash in Japan. Problems of Innovation at the Macro-, Meso- and Micro-Social Levels.....</i>	85
5.3	DIFFUSION TO THE US.....	86
5.3.1	<i>The Artefact in the US. Diffusion of the Nintendo Games Technology and Production Practices to America</i>	86
5.3.2	<i>Communicating the Meaning of the Machine in Design.....</i>	86
5.3.3	<i>Redesigning the US version of the Hardware. Emphasising 'Entertainment' Applications.....</i>	87
5.3.4	<i>Consolidating the Successful Diffusion of the NES.....</i>	89

3.2	THE THREE LEVELS OF ANALYSIS THAT EXPLAIN THE INNOVATION PROCESS.....	30
3.2.1	<i>Introduction.....</i>	30
3.2.2	<i>The Macro-Social Level.....</i>	32
3.2.3	<i>The Meso-Social Level.....</i>	34
3.2.4	<i>The Micro-Social Level.....</i>	34
3.3	APPLICATION OF THE MODEL TO THE STUDY OF THE PROCESS OF INNOVATION OF A CONSUMER ELECTRONIC DEVICE.....	36
3.3.1	<i>An Examination of the Emergence of CD-i.....</i>	36
3.3.2	<i>The CD-i at the Macro-Social Phase of the Innovation Process.....</i>	37
3.3.3	<i>Diffusing the CD-i Technology - The Meso-Social Phase.....</i>	38
3.3.4	<i>CD-i Technology in the Micro-Social Phase.....</i>	40
3.3.5	<i>Applying the Approach to the Study of Making Video Games.....</i>	40
3.3.6	<i>Separating out Emergent Products from their Membership Categories. Product Space.....</i>	41
3.3.7	<i>Definition Issues.....</i>	43
3.3.8	<i>The Concept of a Technological Career.....</i>	43
3.3.9	<i>The User.....</i>	44
3.4	EXTENDING AND CRITICISING THE THREE DIMENSIONAL MODEL FOR ITS APPLICATION TO THE STUDY OF VIDEO GAMES SOFTWARE.....	45
3.4.1	<i>The 'Political' Nature of Designed Artefacts. The Contribution of the Social Shaping of Technology Approach.....</i>	45
3.4.2	<i>The Social Construction of Technology (SCOT) Approach.....</i>	46
3.4.3	<i>Clarification of SCOT Terms.....</i>	48
3.4.4	<i>Contributions from Media and Cultural Studies.....</i>	51
3.4.5	<i>The Production of Culture, Media Studies and Media Texts.....</i>	51
3.4.6	<i>Theoretical Summary.....</i>	53
4	CONDUCTING THE RESEARCH.....	57
4.1	METHODOLOGICAL CONCERNS.....	57
4.1.1	<i>Introduction.....</i>	57
4.1.2	<i>Finding an Appropriate Methodology for Studying Media Production.....</i>	57
4.1.3	<i>Main Data Gathering Tools.....</i>	58
4.1.4	<i>Considering the Viability of Participant Observation.....</i>	58
4.1.5	<i>Considering the Approach of Interviewing.....</i>	60
4.2	RESEARCH DESIGN, METHOD AND ANALYSIS.....	62
4.2.1	<i>The Overall Plan of the Research.....</i>	62
4.2.2	<i>Gaining Initial Access to Subjects.....</i>	63

Contents

1 ORIGINS OF THE THESIS 1

1.1 INTRODUCTION 1

1.1.1 Background 1

1.1.2 Origin of Theoretical Approach..... 3

1.2 PLAN OF THE THESIS 4

1.2.1 Introduction..... 4

Chapter 2: Identifying a Topic of Study: The Niche in the Literature 5

Chapter 3: Theoretical Framework 6

Chapter 4: Conducting the Research..... 6

Chapter 5: Industry Structure – The Problem of Production 6

Chapter 6: Creating a Video Game - Cyberpunk and Bloodshot’s Inception 6

Chapter 7: The Making of an Original Game – Putty 6

Chapter 8: Putty Squad - A Game as a Sequel 7

Chapter 9: Discussion..... 7

Chapter 10: Conclusion 7

2 IDENTIFYING A TOPIC OF STUDY: THE NICHE IN THE LITERATURE. 9

2.1 PART I: INTRODUCTION..... 9

2.1.1 Overview..... 9

2.1.2 Video Games are an Environmental Issue - A Thematic Insight to the Literature..... 9

2.1.3 The Basis for Concern..... 9

2.1.4 What is Inside the Environment? 11

2.1.5 Game Design and Use: Coupling Production with Consumption 14

2.1.6 Accounting for the Design of Games..... 18

2.2 PART II: IDENTIFYING A TOPIC OF STUDY..... 21

2.2.1 Some Initial Motivations and Insights..... 21

2.2.2 Game Design Values. Questioning the Aesthetics of Games. 21

2.2.3 The Exclusion of the Design Studies Literature 24

2.2.4 Summary: 26

3 THEORETICAL FRAMEWORK 27

3.1 THE SILVERSTONE AND HADDON MODEL (1993A, B) 27

3.1.1 Introduction..... 27

3.1.2 Background Assumptions for the Model and Critiques of Other Approaches

27

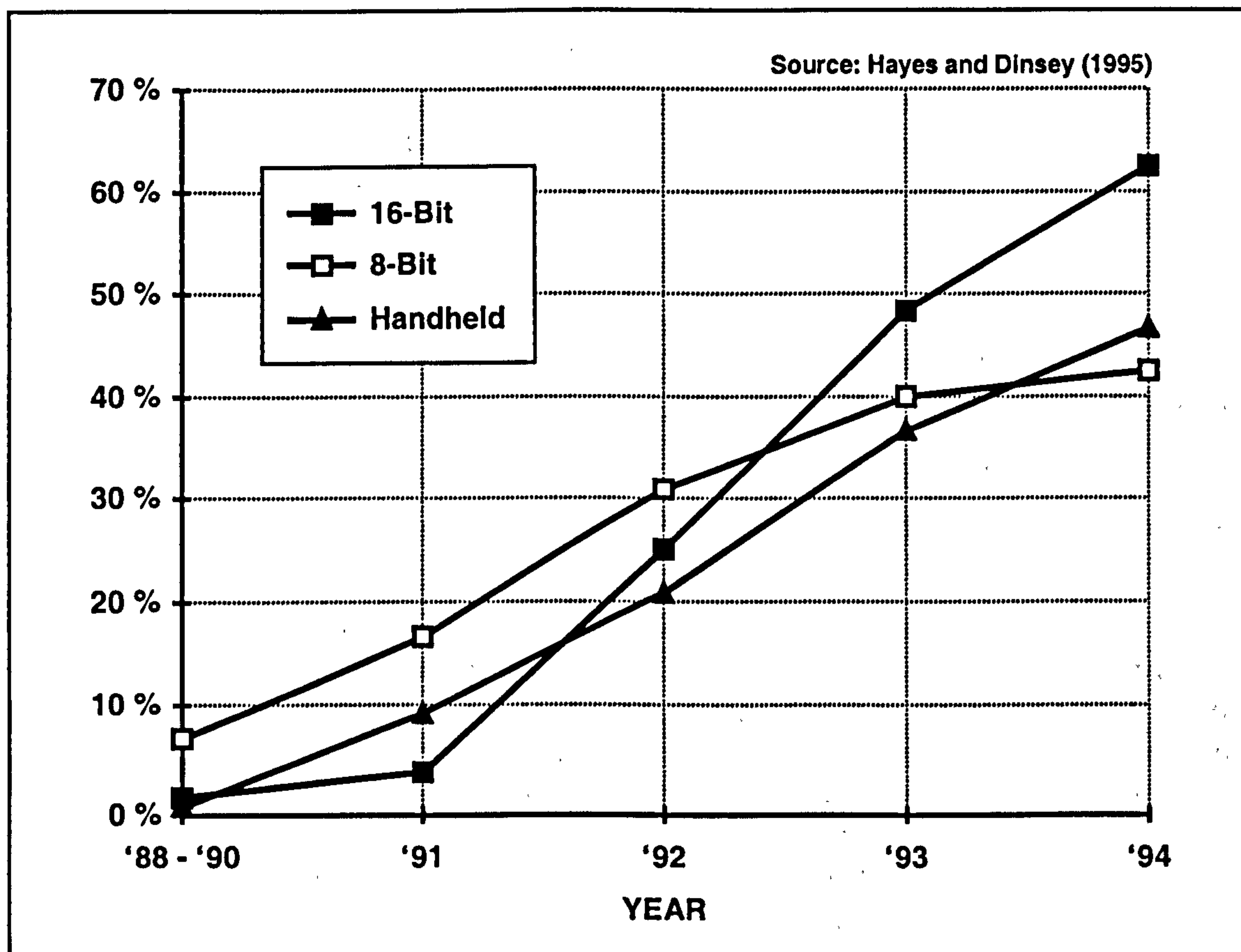


Figure 1.2: Percentage of UK Households with Children Owning a Console

uses of this technology were finding expression in films such as 'Jurassic Park' in 1993. This had prompted a wide spread media focus on leisure and technology and the role of science, technology and society which influenced programmes such as Equinox and Horizon and led to the emergence of programmes such as BBC television's 'The Net' or Channel 4's 'Games Master' and ITV's 'Bad Influence'. This resurgence of interest mirrors much of Haddon's (1988a) observations of the state of the popularity of the home microcomputer technology and the interests generated by that technology a decade earlier.

Given the interest noted above, however, the relationship between technology and leisure was extremely sparse in the academic literature. The following extract from a seminal text demonstrates this:

MacKenzie and Wajcman (1985, p.176):

"There has been some discussion ... of the effect of technology on leisure. The transformation of sport into a media event by the development of television is an example: one-day cricket did not exist before sport was packaged for television. The marketing of pop music now requires the production of rock videos in which the images are as important as the sound. Although these and similar phenomena are much remarked upon, our understanding of how the technology of leisure is developed and what factors shape its particular forms, had progressed very little. The research has yet to be undertaken..."

Where research had been exploring the relationship between technology and society, as in the above text, it was largely related to work, the military, white goods' technologies or general impacts of technology on society, not specifically on leisure. This is unusual because one of the thematic issues of academic discourse on the

impact of technology on work is the supposed rise in leisure time which individuals may reap as unemployment sets in, or as machines are substituted for human labour, in Jenkins and Sherman (1981) 'The Leisure Shock'. This issue is related to the concepts of 'the privatisation of leisure' or 'the leisure society' in sociological analysis. In these accounts technology is seen to be *creating time* for leisure but not really *constituting* it.

In relation to video games the key overall questions of the thesis involve examining the formation of this technology and exploring aspects of its construction. After a literature search of academic research the thesis provisionally sought to:

- (1) Understand how video games emerge from idea to final product.
- (2) Examine and identify the sources of influence on the process that impacts upon content selection.

The consequence of enacting this line of enquiry was to gain an understanding of how a 'play-thing' is configured by the intentional activity of designers and to identify broader forms of power and influence that mediate this activity. The 'mapping out' of the decisions and the reasons for them, would yield insight into the process of product innovation specific to the construction of this leisure technology. The actual mapping out of the design choices not only revealed what choices were made and why but also engaged in exploring alternative design choices that could have been made. These illustrate the influence of contingent social factors upon technical development that the 'social shaping approach' illuminates. This reveals the political nature of the design process and the sources of power and influence that effect technology development. Therefore 'the contribution to knowledge' derived from the thesis was to open 'the black box' of the construction of computer and video games and to fill the gap in the literature that had mainly paid attention to the uses and impacts or 'effects' of games.

The scope of research explored the designer's micro social decision making with regard to design choices and placed these in a wider context of the development group or 'team' working in an organisation, that in turn interacted with other organisations such as publishers and hardware manufacturers. This was enacted via case study research of the making of three home computer and video games conceived in the first half of the 1990s. By tracking the game's development from idea to finished and released product, this aimed to illuminate the changing contexts of influence upon the games' design choices.

In addition to the case study material, other more general interviews with a range of personnel involved in creating games were conducted in order to give some breadth to the understanding of the making of games. The attention of the research activity was mainly focused on creating games and the initial stages of release into the market. The research did not account for the consumption of games by users in the play process.

1.1.2 Origin of Theoretical Approach

The theoretical approach used to examine the process of innovation was derived from aspects of a model constructed by Silverstone and Haddon (1993a,b) which had been developed out of other research at Sussex University into the innovation process in the development of information and communication technologies (ICT). In conjunction with the above, concepts from the 'social construction of technology', (SCOT) approach were drawn upon to sensitise the analysis of technology development to

account for the significance of the nature of design choices involved in actualising a technology in a finished form and to explain the implications of the existence and resolution of these 'political' choices. To help gain insight into the making of non-utilitarian items the literature of media and cultural studies was examined to gain an awareness of the contexts of construction of other entertainment media that the traditional social shaping of technology accounts could not account for.

The outcome of this was to map out the process of technology development that used a 'multi-direction model' (Pinch and Bijker 1987) of technology development as applied to the emergence of specific video game artefacts created within its class of technology or 'product space' (Silverstone and Haddon 1993a,b, Cawson, Haddon and Miles 1993). This demonstrated the interactive nature of software development and took into account the range of heterogeneous influences from individuals, organisations, technological and institutional structures to globalised economic and market trends.

The specific objectives of the research were to understand:

- (1) The motivations of the designer's content choices and see how these were mediated by the following:
- (2) The influence of the development context in relation to technology, group and organisational impacts
- (3) The influence of the console manufacturer's licensing conditions and the software quality control or approval process
- (4) Where the user or player entered into the development process and how their 'needs' were considered in design

1.2 *Plan of the Thesis*

1.2.1 Introduction

The contents of the thesis are briefly outlined in the following sections. Figure (1.3) illustrates the thesis structure.

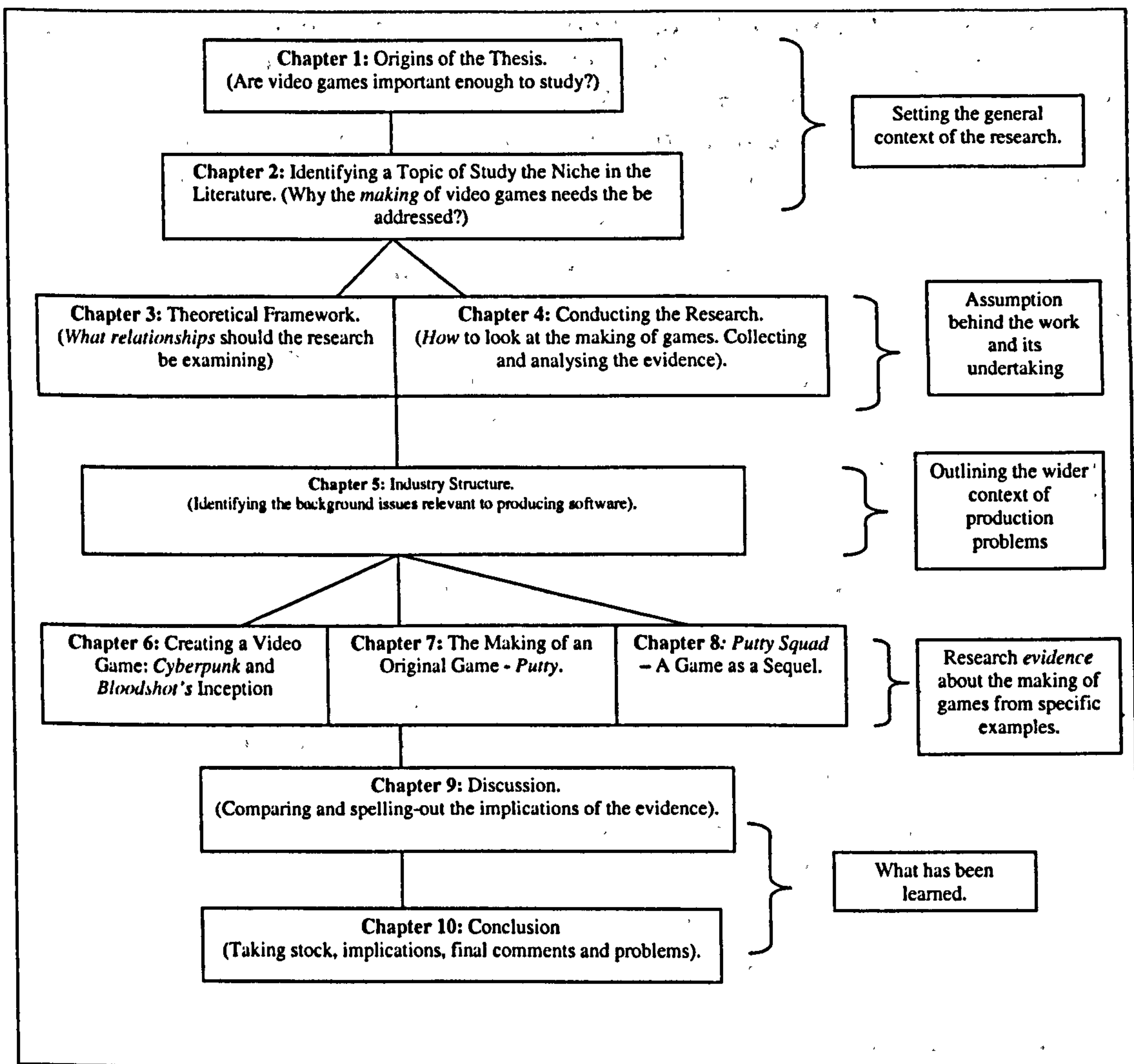


Figure 1.3: Flow diagram of the thesis structure.

Chapter 2: Identifying a Topic of Study: The Niche in the Literature

This chapter identifies the approaches used by academics to highlight the significance of video games' diffusion into society and their effects. The theme adopted to organise the literature review is to regard academic's treatment of video games as a form of technology development that constitutes an 'environmental issue'. This section addresses academic considerations of the design of the games themselves and their layout, to the implications of children's interaction with this environment. Here the literature's 'blind spot' in the account of the design process is identified.

In conjunction with this an account of some initial insights into the design process of games is given. This section of the chapter seeks to gain some awareness of the contexts that development considers in configuring game ideas and implementing them. A diagram of the 'web' of these contexts is provided. This serves to highlight the evidence of 'problems' in the creation of games that make further investigation a fruitful one, worthy of study in conjunction with the 'blind spot' or 'gap' in the academic literature.

Chapter 3: Theoretical Framework

The theoretical approach used in the thesis is outlined. This uses concepts from Silverstone and Haddon (1993a,b) and the social construction of technology approach (SCOT). The significance of these approaches to the political and contingent nature of technology development and their relevance to studying the construction of a leisure technology such as video games are discussed. An explanation of what phenomena should be focused on to examine the development of games that accounts for analysing the aspects of agency and structure in design is given and a diagram of the conceptual framework used for the thesis provided.

Chapter 4: Conducting the Research

The methodology and research design of the thesis are outlined in order to give an explanation of what tools were used to gather the data, analyse it and recount it. Further, the rationale of obtaining subjects to interview and obtaining additional documentary materials for analysis are outlined.

Chapter 5: Industry Structure – The Problem of Production

This chapter outlines the specific nature of part of ‘the problem’ regarding the impact of hardware manufacturers upon the supply and design of games that constitutes the basis of objective (3) given in (1.1.2). The chapter deals with the emergence of an industry structure that saw the specific configuration of the Sega and Nintendo hardware consoles and the strategy of licensed software creation. The outlining of this historical process and the diffusion of the hardware with its institutionalised management from Japan, to the US, Europe and specifically the UK, explains why the successful diffusion of a technology was conceived as ‘a problem’. This chapter explains part of the political nature of the wider contexts of the development process of making games. Consequently the chapter explains the antecedent and concurrent industry conditions that influenced games’ development.

Chapter 6: Creating a Video Game - *Cyberpunk* and *Bloodshot*’s Inception

The first case study game *Bloodshot* is presented and a detailed account of its concept formation, configuration and attempts to publish it in the UK and the US is given. This illustrates the heterogeneous sources of influence that mediate the designer’s intentional product vision and demonstrates how design is subject to influence from innovation in competing games and how this influences the perception of the game’s ‘needs’. The chapter illuminates the tensions between autonomous designer content choices and those enforced or negotiated from countervailing sources of informal and formal power from other in-house and external organisational bodies.

Chapter 7: The Making of an Original Game – *Putty*

The next case study game *Silly Putty* again presents a detailed account of the emergence of a game from idea to finished commodity and its attempts to be diffused in other global territories. Peculiar to this game’s creation is the attempt for the idea to be accepted and the difficulty in finding resources to implement it. The transition of the game from concept to final idea highlights the unintentional influences of institutional relations between the press and the development organisation that influences the game’s design choices. The attempt to translate the game design from a

home computer to console technologies further introduces unforeseen influences upon the game's design.

Chapter 8: *Putty Squad* - A Game as a Sequel

The case study here presents the process of creating a sequel game and illustrates the issues underlying innovation and continuity in design choices. Additionally it demonstrates how a software development organisation learns from its design processes and how this influences successive design. As with the first case study game the external influences of the market 'crash' are noted.

Chapter 9: Discussion

The discussion aims to compare the creation of the case study games concurrently and to simplify the complex process into three stages. This serves to 'map' out the 'multi-directional' aspects of the game's choices and explore the implications for the decisions made and not made. This is done with reference to other interviews made with game developers to give breadth to the discussion and to illuminate emerging themes.

Chapter 10: Conclusion

The conclusion summarises the findings with reference to the initial objectives made at the start of the thesis, (see 1.1.2). Subsequently the implications of the findings are outlined with references made in relation to the issues raised in the theoretical chapter (chapter 3). Weaknesses in the research and the potential for further work end the chapter.

2 Identifying a Topic of Study: The Niche in the Literature.

2.1 Part I: Introduction

2.1.1 Overview

The aim of this section is to provide an overview of how the academic literature has approached the phenomenon of video games and to offer some critical evaluation of these approaches. The outcome of this demonstrates an awareness of the importance of the video game's rapid diffusion into culture and various implications of this diffusion, and also illustrates very little academic awareness of the intentional activities of agents producing games. Therefore attention to the creation of computer games is necessary to complement the literature. Section (2.2) covers some preliminary observations made about the industry and problems associated with the making of games that helped to give the thesis a focus for analysis. Section (2.2.3) finishes the chapter by explaining why the design studies literature was not explicitly used in the research.

2.1.2 Video Games are an Environmental Issue - A Thematic Insight to the Literature

The key theme running through out the literature about video games that emerged to become a focus of attention for academics in the early 1980s, is the notion of games being an environment. The environment is seen on different levels: one in which the game immerses players during the play process; one in which games are electronic media, part of the environment of youth culture leisure; and thirdly games represent an environment in the sense that they combine economic and global media forms for the player to interact with. Writers in the literature do sometimes deal with all of these issues simultaneously or engage with them discreetly. The spread of the theoretical insights into video games range from child psychology, cognitive psychology, cultural studies, post-modernism, sociology, literary studies and media studies. Within these fields the focus of the video game is sometimes direct - i.e. considering what is in the game's content. Or the research questions are concerned with influences on the player "*what do video games do to players?*" (Myers 1990b, p.17), player's motivations, or with demographics identifying who plays video games. Therefore the issue of the research is always around the *games* content as a play environment or implications for the *player* being involved with it, either in their direct interaction or in their post-play consequences for players.

2.1.3 The Basis for Concern

Part of the initial concern of the research literature that questions the issue of the emergence of video games and their impacts on society is initiated by broader concerns with the role of technology in society. A secondary issue is that of the role of children and the value and nature of their play and the role of games' as they increasingly become economic and technological commodities. This type of approach places the issue of the environment as a 'space' that is being 'invaded' by technology and deals with man - machine issues from a humanist perspective that criticises technology change for its de-humanising effects.

Writers note how games are a central part of human societies and serve a function in their survival and maintain social order (Sutton-Smith 1986, Aveden 1982, Ellul 1990). With the impact of technology and commodity production of capitalism, the influence of games has had an individualising function that changes the role of game playing. In Ellul's case this has negative implications for society; while for Sutton-Smith and Aveden, it is relatively neutral and reported as an evolutionary trend. This impact of technology on game-playing and society describes the interaction of technology and society in a one-dimensional view with one influencing the other. The conclusion of Sutton-Smith's (1986) insights is that the computer is a modern day toy, it is a post-enlightenment development of 'orthodox' toys that seeks to model its environment. Historically toys served to model some aspect of the world and since the period of 1550 to 1770 they reflected the insight that the universe was an ordered rational structure operating under god inspired laws like a machine or like 'clockwork'. Toys reflected man's power over nature as well as modelling it. The computer is seen by Sutton-Smith as the ultimate toy as it is a self regulating machine that operates autonomously for solitary use for the player to tinker with, speed up, slow down or turn off. Yet also, the computer is 'a game' because the rule driven nature of the game's software enables it to engage the user in play but in a solitary context. The societal role for the use of games in all societies relates to their ability to reduce anxiety, and the contemporary use of computer games in modern culture is to reduce the anxiety society has about machines. In playing these games the defeat of the computer and human mastery is the central rationale of the programme's or machine's operation and this serves to reduce human anxiety.

More critical accounts concerning the impact of the technology on games such as Ellul (1990) cite the computer as a socially divisive influence upon the social aspect of play that is symptomatic of the relations between technology and society. For example (p.364):

"How many people have I seen in a trance, unaware of what is happening around them, unable to tolerate a human presence that breaks the concentration of their relation to things! The computer is not a companion: it is a vampire...[creating]... obsessed and impassioned mentality of the players, hypnotised by the games ... What time do they have for friendships or for social relations that are true relations?"

This critical theme relates to the literature's second area of concern regarding the issue of the child and youth 'environments' which are often termed as "electronic environments" (e.g. Ellis 1983, Provenzo 1991, Gill 1996). Here the impact of communications media such as TV, radio, personal stereos, pop music, Virtual Reality, video games, and videos are part of the 'information revolution' that are open to access in contemporary children's worlds. Much of this interest mirrors the impact of TV upon children that concerned other researchers but in relation to play. Specifically video games are targeted for attention for their distortion of a form of culture that should be ideally free from undesirable influences. For example Stutz's (1996) account of the impact of video games on play is noted as a spatial issue that sees traditional play environments transformed. Where once spontaneous play occurred, (ibid., p.60)

"... in streets and open spaces, in the garden, the farmyard, by the village pond and the playground ; wherever children had the space to pursue the kind of life that was their own".

In this type of critical account, the impact of video games, as examples of the electronic environment, creates a situation whereby these media effectively serve to colonise children's culture. The consequence is a transformation of their space and time and their pattern of development. Therefore, previously 'free' and spontaneously motivated playful activities that were open to children as part of their child culture are being 'invaded' or substituted with electronic media. The skills used in typical playground activities are described by Stutz as disappearing with her reference to Opie's (1994) study of the decline of traditional forms of play in the playground, such as, hop-scotch and marbles. This creates a situation where the rise of boredom is encountered where "*children ... no longer know how to occupy themselves*" (ibid., p.60). The replacement of "*real play*" or the "*disappearance of play*" (ibid., p.70) that is authentic and places the child in touch with nature and the 'real' environment is exacerbated by what Stutz calls "*saturation entertainment*" (ibid., p.62) whereby there exists commercialised penetration of the child's environment by media industries. This creates a demise of spontaneity and child directed decision making over play and it becomes pre-decided or pre-designed and commodified for sale. As is noted in the next section, the content of the play environment is seen as prescribed and non-spontaneous and a largely violent play environment. This aspect is very similar to Provenzo's (1991) account of the decline of the social aspect of games and their 'need' to be autonomous and less rule driven. The typical theme in this type of account (Dawson 1990, Provenzo 1991, Flemming 1996, Bing 1982) is the call for the place of games and playthings and their designs to be critically reconsidered for a 'better' use:

(Stutz 1996, p.69) "*... the situation might be reversed if the relevant parts of the entertainment industry, the planners and designers, changed from offering passivity on part of the player, and death as the motivating force of the game, to a mould breaking and fresh kind of game in which the players were set a variety of creative and life-affirming tasks, preferably away from the screen*".

These critical accounts according to Ellis (1983, p.3) share the motivation in their analysis of examining how far childhood and youth values are deviating away from adult or societal norms and values.

One response to this type of critical account of the impacts of video games on children is that it is in itself ideologically constructed, (Jenkins 1993). The implications of this is to construct a middle class, pre-capitalist romantic vision of childhood as being something 'pure' and 'innocent' that should be above any influence of culture or society in which it is inevitably situated. The creation of some kind of "*golden age*" (ibid., p.63), of critical accounts of media play and playing, is unable to explain the inevitability of influence of other media story lines or narratives in popular culture rather than 'high culture' and does not account for differences in class, race or gender upon the construction of childhood experiences and identity.

2.1.4 What is Inside the Environment?

The extension of the environmental theme here acts as a second area of research concern. This seeks to explain how academics have examined the actual content of the medium penetrated the 'real' environment of the child's leisure space and time. The aim of the academic research here is the description of the content and the degrees of freedom the player has in interacting with it in play. Again, there are some pessimist and optimist accounts here that account for the game's logic. The recurring theme in

the research is the description of the game design as an environment or 'world' and its rule driven nature of the design regulating play. Points of divergence are the implications for the player's interaction with the 'world' in the play process.

The use of the term 'world' to describe the software driven game environment has been used with reference to video games and is largely derived from the work of Papert (1980) and the educational uses of computers. He used the term 'micro-world' to denote the child's cognitive learning process in interacting with a graphical programming environment. (Papert (1980) and Malone (1981) are examples of the psychological study of games that examine the cognitive motivation they provide for players. They are neutral to the ideological implications of the meaning of the content). The term has had wider use with regard to games such as Turkel (1984) and Provenzo's (1991) description of games' environments. The spatial concept has also been used in relation to virtual reality with the description of 'virtual worlds' (Reid 1995), 'cyberspace' metaphors and in communications' metaphors such as the 'information super highway'. In relation to games and play, Provenzo (1991, p.30) notes how both media theorist Marshal McLuhan and child psychologist B.Bettleheim - (with his metaphor of play-space or '*speilraum*') - have placed analytical importance on games as 'environments' and what this symbolises.

Within these 'micro-worlds' critics such as Stutz (1996), Provenzo (1991) and Gottschalk (1995) draw on Turkel's (1984) insights that the 'micro-world' of the computer game is a rule driven one. Inside the micro-world the player is seen to submit to the programmers pre-coded scheme. This can inhibit player autonomy and criticisms on ethical grounds are consequently made by some writers.

For example, Turkel (1984) in Gottschalk (1995, p.13)

'Unlike the real world, the game universe always conforms to rules. There is violence, murder, and theft, but the rules for what can happen and how to handle it are precise ... Their constraints are those imposed by rule systems, not by physical reality or moral considerations'

Turkel (1984) in Provenzo (1991, p.22, p.34).

"When you play a video game you enter into the world of the programmers who made it...working out your game strategy involves a process of deciphering the logic of the game, of understanding the intent of the game's designer, of achieving a 'meeting of minds' with program. The video games reflect the computer within their animated graphics, in the rhythm they impose, in the kind of strategic thinking they require"

The operations of the game then are noted to be programmer induced - but the programmer's explicit motivations are never examined as the product of an active intentional designer in this critical literature. Rather they are taken as a given, existing aside from the intentions and meanings of the designer or programmer who made the game. Additionally, it is noted that the micro-world uses violence as part of its internal mechanism of rules and this issue has been noted frequently in content analysis that seeks to account for the game's operations in their play objectives, (Toles 1985, Provenzo 1991, Gottschalk 1995). Here the use of violence is seen to be an optimum strategy in the game's design for 'winning' or finishing. Further the role of women, their absence or passivity, is another example of how games serve in Provenzo's analysis to select and amplify aspects of a society's sexist or violent culture and include them in the game's formal structure. The objects of selection and amplification in computer games are seen as undesirable because they do not allow

players choices when they interact with it and this subverts the cathartic aspects of play that are essential in 'normal' child development.

An additional concern in the literature is the role of identification in the game's mechanism. This implies that the player uses the game's character to represent themselves in the game and this is why the games exert a 'holding power' over the player producing what Turkel called the player's '*altered state*' or '*second self*', (Provenzo 1991, p. 22). The issue of the bonding that the games create with players has been noted widely in the literature, (Myers 1992, Freidman 1995, Gottschalk 1995), and illustrates how the deciphering of the game's rules can induce a 'flow' or Zen like activity for the player where total concentration occurs and the sensation of 'time flying by' occurs. This issue has been taken up beyond a simplistic symptom of addiction or trivial diversion as in Ellul (1990) above, but rather seen in post-modern terms as redefining the user's self in combination with the machine as Freidman (1995) saw similar to Haraway's (1991) 'Cyborg'. Here the implication of post-modern culture and man-machine interaction is the provision of environments which create a shift in the boundaries between man and machine identities and definitions of the self. This "*losing oneself*" is part of the pleasure experience of game-playing (Fisk 1989b, p.93) and here it represents not imprisonment in the game world but rather escape from attempts at economic control by content suppliers seeking to control pleasure in commodities. For instance prolonging play for as long as possible in an arcade is an active form of resistance against the game's attempts to maximise revenue. (This relationships between design and the wider economic structure is covered in section 2.1.5).

The theme of identification and space has been taken up by Skirrow (1986) in a feminist - Freudian account of how games 'work' on the player by immersing the user in a womb like environment that the game subconsciously symbolises. This is reflected in the content of many games involving a quest for the player to journey through. The desire to keep playing and journeying through the hostile environment has the player use technology to penetrate and combat the environment. The repetitive structure of video games is conducive to resolving the male's subconscious anxieties rather than the female's, which is seen by Skirrow as explaining why games are a male hobby.

The attempt to extend the concept of games as environments by Friedman (1995) and Fuller and Jenkins (1995) explains that the activity of game playing combines the player and the game - not through character identification - but immersion in a process in the former case and through navigation of space in Fuller and Jenkin's account. Here games are seen by Freidman as simulations of a process such as in *SimCity* where the complexity of the town's development over time draws the player into interaction with a *structure* that they identify with, not with the role of mayor.

For example, Freidman (1995, p.86):

"Playing a simulation means becoming engrossed in a systemic logic that connects a myriad array of causes and effects. The simulation acts as a kind of map - in - time, visually and viscerally (as the player internalises the game's logic) demonstrating the repercussions and interrelatedness of many different social decisions. Escaping the prison-house of language that seems so inadequate for holding together the disparate strands that construct post modern subjectivity, computer simulations provide a radically new quasi-narrative form through which to communicate structures of interconnection".

This work by Friedman is relatively unique because it deals with a specific genre of game, a simulation, and this brings us an awareness of types of game - it is not a uniform technology. These types of games or 'genres', Myers (1990b) argues, serve to define the meaning or uses to which computers are put because they define the nature of user - machine interaction.

Again on the issue of the nature of analysing the user in the process of play, Fuller and Jenkins (1995) note that the character in games, like Mario in Nintendo's *Super Mario World*, merely acts in the same way as a computer cursor and is just a point of reference for the player's explorations in the game's environment. The attraction of playing games relates to the role playing that puts the player in a similar situation as a colonist mapping out spaces (or territories). The movement in space is the point of the game, its plot or 'narrative' structure serves to legitimate and this exploring/conquering the 'playground' environment is a typical repetitive theme of games. The spatial exploration in the game's stories and play structure mirrors many historical societies colonisation of spaces and the authors suggest that the aspect may be linked to wider ideologies of global expansion in reverse media imperialism, in terms of the flow of cultural and economic goods from Japan to the West.

These accounts from authors attend to the content of the games either in their structure as in textual analysis or with passing references to wider ideological influences. The next section seeks to cover works that make an explicit attempt to link these themes of design, production and use.

2.1.5 Game Design and Use: Coupling Production with Consumption

Here the environmental issue of games design and use is stretched by writers to account for a "*media scape*", Gottschalk (1995, p.11). This is part of a globalised media production scheme that mixes and recycles its symbolic content across media from films, books, comics TV and games for consumption. This process has been noted in the analysis of toys, (Dawson 1990) and children's TV, (Klein 1993, 1995). The attention here is on video games as part of the media production strategy and places the user or player as part of the economic consumption process. These accounts therefore go beyond noting how capitalist development, technology change, industrial development, market forces and commodification changes children's hobbies and playthings, as in for example Butsch's account of model aeroplanes (1984) because of their attention to the role of the mass media.

Critical academic accounts of the complexity of the global commodified nature of video game production and consumption see games as part of exploitative relations in capitalist society. This is complemented with more agnostic or paradoxical accounts from those academics that analyse it as a symptom of post-modern popular culture.

The account offered by Stallybrass (1993) is a critical neo-Marxist account that seeks to explain the user's relation to the game through the working of the capitalist mode of production. This work uses insights of Frankfurt school theorists, Adorno and Benjamin, to explain the specific working of game aesthetics and their place in society. Video games are described as providing an operation very similar to cinema and share many production aims in structuring their content. The operation of game's content increasingly serves to provide a "*phantasmagoric experience of total immersion*" (ibid.,p.84), or exhibition of optical illusion similar to Chinese lantern shows in the last century. The role of video games is described as one of simulating cinema film's logic of presentation by increasing the game's "*naturalism*" (p.87) to

make the visual images more detailed and colourful. The role of the game's simulation for the user is to create a man-machine interaction in favour of the machine which produces a "tyranny of number(s)" (p.88). This situation recreates the familiar theme in the literature of the rule driven nature of computer game play, that in turn, creates a "mechanisation of the body", (p.87). The player becomes an extension of the computing machine. The reason for this is that computer play is simulating the conditions of capitalist labour, just as Adorno had described the role of hobbies in capitalist society.

Stallybrass (1993, p.96):

"Play takes the form of labour in which the exploration of highly complex spaces involves repeated sequences of simple actions...games punish failure by constantly pushing the player back to the start. As in work the effect of this endless iteration is dulling...[a]... simulacrum of the sweatshop".

Stallybrass tries to account for the actual play process rather than just the symbolic characters inside it, which like Fuller and Jenkins (1995) account, is unusual in this literature. However, here it is linked to the workings of the capitalist economy. The decline of the player's agency mirrors that of the work environment. Stallybrass extends this to account for the fact that increasingly in a post-industrial context the convergence of computing in the spaces of work and household leisure are united by the diffusion of the computer. The Microsoft 'Windows' environment of the work computer replaces the industrial activities of operating machines and the operations of the game make the player work through a simulation of the declining manufacturing labour in the 'real' post-modern world.

Beyond analysing the game's operation, the wider context of consumption managed by the economic processes is attended to and demonstrates how "consumer fashion culture" (p.101) operates by creating both a 'desire' for new goods while also structuring an amnesia of the goods that sustains their consumption:

"As the boundaries of illusion are pushed back, and players' expectations follow suit, games very quickly become obsolete. Yesterday's state-of-the-art games are unplayable today, for the act of imagination and involvement necessary for playing is intimately tied to the state of the technology at any particular moment. Constant amazement at the predictable improvement of hardware and software keeps players engaged".

Therefore both aspects of time and space are involved in the consumption processes of playing and buying games in the commodified nature of consumption.

This pessimistic account takes a passive view of the video game playing subject and the role of video games. Researchers applying insights from cultural studies have questioned this position.

The accounts that use insights from cultural studies to provide insights for video games playing - as above - situates the game and the player as part of a process originating from production of firms that operate in competitive markets. However, the player is not at the end of a uni-directional flow of goods and products, passively consuming them. They are involved in a dialogue that to some degree offers scope for 'resistance' against the producer's intentional strategies and scope for creating new meaning around the products that cannot be controlled at the production level. This type of analysis was proposed for application to video games by Panelas (1983), who notes that both the logic of consumption and production needed accounting for, in

order to appreciate their interplay and to see them as non-discrete processes involving complex interaction. The issue here is to avoid seeing the provision of these technologies and their adoption and diffusion as an inevitable exploitation of industry aims but one involving a dialogue between providers and users with different powers over certain resources.

Panelas (1983, p.54):

“The relationship between producers and consumers of culture is a continuing interchange in which each side enacts conscious and unconscious strategies of resistance to the other. To understand the nature of this reciprocity in all its contingencies, the interests and practices of both sides will be examined in some detail”.

Panelas’ aim then was to examine *“the motivations, practical interests, and behaviour of the suppliers and consumers of these products”*, (ibid., p.53). The video games industry has power over providing the *“symbolic raw material”* (ibid., p.52) that forms part of the cultural artefacts that constitute the technology around this leisure activity. The strategy of the marketing of the games is to reduce the uncertainty around the release of a product and to try and create consumer awareness and manipulate buyers’ tastes to encourage its purchase. The uncertainty of a product’s success is the key to why producer aims are not automatically successful and is the site of where resistance can occur and is a theme which Fisk (1989a) notes in the production and consumption of popular culture. In video games this uncertainty is similar to pop records, films and TV programmes and the need for ‘hits’ is sought by producers operating in a competitive market place. Games must therefore be differentiated from one another in a crowded market. One tactic that producers use and is taken up by Panelas (1983), Kinder (1991) and Gottschalk (1995) is that of the cross diffusion of media content from films and TV into games, which aims to popularise games by use of licences to diffuse games to a known market sector.

Panelas then goes on to argue that peer groups, or social networks or *“consumption communities”* (1983, p.59), within which these games are used need to be understood. Consequently he calls for research into the *“natural history of the video game as being an attractive project of study”* (p.63). The use of games then, gives an insight into the social determination of the technology’s adoption, use and meanings. An account that examined the consumption of games would examine the social organisation of the video games and account for the basis of their attraction whether it is imposed or taken from within the artefact or created socially in a meaningful context that exists independently of the machine.

In line with the examination of players meaningful experiences of consuming these game’s, work by Gailey (1993) and Cunningham (1995) tried to account for the player as a critical agent engaging with the commodified cultural artefacts that the above critical accounts had chastised. Gailey’s (1993) work attempts to account for how the game’s content is mediated or ‘resisted’ by players who do not necessarily consume the ‘sexist’ or ‘violent’ encoded messages in the games uncritically or passively. The research had similar aims to ‘modern’ cultural studies research into audience reception of media messages that examined how meanings are constructed - e.g. Morley (1980), but here what is unique is that the audience are children and not adults and the research is about video games not TV broadcast media. The findings here, as in other research of this persuasion, tied the child’s interpretation of the

games to the child's competencies and resources that are derived from their environment and their backgrounds. Therefore the child's critical abilities and interpretation of the game's content were dependent on class, culture, community and prior expectations. A degree of uniformity existed in the child's video game playing experience through "*empowerment*" according to Gailey (1993, p.93). This meant that children altered the game's meanings to suit their needs and this illustrates the theoretical point that capitalist processes provide a degree of uniformity in the violent and sexist imagery they provide but this is decoded in the consumption process in a fragmentary or non-uniform way.

In the analysis of consumption, Cunningham's (1995) account of tentative examination of girls' use of video games noted, despite the gendered nature of the game's content, that this in no way predetermined their orientation to the 'sexist' content of games. This raises the issue of gender essentialism for researchers assuming that gender orientation to technology is an uncomplicated inevitable outcome of the invisible hand of 'patriarchal' processes. The danger according to Cunningham of researchers ignoring girls' play with these technologies is to assume that computers are "*boy's technologies*" (1995, p.199) and to make "*invisible*" girls' actual consumption processes of games' cultures which is also becoming a public culture as the game playing technology becomes increasingly popular and more widely available. Cunningham's last point raises the issue that most of the research into video games that predated the boom of the Sega's and Nintendo machines of the late 80s and early 90s. It cannot account for changes in the medium's development or deployment.

The following account seeks to combine consumption contexts with production. The work by Kinder (1991) is an ambitious attempt to analyse how the game playing subject interacts with both the game and economic processes. In doing so the player interacts with agents in the globalised media corporations' strategies or "*super system*" in providing entertainment media that is available across video games, films and TV. Kinder's approach analyses both macro-economic events such as the shifts in US and Japanese trade and media provision as well as analysing the game's content and accounting for micro developments such as child's personality and cognitive development as these are influenced by encountering the technology in consumption in a commercial context and in a symbolic context in play. The research combines global political economics with cultural theory and with psychoanalytic and cognitive psychology. Kinder's work is motivated to a degree by the question of video games as an 'environmental issue' and her motivation for study was the observation of her own child's play and consumption of video games and children's TV as they interact with the synergistic modern media system in their play and leisure.

The work does have as one of its research questions the implications for the 'effects' of being involved with this environment as the child develops but this is dealt with in such a way that affirms both the positive and negative aspects on the child. For instance the analysis of the popular fictional characters the 'Teenage Mutant Ninja Turtles' reveals how the media 'super system' operates in its strategy by recycling its symbolic content across media formats for the child to belong to by watching the cartoon and film, playing the game and wearing the T-shirt. The system makes an environment for the child to be "*recruited into the T[eenage]M[utant]N[inja]Turtle network*" (p.132) and marketing practices put the child at the centre of this. The child learns both to identify with the process of consumption by learning to consume to become a part of the world and also learns gender identification and in this way

communications' technology operates to construct the subject. Video games are used to illuminate how computing technology has become part of this system and in her work drawing on child psychology, Kinder shows how computer games can have positive and negative consequences on the child's development.

Using insights from psychoanalytic theorists, Kinder notes how the marketing strategy of video games is compatible with the phase of child development that constitutes the medium's largest consumer base of 8 to 15 year old boys who are undergoing the 'oedipal' phase of gender identification and learning to adopt the male role. The subjects chosen for the games are based on myths conducive to this phase and serve to exclude girls, as Skirrow (1986) had noted. However, a positive aspect is noted that using insights from Vygotsky's analysis on play, video games also serve to speed up the child's cognitive development and the 'ripe' age group for this are 7 year olds who can experience an acceleration in their cognitive development. This phase of Kinder's work draws on the largely sympathetic work by Greenfield (1984) and Loftus and Loftus (1983), that posit that computer games have educational and developmental value. Using an allegory Kinder notes how games serve to skew the subject's development and bias male and consumerist values: Kinder (1991, p.119)

"...I have argued that, because of the ideological assumptions implicit in the software and marketing of cartridges, video games not only accelerate cognitive development but at the same time encourage an early accommodation to consumerist values and masculine dominance. A similar dual effect is achieved in the Teenage Mutant Ninja Turtle myth, where 'glowing ooze' accelerates the physical growth and cognitive development of Splinter the rat and the four baby Turtles and simultaneously bonds them as father and sons, master and disciples, in a clan of pizza loving ninjas".

The arguments for the co-ordinated work proposed by Panelas (1983) have therefore been followed by some attempts to link both production and consumption practices but with most exceptions these do not look at the actual process of the game's design choices and aims but rather 'black boxes' them. Accounts of the producer's aims in providing games are usually defined as being a predefined coherent media logic, synergy or strategy and this carries a risk of creating too rational a view of production without accounting for internal conflicts from producers. This aspect of human agency in media production is attended to in section (3.4.5.). Conversely the accounting of the logic of consumers in the popular cultural accounts such as in Fisk (1989a,b) may over-rationalise the user's 'resistance' strategies and not examine where consensus co-exists in relation to producer strategies.

2.1.6 Accounting for the Design of Games

Research in the 1980s noted that games are made by intentional individual agents operating in commercial contexts. This is not the sole focus of the researcher's analysis, rather design is treated as a sub-section of the research aims.

One piece of work by a sociology professor, Sudnow (1983) in 'Pilgrim in a Micro World', attempted to decode the game's operations and rule structure through the inductive play process and link it to the original designers. He went to the producer firm Atari to seek out the programmers of the game to elicit how the rules were intentionally designed.

Sudnow's interviews showed the practical limitations in obtaining interviews with designers in these media organisations, in terms of their movement between firms and

their memories. The original designer of the game had left the firm and the remaining programmer who had worked on a sequel of the game had noted from memory that the game had certain rules influencing how the games bat and ball worked. Even when the original programmer was located at a new firm he too had struggled to remember key details of the game's operation and Sudnow noted that at the firm the game had only received limited attention from the organisation. This was because the firm's attention was always displaced by the next 'new' game. The insights that were gleaned from this did reveal that the game was programmed and therefore:

"Atari provided a grid, an object with fixed properties, no more an opponent than my piano", (p.104).

The remaining insights into the operation of the game had revealed that the game's operations were linked to its economic context i.e. its derivation from a coin-operated arcade machine and therefore 'good play'. The game also mirrored a form of player learning that drew in a supply of money on repeat play. This hermeneutic process of understanding an artefact's meaning by tracing its origins and theorising about its meaning is an interesting one worth mentioning, but the style of the book is idiosyncratic in use of American which suggests that it was more populist in appeal than a formally planned piece of academic research. The approach however, is worthy of repetition and this research does invert Sudnow's approach by interviewing designers first and then examining the game's content.

Difanti's (1984) paper about coin-operated arcade games also examined the ideas structuring game's designs and elicited some intentional aims of the designers in determining the game's rules in order to create 'an entertaining game' that was also profitable. Here emphasis was on keeping the player moving so their game's character could not stay in one place on the screen for too long and to make sure the game could not last too long before more money is put in. The paper is one of the first to acknowledge that designers experience problems in the work place and the problems facing the industry's production. It draws some comparison with television in terms of disputes with managers over quality issues and time needed to finish a game and to produce a 'hit'. Additionally the paper draws some attention to the issue of creativity and aesthetics in games by noting the number of new games that are copies of one another and the attention paid to aspects of the game's appearance.

Other research exploring games content choices include Myers' (1990a) work on game's aesthetics. This also attempted to draw attention to the designer's perspective in allocating resources to the game. However, the approach taken was an auteurist one - i.e. focusing on the motivations of the sole creative individual's aims at the exclusion of the context of creation. Myers examined secondary sources of a designer who worked at Atari and had later written about his game's designs in two books that explored the ideas and aims behind the games. His account stressed how these games from the particular designer were seen as art and were a communication from the designer to the player who was expected to decode the programmer's algorithms and understand the game's working in the play process. These were simulation-type games rather than more popular action based ones. The account addresses games that were written in the early to mid-1980s and did not examine the negotiated or political nature of the design process that may have mediated the game's content choices.

Where the context of game's design has been accounted for is in Haddon's (1988a,b) analysis on the historical roots of the home microcomputer in the UK. This noted how the motivation for the design of the original games by programmers occurred in an

educational context in the early 1960s. Games were examples of programmes that were used to explore the machine's capabilities, learn about programming itself and demonstrate the programmer's skills. This led to two divergent applications for games: one in the domestic sphere as an extension to television programming providing an alternative use for the television; and secondly as a coin-operated machine in a commercial alternative to pinball in a public setting of bars and clubs. The rise of the home microcomputer in the late 1970s and early 1980s saw it as a technology seeking a legitimate application in the domestic sphere. Games were seen as a possible application for the hardware amongst other applications, such as finance management and word processing and learning about programming. These 'preferred' images were promoted by firms, such as Commodore and Sinclair, who were reluctant to directly position their machines as game playing technologies for fear of it being a 'fad'.

Part of Haddon's research for his thesis went beyond analysis of secondary sources accounting for the historical emergence of games to incorporate interview data of the experiences of personnel in domestic software houses who began supporting the home micro with games' software in the UK. Here the motivation for production noted a shift away from a hobbyist mode of games production, producing games for their own intrinsic value, to one of an emerging industry that commodified games in synchronisation with productive operations similar to other cultural industries such as pop music. The cultural meanings around the home micro that were conducive to it becoming a de facto games machine for males were the compatibility of the influence of coin-operated arcade games that were used as design models for the initial home micro games' designs.

In the analysis of the emergence of games as a catalyst for diffusing and defining the meaning of the home micro, Haddon's work could not focus exclusively on the content of games and the specifics involved in their configuration. The research did attempt to link the production process with the consumption process made some effort to account for the historical nature of games' design motivation.

However, the general theme running through the academic accounts of computer games has been the absence of sustained analysis of the intentional design choices and their contexts of creation that actually account for their construction and apply this to games. The need to analyse the creation process does not automatically mean that the accounts that deal with the 'effects' of games or the meaning of their content are 'wrong' per se but that they can legitimately be complemented by analysis that focuses on its content. This line of argument is part of MacKenzie and Wajcman's (1985) need for applying a 'social shaping of technology' approach to researching the design process of technology *before* they enter public use. This line of argument and its implications for the thesis's approach is analysed in chapter (3). The next section of this chapter deals with insights from designers into the design process that were derived from magazines and some initial meetings with designers at a trade show. These provide some ideas about what could be expected in examining the contexts of constructing game design and these were useful in absence of any sustained academic literature.

2.2 Part II: Identifying a topic of study

2.2.1 Some Initial Motivations and Insights

In connection with identifying a 'gap' in the literature about game's design some initial exploratory work was performed. This involved scanning articles in magazines about the development of games and some note taking at a developers' conference and 'hanging out' and talking to developers at an industry trade show at the London Business Design Centre Islington. These served a similar function to Shotton's (1989) initial reading of press accounts and initial informal interviews with computer studies' teachers and care agencies about the possibility of the existence of 'computer addiction' and the viability of research in the area. Here the initial work made clear that there was an issue regarding game's design that merited concern and further study. Additionally it served as a motivation to direct the thesis's focus on the substantive issue of the creation of games rather than users' consumption processes.

The initial investigations had revealed that the making of games was problematic in respect to various issues of 'change'. This related to a lack of content change or innovation in games design to a perceived lack of creativity in games software and the lack of critical questioning of the game's designs content choices. This perceived lack of change in game's design was related, paradoxically, to sources of change and ensuing uncertainty in the impact of technology change in hardware upon software, problems in implementing games; the influence of hardware firms in the console sector on game's design, the conservatism of publishers and distributors and retailers regarding the risks entailed in choosing innovative designs.

These initial investigations seemed to suggest that game content choices was influenced by technical and institutional factors that interrelated to give rise to perceived 'problems' in the designing of games. The main themes and arguments underlying these are spelt out below and gave an ad hoc 'map' or 'web' of heterogeneous concerns that were mentioned regarding games' design content. (Appendix (A.1) gives details of this). These issues were largely derived around the period of 1993 to 1994 and reflect the nature of debates and issues of technical and institutional structure that applied at that time frame in the industry. The themes and issues raised are derived from disparate sources relating to the emergence of multi-media, the design of interfaces, the development of software standards, the creation of software tools and the criticisms of the market's operations. This period was marked mainly by the advent of technology change with 'next generation' machines that were using more powerful 32-bit processors and the rise of CD media as well as the influence of Sega, Nintendo and then Sony's entry into the hardware market.

2.2.2 Game Design Values. Questioning the Aesthetics of Games.

One issue raised was the questioning of game content choices and this made it clear that industry actors were not in agreement about what games should be. The sources underlying the questing of games content related to various issues.

One theme in a conference seminar entitled 'Games for the masses', (see appendix (A.1) for details of speakers), related to the need to mimic other film and audio markets to increase the appeal of games to adult audiences. This example occurred in three sessions at the Develop '94 conference with the emergence of Philips's multi-media machine the CD-i (interactive) and the strategy of designing multi-media game titles that were to incorporate video material. The designs of two titles *Voyeur* and

Burn-Cycle were cited as examples of how the design had aimed to incorporate conventions familiar to audiences from both the games' and the film and science fiction market. It was felt that if video games were to grow into a mass market for adults rather than as a toy market, the design of games would have to take into account players' life styles. So for example, games should offer play patterns lasting for just two or three hours for adult users after coming home from work, rather than sixty hours of play suitable for dedicated enthusiasts

Other examples related to the questioning of game content included the role of games as providing 'fun' rather than 'entertainment', which limited their competition and chance of widening their appeal similar to that of films. According to one seminar, games could provide a form of artistic communication if the design values moved away from focusing on graphics and sound, (Crawford, 'The Machine or the Message?', see appendix (A.1) for speaker details). The example given here is that the advances in hardware technology should not be seen as an end in themselves providing graphical innovation but should be software-led with attention given to characters and narrative, similar to 'Hollywood'. Another problematic issue touched on in the conference was the player's role in design and was mentioned in regards to the design of interactive sound. In one seminar the speaker questioned the nature of the player's actions in the game and the validity of their influence on the games sound and music in a game. The issue at stake here was to see them as being the reserve of the skilled musician or delegated to the potentially unskilled, unmusical user, (Sanger, 'Music and Emotion: The Heart of Interaction', see appendix (A.1) for speaker details).

These types of examples also related design issues to **market issues**, and **institutional issues** that saw game design as possibly being 'creatively stifled' and experiencing resistance to design changes and innovation. For example regarding the market and its growth, game design was considered as 'a problem' if it was to be seen as less of a toy and to match the revenue of other entertainment media in the above accounts. Alternatively the **audience** was seen to be 'a problem' with a lack of critical ability or following games as a fashion and being manipulated by industry forces. In regard to institutional issues, there was criticism of a lack of innovation in games design that was directed against conservative content decisions by publishers and distributors in Crawford's account and mentioned in magazine interviews with two designers, (Edge Magazine 1994a; 1994c). In relation to this issue of concerns over influence on the design of games, one key theme related to Sega and Nintendo's institutionalised scrutiny of game concepts for approval that related to its hardware design. This issue of '**open and closed hardware architectures**' had re-occurred and highlighted awareness of the mode of software creation, for these Japanese consoles were seen by some to influence the design of games.

One typical expression of this theme is given in an article in a development magazine that questioned the issue of censorship in game design that formed part of the licence requirements to publish a game compatible with the Nintendo hardware system standards:

"Many designers believe [that the content censorship and approval process] goes further in hindering quality, rather than creating a climate for excellence. The restrictions are quite extensive and many unenforceable, because they are wholly subjective. Censorship is always a slippery slope to entertainment, no matter what form it takes. Obviously Nintendo had a right to grant selective licenses to access its

patented technology. American and European designers complain, they are being stifled, and products are becoming bland and repetitive; soon the best designs won't be accepted or must be modified to the point of indifference by the consumer".

(Stevens and Thomas 1992, p. not applicable)

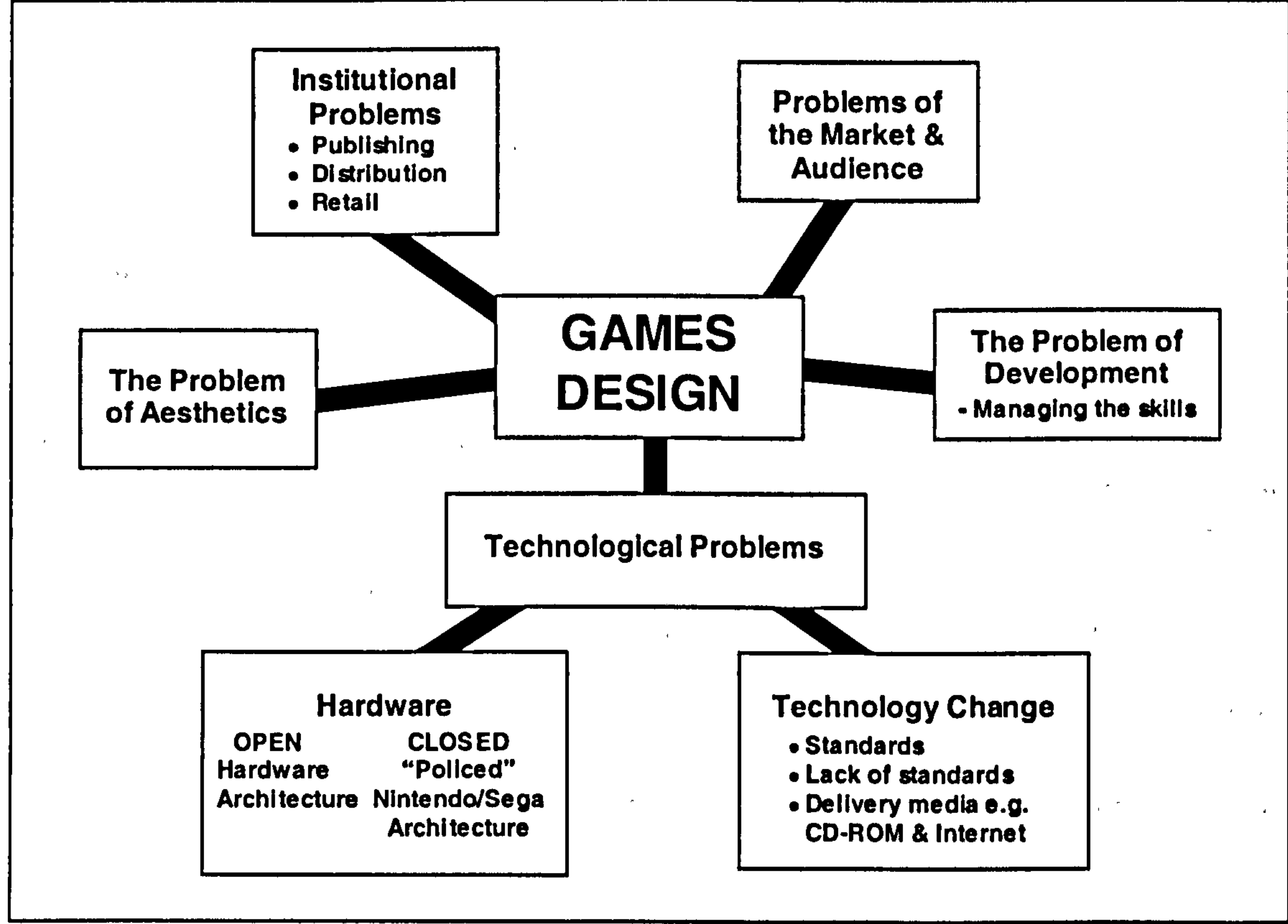
Here the issue is that design-vetting by console hardware manufacturers may influence the rate of innovation and that open hardware systems such as home computers like the Amiga or IBM PC have designs that are more creative or experimental. Given the widespread diffusion of the Sega and Nintendo hardware and the influence of this, one of the sub-objectives for the thesis was to explore the influence of the console manufacturer's software licensing policy upon game design practice and this is extrapolated in chapter (5) regarding industry structure.

This argument tied in the institutional arrangements relating to hardware design, and the issue of **technical change** which was another theme that was referred to in relation to its influence on software. Specific aspects of technology change in the industry that were seen as relevant were changes in delivery medium with the rise of CD and internet and network connection; the change in processor based technology with new hardware platforms using 32-bit processors. These changes were seen as providing both opportunities and problems for software development. The 'problem' of the increase in games platforms for computers was seen as providing software houses with a dilemma over which machine to target their games designs at as there were no compatible **hardware standards**. The problems associated with this were that it fragmented the possible target audience who could only play the games designed for that specific machine and the firm could not maximise its possible revenue. Additionally the design of games would have to be configured in such a way that they could be translated or ported from one machine to another and the use of the 'C' programming language was seen to be a viable route to aiding this. This would mean that the idiosyncrasies of the game designs might not be totally optimised for a single machine. However, this was seen as a strategy that was useful while waiting for a hardware platform to dominate the market eventually. Another associated issue with technology change was the time needed to learn new software skills with which to program the hardware and this was described as creating a 'lag' while the games were designed that could demonstrate an advantage over present designs.

Another aspect of technology change noted repeatedly was that of **delivery media** such as the Internet and CD-ROM media. These were seen as technological developments that would transform game design. This related to issues of their storage capacity and availability. The rise of multi-media and the scope for mixing different forms of print, audio and visual media was seen as creating a possible change in the nature of software **labour issues** and the issue of teams needing to write more complex and larger games was raised. The networking of games was seen as a way of changing the nature of playing for the user in that they could take part in multi-player games and use a pay-per-use method of play which could influence design practice. (See appendix (A.1) 'Platform Panic!' panel session for details of seminar speakers).

The basic illustrations of these themes, (summarised in fig. 2.1), gave some insight into what issues faced designers in the construction of games. This gave some evidence for there being ‘problems’ and disputes that would impinge upon the study of actual designing games that took into account design choices as well as its context. As will be explained in section (3.4.3), the existence of problems surrounding a technological artefact is conducive to the researcher using the social constructivist approach to technology design, as it provides a demonstration of ‘problems’ or ‘interpretative flexibility’ which illuminate the dimensions upon which the technology is shaped by social influences.

Figure 2.1: A Web of Problems



2.2.3 The Exclusion of the Design Studies Literature

The above sections of this chapter have explained the motivations to examining the making or ‘design’ of games in order to understand what content is included in their design. The next chapter was used as the main basis of exploring how information and communication technology and entertainment media are constructed. One body of literature that was not systematically examined was that of design studies. This was motivated to trade off time and resources with the need to explore other literatures. Secondly, the decision was made in view of the attempt to limit the thesis’ focus directly onto the primary object of analysis – the video game’s content. Borrowing

from entertainment media and construction of technology literature was compatible with this focus.

It was felt that, given the formation of the research emphasis on video games as artefacts that constituted an 'environmental issue', in (2.1), the design studies literature was not *vital* in this examination. At the risk of oversimplification, this literature seemed to be more focused on the examination of design *processes* for their own sake. It was felt design studies seemed to be concerned, in general, with the process of analysing "*the way ideas arise and are realised in physical form*", Candy and Edmonds (1996, p.72). This seemed to be regardless of, or neutral to, the artefact's nature and was at the expense of analysing *primarily* the artefact's construction and the implications of its constitution. For example, some case studies in the journal *Design Studies* seemed to provide evidence of the creation of artefacts in order to reveal understanding primarily of: creative thinking, problem solving, personality and motivation e.g. Cross and Cross (1996). The creation of a racing bike revealed how computers can aid creative design, Candy and Edmonds (1996) and Goldschmidt (1995) examined the productivity of a solo designer versus a design team. These types of study are cited to note how the qualitative changes to the artefact, and its wider implications, are *not* the major issue for the researcher here in this study. The implications of this was that if the thesis wanted to explore, for example, 'how games are designed', or 'how (game) designers think', in order to reveal an understanding of the process of design for its own sake to contribute to the knowledge design of artefacts *per se*, then this literature would have been of greater value. Rather, the thesis was intended to reveal what *content* was included in the game and what happened to the game *before* it reached the home. This aim seemed compatible with the literatures in the next chapter.

It is worth noting that the design studies literature mainly dealt with utilitarian artefacts rather than entertainment artefacts or entertainment software. With the diversification of high technology and entertainment firms such as Sony, Disney, and Philips into video games and the talk of 'convergence' of media forms and technologies the use of the cited literature in chapter (3) seemed appropriate. It was noted that there were similar concerns in the design studies literature that overlapped with those in media studies and the information and communication technology and social shaping of technology studies. The concern with the 'user' or the 'audience' and 'environmental' or 'political' implications of design of artefacts, in chapter (3), were also noted in the design studies literature. For example issues of: 'user models' (Hasogan 1996) and 'participatory design' (Reich et al. 1996, Margolin 1997) and 'feedback' (Busby 1998) in design processes, all seem to have their equivalents in the media studies and information and communication literatures. Where as design studies refers to 'user models', the literature from media studies and social studies of science talked about 'audience construction' or 'typification' e.g. Turrow (1992), or the 'configuring the user' Grint and Woolgar (1997). Or the concerns with user participation and design issues were examined in the information and communication literature e.g. Cawson, Haddon and Miles (1995) and Mansel and Silverstone (1996), this seemed to be in absence of any sustained and explicit reference to concepts in the design studies literature.

Where design studies, media studies and some work in the information and communication technology literature did converge was on the use of literature from cultural studies that referred to work from post-modern authors. Work by authors such as Baudrillard, Hebdige, Barthes and Foucault were cited in the design studies

literature that explored the wider influence of culture upon the symbolic use and meaning of design styles, e.g. Forty (1986), MacKay (1995), McDermott (1992). This aspect of design which emphasised latent ideological and semiotic meanings that structure the design and style of artefacts was not used. It was not compatible with the thesis' aim of examining the explicit motives of actors and groups in their decisions about content. This point is returned to in the next chapter at the end of (3.4.3).

2.2.4 Summary:

The implications of the literature review and speculative examination of developer's accounts of game design had promoted the following provisional objectives:

- The examination of the process of game design needs to be accounted for and this account should include the designer's aims.
- To examine the impact on game design from influences of technical and institutional structures partly to see if there are 'detrimental' influences upon design choices.
- Of special reference are the relationships between console hardware manufactures such as Sega and Nintendo and the impact they have on game design again partly to see if there are 'detrimental' affects on design choices.
- The chapter finally explained why the design studies literature was not systematically used for the research.

The next chapter seeks to construct a theoretical / conceptual framework to refine the expression of the contexts surrounding technology development and seeks to explain what aspects should be focused upon for the research effort. The objectives are reiterated in the next chapter and reformed in light of the additional material covered there.

3 Theoretical Framework

3.1 The Silverstone and Haddon Model (1993a, b)

3.1.1 Introduction

This section of the thesis outlines the assumptions underlying the production of video games. It examines what should be focused on for analysis and why. It outlines the concepts that are used to make meaning and 'order' out of the complex interactions that go on in 'the real world' in the production process and to capture some of this process and to simplify and order it for representation in the analysis.

The backbone of the framework's 'skeleton' originates from (i) Silverstone and Haddon's (1993a,b) work on the multi-layered levels of the innovation process specific to the production and consumption of Information and Communication Technologies (ICTs). (ii) The work then amends the main 'spine' of the framework to sensitise it to the explicit analysis of the 'choices' made in the process of production of the technology over its 'life cycle' or 'career' and signifies the political implications of these 'choices'. These insights are derived from the field of research undertaken under the umbrella term the 'Social Shaping of Technology'. (iii) Finally, the framework draws on insights derived from work in media and cultural studies. The relevance of this field to the research is that there has been a body of analysis of entertainment production that usefully illuminates issues relevant to examining the production of video games as examples of entertainment media. The work in (i) and (ii) does not directly cover this process.

3.1.2 Background Assumptions for the Model and Critiques of Other Approaches

This section summarises the assumptions of Silverstone and Haddon's (1993a,b) model of innovation that this research draws upon. The approach used in this account stresses the need for an appreciation of the complex interplay between production processes and the consumption practices in accounting for the whole process of innovation. Such an approach needs to account for the political, economic, cultural, social and technological aspects of technology change. The approach attempts to go beyond the weakness of the literature of product innovation but does not account for the complexities involved in innovation. Additionally the approach seeks to explain innovation specifically relating to the development and diffusion of ICTs. Three types of literature were identified that presented examples of "*failures of existing approaches*" (Silverstone and Haddon, 1993a, p.9) to provide adequate explanations of the complexities and interrelationships above. What follows in the remainder of (3.1.2) is the outlining of the premises of the approach given by Silverstone and Haddon. This was taken as a 'given' or starting point for developing the premises of this research's theoretical underpinning in addition to the social shaping of technology approach outlined in (3.4.1).

Silverstone and Haddon (1993a) note that the literature of 'innovation research', 'marketing' and 'futurism' only provide partial accounts of the innovation process. The account of innovation research was noted as being motivated by post-war attempts to manage the economy with state intervention in funding science and technology and it

examined policy-relevant areas of industrial and professional technologies rather than consumer electronics. These studies used statistical analysis and case studies examining the emergence of technological developments using models such as 'product lifecycles', technological 'paradigms' and identifying technological 'trajectories' and technological 'revolutions' to help identify trends.

The criticisms levied at some of the literature in this field (ibid., 1993a, p.6), are its explanation of innovation as being motivated by actors who are overtly 'rational' in their scrutiny of their environment and technologies. This runs the risk of failing to capture the irrational social and political influences on technology development that the social studies of technology outline (see 3.4 below) and account for how technologies develop through social interactions between actors. These accounts see technology as being 'discovered' by individuals or explained in the absence of the contexts that motivated their development by pure analysis of numerical data.

The marketing literature accounts of innovation were seen by Silverstone and Haddon to mainly consider consumer behaviour and consumption, with less emphasis on work in the field of product development which covers origins of product ideas and their development, with little on technological products. The analysis of consumer motivations in this field seeks to 'typify' the consumers' motivations and propensity to consume by analysing personality traits or demographic and social-geographic trends or analysing consumers' subjective values and lifestyles in order to find predictive trends of the adoption of innovations.

The futurism literature, identified by the work of consultants and authors such as Toffler's (1980) *The Third Wave* was seen in the model as attempting to account for technological development for the future by analysing the present scenarios and trends. The problems with the approach, as with aspects of the marketing prediction of trends, is that interpretations of trends are subjective and the logic of the production of such futuristic reports seek to play up trends to maximise the impact of their findings.

The 'failures' of these approaches according to Silverstone and Haddon (1993a) are in their neglect of accounting for the social element integral to the innovation process. An account of innovation needs to span beyond the simplistic linear notion of idea holders in the firm generating products to be consumed passively by users. Rather it must be applicable to accounting wider social contexts beyond the firm. The key issue to be aware of is the social contexts that mediate innovations and products' meanings and uses. For example, the research with psychological emphasis on the individual's adoption and responses to new technology does not account for the 'negotiated' aspects of acquiring and using technologies over time once they enter the home. The negotiation of user 'needs' is often not undertaken in a 'vacuum', are meaningful to a wider cultural context in the environment of 'households' and family members who discuss them and allocate resources to acquisition and use. Further neglected are the 'networks' of use that technologies are operated within. For instance the home microcomputer is made meaningful and, hence worthy of acquisition, by the culture of users such as teenage boys that put it to use as a de facto games machine, e.g. Haddon (1988a). In this example, Silverstone and Haddon (1993a, p.9) note how the symbolism of a technology that articulates its appearance and meaning is socially constructed and can amend producer's definitions and thereby extend the researcher's boundaries of product innovation beyond traditional research. Therefore consumption processes are an important research site for innovation research.

Further neglected in the research of innovation is the attempt to gain awareness of how demand is 'constructed'. The issue here is to draw attention to how users' 'needs' and 'desires' are not necessarily pre-existing categories to which consumer goods are fitted. Conversely, the researcher's attention is alerted to how needs and desires are influenced and gain wider social currency beyond isolated individuals' preferences. Again 'needs' and 'desires' are not a-social constructs but are influenced by social and cultural values which can be mobilised to give meaning to artefacts and influence taste preferences among social groups. Such analysis is mirrored in Panales (1983) and Dawson (1990) for video games and toys, the point being that notions of 'consumer sovereignty' cannot account for demand and supply without oversimplifying the nature of demand for 'new' goods that are created *ab initio*. This also relates to the study of the telephone (De Sola Pool 1977) and microcomputers (Haddon 1988a), where the specific use and role of the products were initially ambiguous and users have to be 'persuaded of its value' (ibid., 1993a, p.11). Therefore the motivations of producers need to be accounted for.

A further inadequacy is the basis of predicting demand of new goods on present trends and analysis of current snapshots of data. The problems here are that consumer research is based on the analysis of consumers' present needs and their own future needs may be unknowable or unimaginable for research efforts. Further, the social and cultural environment changes and it is difficult to predict this once a given technology change occurs. Additionally the issue of rationality is questioned in the consumption process that sees households imposing symbolic meanings upon technologies that complement the functional dimensions of a new technology. The range of contexts of consumption in the home for configuring use and take-up of technology makes prediction difficult.

Another issue which complicates the prediction of innovation diffusion is that each technology has its own intrinsic uniqueness that differentiates it from other preceding technology's diffusion paths. For instance the TV, the radio, and the home microcomputer differ in their patterns of diffusion for historic and cultural and institutional reasons. This makes the prediction of new technologies' diffusion difficult to predict or manage. Yet, given that knowledge of the future is impossible to acquire, present trends are the only basis for prediction of future diffusion patterns and take-up of consumer technologies. Silverstone and Haddon note that the issue at stake is specifically *how* such information is interpreted. For example, the diffusion patterns of the video recorder that was initially taken up by skilled manual workers and clerical workers, rather than managerial class of consumers, cannot be easily extrapolated to account for the diffusion of other technologies. This data on demographics is less difficult to collect and analyse than futurist work that examines cultural trends. For example, work that targets (ibid., 1993a, p.12) 'the decline of the family', and 'loss of community' are themes identified in writing that have yet to manifest themselves despite being announced at the start of capitalism.

Where technology trends are noted in the literatures they do not necessarily translate into reality, technologies may not develop as expected or are not developed. For example, the writings on artificial intelligence, fifth generation computing, 'Virtual Reality' and man-machine communication in the early 1990s had predicted many revolutionary applications for the technology which have yet to transform society as claimed.

Further issues that problematise the analysis of predicting innovation diffusion and production are the increasingly blurred differences in the private and public sphere where work and leisure patterns are open to question. For example home teleworking or microcomputing as a homework tool for children show two routes by which technology can come into the home for non-leisure use. This defines the user as being more than a passive 'consumer' and places the issue of how ICTs enter the home in a different light.

Another 'blurred' distinction is between 'entertainment' and 'information'. Here the point made is to question the qualitative nature of what exactly is the content of the 'information' that information technologies are disseminating or have created for them. Metaphors of the 'information age' and 'information hungry' households and a 'gulf' between the 'information rich' and the 'information poor' are terms that do not necessarily consider the specific nature of *what* the 'information' people have access to. The household's consumption of 'information' does not necessarily match that of the public sphere, and the home is largely seen as (ibid., 1993a, p.13) a '*leisure centre*'. Thus returning to the theme of section (2.1.2), the environmental demands on ICTs for leisure and entertainment mean that the 'information' or software had to a large extent been designed mainly for entertainment. Given this, however, even identifying the boundaries between 'serious' factual information and non-utilitarian 'entertainment' information has its problems in identifying clearly demarcated lines. The analysis of post-modern theorists of media culture and critical analysis has shown that 'fact' and 'fantasy' or 'fiction' are not really totally discrete in media communication and such categories of 'info-tainment' are examples of programming that deliberately crosses these boundaries. Questioning the nature of the information carried by these communications technologies raises the significance of analysing the type of software households subsequently consume.

3.2 *The Three Levels of Analysis that Explain the Innovation Process*

3.2.1 Introduction

The approach created by Silverstone and Haddon seeks to place the dynamic process of production and consumption in a social context that accounts for its political, economic and cultural and geographic dimensions. The three layers of analysis, mentioned at the start of the chapter seek to grasp some of the complexities of the innovation process by attending to the production, diffusion and consumption of information communication technologies. Each of these are outlined below and attend to different 'environments' of the innovation process. The background of the approach is derived from work in media and cultural studies, anthropology and the social studies of technology. The implications of this approach are to increase the scale of analysis to take into account both the public and private sphere of social interaction to analyse the process innovation. Section (3.3) helps to illuminate the ideas of the attempt to account for the processes of innovation.

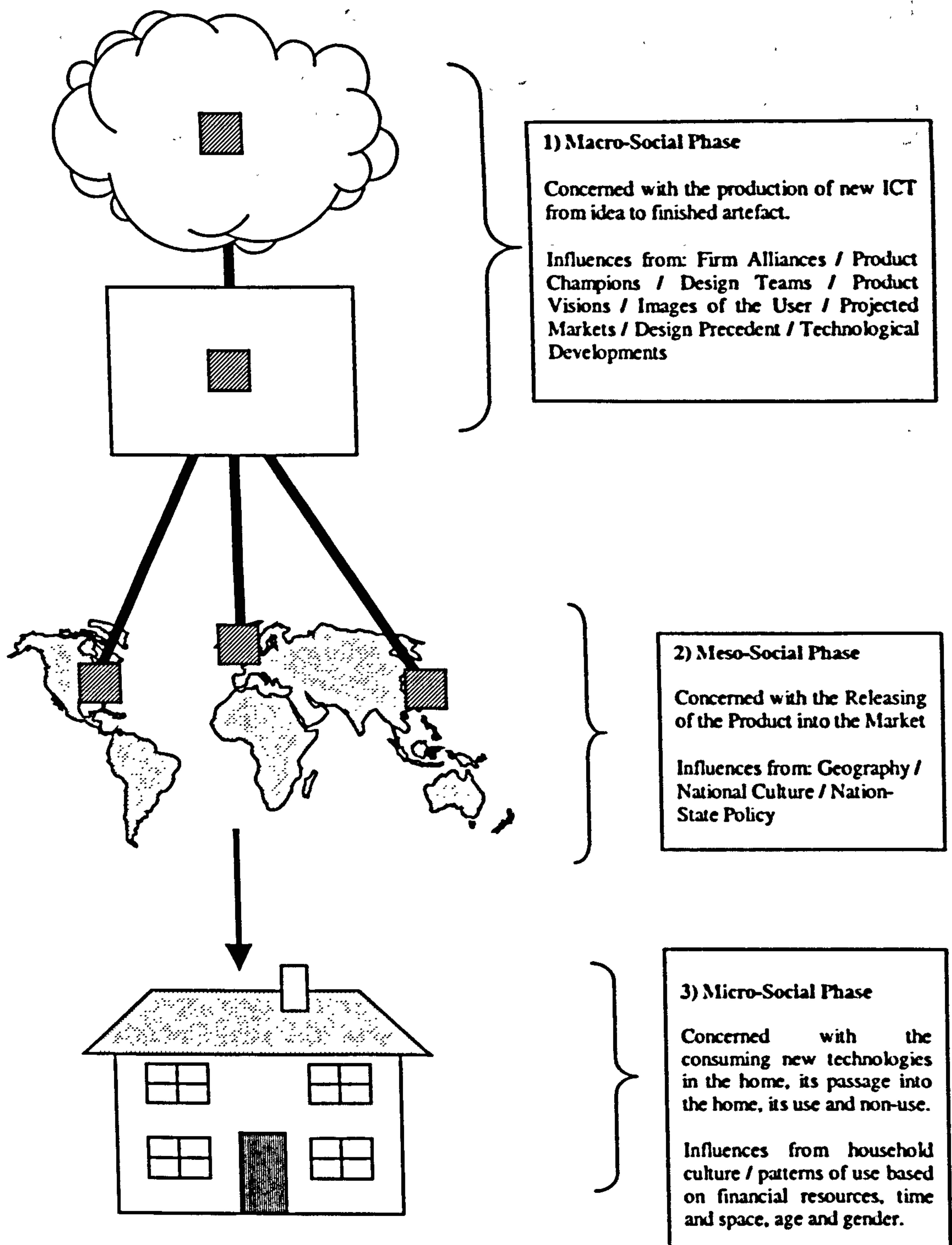


Figure 3.1 Silverstone and Haddon's (1993a,b) Model of Innovation for ICT.

This diagram expresses the model's representation of the *process* of product innovation. Phases 1) 2) and 3) represent the technological career of an innovation in terms of the new artefact as it emerges in concept, is made, released and then consumed in the private sphere. The point to remember is innovation occurs beyond just the influence of individuals in firms, and also to note it continues after the artefact is released, even once in the home.

3.2.2 The Macro-Social Level

This seeks to identify the relevant trends and 'actors' for the analysis the innovation process. It also notes the importance of attending to the allocation of resources and its construction by producers of ICTs hardware and software.

The models main thematic issues at this level of innovation are listed:

- The focus on technology trends notes how the household is the target for consumer electronics that have been described as turning homes into "*integrated leisure and consumer centres*" (Silverstone and Haddon, 1993a, p.16). The specific technologies that are implicated in this include: satellite TV, home computers, cable TV, CD ROM multi-media machines, video game consoles, interactive TV, CD hi-fi and stereo equipment, faxes, internet and ISDN connections. These technologies are part of the 'convergence' of digital technologies that form part of the present set of consumer electronics that are becoming available for the home. These offer the raw materials which enable increased user control, manipulation or 'interactivity' and choice over media such as TV programmes, computer software or music formats.

- The next site of analysis identifies the relevance of 'producers' in the innovation process. Here their significance to research in innovation is to understand the motivations of design and development decisions about how the above ICTs are developed and intended to be deployed. Therefore the social and economic context of actors in the production process is accounted for because technologies do not just emerge in a vacuum but reflect influences from their environment. Based on research undertaken by Cawson, Haddon and Miles (1995), the relevant issues for producers creating new information and communication technologies involved examining the following interactions.

'Changes in technological and market boundaries' - Here new technologies may need the combination of new skills and previously separate technologies that may go on to be targeted at new markets. The research on multi-media and Philips' CD-i machine (expanded in 3.3 below) represents an example of the combination of hardware such as CD, digital video and computer technologies as well as combining skills from video, music, and software industries which were needed to try and create 'new' multi-media software.

'Organisational innovation and alliances' - Some technologies, for example software-dependent machines, such as computer games consoles, or network-dependent technologies such as e-mail need other firms to provide complementary goods or services for the machine or technology to be utilised. The mobilisation of other firms' resources through strategic alliances is often needed to acquire necessary competencies to enter the market and support the technology. The term 'socio-technical constituencies' (Molina 1990) is used to note the need to build and mobilise a network of actors to create and release technologies, (Silverstone and Haddon 1996, p.53). The production realm of ICTs, with the need for strategic alliances, is an example of this.

'Competing innovations' - Here new innovations can compete with other technologies within firms for attention, scarce resources and other product ideas. Another conception of competition is that of the various 'visions' and different configurations that the product may emerge to occupy and utilise as they 'evolve' to be eventually defined in the production process. Here the concept of '*product space*' is used to denote the potential development of an artefact within its category or class of product

to which it belongs. The actual definition and application of the concept of 'product space' is not totally clear cut (e.g. Haddon 1998), and this is returned to in section (3.3.6) below. This has, however, been applied in the research exploring the emergence of Philips' CD-i product in the 'new' multi-media category of technologies or 'product space', (Silverstone and Haddon 1993b, Cawson et al. 1995). Cawson et al's (1993, p.246) definition is applied for shorthand use : -

The product space is where "*there arise different possibilities for configuring products and from these one or more is launched into the market*".

Additionally the "*cultural space*" (Haddon and Silverstone 1993b, p.12) which is constructed for the new technology, refers to the intended and perceived use and meanings given to the product. This relates to the technology's consumption and why it is 'needed' and why it will be 'demanded', rather than accounting directly for its configuration.

- *The shifting and unstable relationship between hardware and software* (ibid., 1993b, p.3): This notes a trend in the relations between the significance of hardware and its strategic relation to software and the issue of 'power' between the two. (This issue becomes salient in section (3.3) and chapter (5) and chapter (7) where hardware and software relationships for firms such as Philips, Nintendo and Commodore are discussed).

- *Narrow definitions of innovation* : Here the location of innovation is stretched beyond just technical development to explore non-technical influences. This may include the use of marketing or consultants in the early stages of development. Therefore attention is given to other sources of influence upon the construction of a product's meaning and the symbolic appearance of the product's final form.

- *Investigating the nature of consuming information and communication technologies and the 'problem of the user'*: Relevant here is the examination of how responsive design decisions are to the use or perceived use of the product. Understanding what sources of feedback are available and how designers and managers interpret them, in order to influence products for their intended use is explored. This reveals how consumption practices are accounted for in the innovation process and to what extent they systematically feed into the design process.

The above sites of analysis have sensitised this thesis' emphasis on video game producer's imperatives and motivations, but other areas of analysis are spelt out in the model and have some relevance. These pay attention to demographic trends and media and information production culture and have relevance to the future uptake of media technologies. The examination of demographic trends is relevant to predicting the potential aggregate demand amongst households and segments of the population. The examination of media cultures is related to issues in the production and dissemination of media programmes or software. This deals with quantitative and qualitative issues peculiar to a nation's provision of programming, media and communications' infrastructure. Relevant issues include the qualitative composition of a nation's programming (i.e. 'serious' programmes compared to entertainment), the composition of audiences and their aggregate consumption habits, media penetration (such as cable or satellite in a given nation), and an examination of the country of origin of the programs for a given nation.

3.2.3 The Meso-Social Level

This level of the model is concerned with the diffusion of information and communication technologies into the public domain. This stage examines the significance of the geographical and cultural differences in nations and between nation states for constructing the uses and meanings around technologies once they have been physically created. For instance, each country may possess a different propensity to consume a technology or possess a different orientation to types of media compared to another culture, which can influence the take up or use of a technology or media type. This can, therefore, create differential diffusion patterns of the same artefacts across countries. Further, the access to a technology or medium may differ across countries and regions due to different spending and ownership patterns - such as the number of second TV sets or video recorders. Therefore there is scope to note how the diffusion of technology can be uneven due to cultural uses and meanings in countries. (The example of the Philips CD-i (interactive compact disc player) given in section (3.3.3) illustrates how the artefact once designed and developed in its 'micro-social' phase is influenced in its 'meso-social' phase once released).

3.2.4 The Micro-Social Level

This stage continues to examine the innovation process in the private sphere of the home and to examine the uses of technology in 'everyday life'. This is the most conceptually developed part of the model. The issue at stake is how technologies find a place in the home and to understand how resistance is encountered to the adoption of certain technologies: (ibid. 1993a, p.30) *"if ICTs are so wonderful, then why doesn't everyone want them?"*

The issue of 'negotiation' occurs here, as it does in defining technologies in the macro level, but here it is how consumers accept and adopt technologies and give meaning to them within the household and share them with other family members. The emphasis on qualitative aspects of the diffusion and use of technologies are prioritised in this phase, as this illustrates the nature of demand for technologies in the home which previously had been a research 'black box', where very little was known about the use of artefacts after purchase and the novel uses 'things' are put to. The impacts and use of technology in households is seen as a dialectical one where behavioural routines and values are influenced and in turn there is influence on the technology's own meaning and use.

In an attempt to capture the complex meanings and uses of media technologies in the home the model of consumption developed has been termed by Silverstone and Haddon (1993a) as the *'moral economy of the household'*, (this is explained below). Part of the basis for the assumptions of the consumption model lay in research work in anthropology and the 'new' studies of audiences' consumption of TV programmes in media studies, and research in technology and everyday life. The insights here are, as mentioned above, a dialectic between technology and temporal and spatial practices of people interacting with it in the home. Additionally, the consumption of media, (such as watching soaps on television for example), is not a passive activity by audiences but an active one where 'work' is undertaken in decoding media texts and reinterpreting them. The attention to the media is selective and the meaning constructed is context dependent. Further, the consumption of goods is an economic

and symbolic activity which has meaning in a social context and transforms goods once they become 'domesticated'.

One key concept here is that of '*double articulation*', whereby artefacts have both a functional meaning and a symbolic one. In other words they are valued for their aesthetic style as well as material practical use. The implications for ICTs are that they therefore are objects acquired in their own right as well as goods that facilitate the further consumption of other goods. A Sony TV, for instance, can be an object of value as a status symbol in its own right, *and* a medium for further consuming other TV programmes. This double value or 'double articulation' placed on artefacts helps to explain why goods become "*locked into the process of consumption*" (ibid., 1993a, p.37).

The analysis of the process of consumption and domestication of technologies in the 'moral economy' of the household has two environmental contexts or 'economies' that revolve around technologies. This concept sees the home as being both an economic unit, (hence moral *economy*) in the traditional sense in that it consumes goods and services and possesses its division of labour internally as well as having members taking part in the formal labour market. Secondly it is an 'economy of meanings', (hence *moral economy*), in that subjective belief systems operate in activities such as shopping and leisure, and affect each individual member of the households' own unique orientations and taste preferences for using artefacts in the home. These beliefs are either shared amongst household members or the source of negotiation and politics in the home.

So, for example, the control of, and regulation of the use of artefacts entering the home are subject to financial cost constraints, as well as symbolic issues that give meaning to them and to negotiations between household members. Each household has their own unique economy as well as sharing similarities with others possibly along class and territorial lines. The actual mechanics of domesticating and acquiring artefacts in the process of consumption and domesticating them is broken down into three stages: '*Imagination*' - whereby the pre-purchase phase of desiring new objects occurs. '*Appropriation*' - where goods are physically acquired and resources allocated to their use within the geography of the home. '*Conversion*' - where the new artefact is communicated meaningfully to others in the home and outside concerning its status, merits and value, i.e. the artefact has a socially communicated meaning that is recycled and fed back to other people in its process of consumption.

The concept of goods or artefacts having a '*biography*' or '*technological career*' in their consumption process is also proposed in the research (ibid., 1993b, p.47), although not explicitly at the beginning. This idea is influenced by the work of anthropologist Kopytoff (1986). This notes how it is possible to trace the 'life' of an artefact's development and 'maturation' as if it were in possession of a 'biography', as with humans. The use of the concept allows for an awareness of what happens to an object as it proceeds along its life cycle from production to consumption. This highlights the dynamic changes that objects undergo as they pass through different environments and is useful because it reveals an understanding of the political, cultural, and economic processes and contexts that are involved in sustaining it, (Silverstone and Haddon 1993b; Silverstone and Haddon 1996). The main use of the concept in the research has been to note how technologies enter the home and what happens to them subsequently, materially and symbolically over time.

Correspondingly it notes how an artefacts' reciprocal home environment and context, such as family and individual life cycles, also change as the artefact changes.

3.3 Application of the Model to the Study of the Process of Innovation of a Consumer Electronic Device

3.3.1 An Examination of the Emergence of CD-i

What follows in this section is an application of the model to help further outline the interaction of the macro, meso- and micro-social phases of the innovation process. The case study of the creation of the multi-media consumer electronic device - Philips' compact disc interactive, CD-i and its software is doubly useful because, (i) it outlines and further develops the model in a practical application by describing the creation of a new artefact and its release. Additionally, (ii) the particular artefact chosen parallels many of the issues discussed in the analysis in chapter (5), such as the issue of creating entertainment consumer electronics and the nature of hardware and software interdependence. Therefore the relationships spelt out here reveal the utility of its theoretical operationalisation *and* yield useful empirical evidence about relationships between actors, technologies and social groups. These also informed aspects of this research regarding hardware and software development relationships.

The aim of the case study was to examine the emergence of a new technology through the interaction of the different interests and processes mentioned above, (section 3.2). This involved examining the conflicting and competing interests of hardware and software producers and the impact of marketing as they sought to construct the technology for 'the user' in an, as-yet, non-existent market where demand was unknown. Further, the case study explored the post-production impacts of the other actors encountered in retail, advertising, media and consumption as they encounter the technology and use it and redefine it. These interactions in defining the meaning and uses of the technology are mapped out in order to illustrate the model's grasp of the complex dynamics of the innovation process in production and consumption and to allow understanding of why it is complex, (Silverstone and Haddon 1993b, p.52).

The work on the construction of CD-i and multi-media technology by researchers at Sussex University highlights the creation of a particular technology that had 'revolutionary' claims and aspirations ascribed to its transformative capabilities. The 'multi-media' term was being applied to a new media type that was purported to be a 'radical' innovation in that it differentiated itself from other media formats in its attempts to provide a unique form of 'interactivity' for users manipulating information and media forms. Given the uniqueness of the whole category of the technology of 'multi-media', the specific boundaries and formations of the technologies within the category or 'product space' were undefined or open to interpretation. Philips attempt to enter the 'multi-media' market and take an early leading role in it, while it was still emerging presented it with many problems. These were both technical and organisational. Technically the combination of computing, video and audio technologies in one machine where uncertainty existed over technical standards and models or precedence of future use meant that there was scope for flexibility in ordering the machines' design and intended use. For instance the machine could be optimised in theory to do many tasks: to play games, to watch films, to play music, etc. However in order to achieve this Philips would need to engage in alliances with other competing firms, such as Kodak and Sony, to create technical standards - as with VHS video in the 1980s - to overcome potential problems in data compatibility.

It would need to collaborate with other firms in order to acquire know-how to create a supply of software that would run on the machine and sustain its use.

3.3.2 The CD-i at the Macro-Social Phase of the Innovation Process

Silverstone and Haddon (1993b) note that the 'problems' facing Philips in the construction of the technology were in building the machine's intended potential use and creating a market for a machine that did not exist yet - therefore they needed to construct the user. These 'problems' illustrate the social influences on the design that seek to relate the technology to meaningful frameworks in order to give it a use and identity.

The '*problem of precedence*' (Silverstone and Haddon 1993b, p.15), illustrates how the potential identities for the technology acted as possible predictive diffusion paths for informing the design of the machine, such as 'being a games' machine', or 'like a video recorder'. These give an idea of the possible uptake of the machine. As the whole category of 'multi-media' was unsettled in identity, there existed competitive scope between Philips and other producers such as Sega and Commodore for defining their products in the category - or product space. Alternative definitions for the emerging technology were possible, such as an enhanced games machine or an extension of the TV.

'The *problem of identity*': relates to the issue of novelty in which the producers of the 'new' artefact sought to cloak the 'multi-media' technology in order to differentiate it from other known functional ICTs. Therefore it was an issue of definition. The issues of product placement were in deciding how different the software for the machine was going to be in offering 'interactivity', e.g. similar interaction to that of a computer or like a TV or music centre? The qualitative issue of what software to release for the machine also had implications for forming the utility and identity of the hardware and was an aspect of the interdependency between hardware and software as complementary goods. The uniqueness of the software design also had implications for the meaning of the hardware and the new 'infotainment' and 'edutainment' designs of software were examples of hybrid designs that mirrored the hybrid hardware. For example, the strategic choices of which software to sell with the machine and commission were part of the construction of the machines' meaning and attempt to manage its preferred diffusion. The design choices in the key software title *The Joy of Sex* had its data structured so it incorporated moving images as well as book-like characteristics such as the inclusion of a bookmark for the user to identify areas of interest for their partner to see. Also the need to form alliances with software houses to create programmes for the machine entailed a problem in terms of risk in allocating resources to supporting an unproved technology that may not be 'a success' as well as trying to invest time with trying to create 'interactive' multi-media software that appeared sufficiently unique.

The problem of the market' notes how firms intended to construct a market for the multi-media product and in effect go about 'finding the consumer'. The interpretation of who would use the machine and for what, was a problem for producers in constructing an application for a novel machine. Where producers obtained this knowledge of the user, where it came from and how specifically it was applied was the key issue here. Other related research by Cawson et al. (1993), Miles et al. (1992), noted how anecdotal knowledge of users and knowledge of competitors products absorbed from trade shows and journals, for example, served as sources of influence

upon constructing an idea for future use, rather than any systematic incorporation of market research of user needs and desires at an early stage. In this process, the actors in the macro-social phase were making interpretations about the 'meso' and 'micro' phase as they interpreted and constructed 'needs' for the technology for markets in other countries and individual users within them.

Specific to the creation of Philips' CD-i, the nature of various national markets was accounted for in terms of language and culture and media consumption patterns. These had an effect on the differential diffusion of the product in particular countries, such as Germany, which was seen to be 'conservative' in its take up of new technologies and its 'parochial' nature of TV consumption.

Additionally the age and class of anticipated users in the early phase of the machine's release reveal what the image of the user was - initially being males aged around 25, managerial middle class with high earning potential. This was reflected in producing software that was oriented to self-improvement and teaching aids or more sedentary leisure titles like golf. The 'need' to promote the technology for family use and construct demand for it meant that the casing was stylised like a video recorder and used a remote control rather than a joystick. Therefore it could be placed along side the video recorder at retail outlets to 'be found' by the consumer and used similarly by "*all the family*" (Silverstone and Haddon, 1993b, p.23).

Changes in the software available for the hardware were made six months after the initial launch because the anticipated take up of the machine was not as the intensive market research had suggested. Purchasers were also made up of 'C2' class users who were described as the "*earring and tattoo brigade with satellites*" (ibid., 1993b, p.23). Hence the change to the software catalogue revealed an indeterminacy in the 'meso' sphere which was interpreted by actors in the '*macro-social*' production level to amend the strategy of their software. This led to the introduction of more games and entertainment software.

In conjunction with this, the corporate culture at Philips changed towards an emphasis on producing entertainment that would bring an aspect of competition with more conventional game console technologies. This would support the machine's software with video footage play back capabilities to appeal to those wanting to watch movies. Therefore the potential user for the machine and the machine's constructed uses were broader wider than anticipated due to the diversity of 'needs' from different groups in markets and between national markets. The competition faced from other competing technologies too, such as games' machines, meant that trying to maintain the initial 'product vision' was difficult.

3.3.3 Diffusing the CD-i Technology - The Meso-Social Phase

To take stock then, the issues that face the producers in the macro-social phase in design concern 'creating the artefact', 'constructing the user' and 'catching the user' (Silverstone and Haddon 1996, p.45). The next phase examines the process of releasing the product into the public domain and the mobilisation of other groups outside the producer firms needed to establish the technology. The relevant interactions with these groups illustrates the impact of the 'meso-phase' upon the emergence of the technology – in this case, including the whole category of 'multi-media', the specific product CD-i, - and the end-user. The 'end-user' here, then underwent continual redefinition as the construction of demand and product continued.

The '*finding of the consumer*' reveals the process whereby the technology is made available to the consumer to buy and their having to be made aware of it. This means, in practice, mobilising the support of retailers, advertisers, and computer magazines to raise awareness and gain access to potential buyers. The impacts of these groups were to influence the meaning of the machine in order to communicate it to users and give scope for redefinition of the original vision. The 'meso' dimension here mainly applied to the cultural meaning applied to the diffusion of CD-i in the UK context.

The advertising influence on constructing demand for the technology was to create an identity in its advertising campaigns that built up the product as "*something different*" (ibid.1993b, p.28). This was a response to the known trend of media saturation in households from owning other consumer electronics such as satellite, cable, CD, Walkman etc. To communicate the novelty aspect of the new technology it was felt that it had to be sampled by prospective users in retail demonstrations and for retailers to be trained in demonstrating its unique points. The chosen association of the campaign was with the television and the aim of the adverts, with a TV with just half a picture, was to suggest that the CD-i would complement the TV and make it into a super TV. This approach was preferred to an association with the CD player, because it was felt users were not looking for a super audio CD player or computer.

Further, the advertiser had suggested that a flexible strategy of promoting the technology be adopted to deal with the emerging patterns of demands in which markets that emerged for it, such as games and educational based ones, be supported simultaneously. The role of software was seen as vital in defining the users' 'needs' and what they could 'do with the machine'.

The retail influence was seen as non-neutral on product definition through the very act of just selling it. A retailer such as Dixons had its own methods of selling and interpreting demand for the products it stocked, based on its needs in high street competition. The product definition at retail was to associate it with CD audio with the future promise of full motion video capability to play CD movies and be a 'five in one machine'. The retail reconceptualisation of the product was at odds with Philips' association with the extension of the TV. The implications for the relocation of the identity tied in with defining the technology as an all-in one machine that would find a domestic niche in the home that was being saturated by the TV, hi-fi, video, games machine - while now the possibility was there for a utilitarian machine.

The strategic role of the press in defining information and communication technologies social significance were described as being either of 'revolutionary' significance or of part of a 'moral panic' about the negative effects of the impacts of technology. The significance of media reporting of new technology is in its laying of foundations for its acceptance or resistance. The media - technology relationship is one that has yet to be examine fully:

(Silverstone and Haddon, 1993b, p.34), "*A major study is required to trace how significant the media are in defining the particular character of the product and cultural space...This has to be set against parallel efforts by manufacturers, market makers and advertisers to create their own version, and vision, of the product.*"

The reconceptualisation of multi-media's significance in the press reporting targeted the fact that multi media machines were really 'hidden computers' and that there was some risk involved in the lack of a dominant standard or format. A further problem

was that there was little specific software designed for the machines, which could be a potential issue.

A magazine specifically dedicated to the CD-i machine revealed another impetus to redefining the machine's identity and related to the magazine's own logic of operation. The definition of the technology again may be at odds with the intentional aims of the producer firm. For example, the magazine's need to find readers by stressing games' applications to a core readership of teenage boys who may leave the magazine lying around for parents to pick up. The focus may have been at odds with Philips' emphasis. Further the editor of the magazine had felt that the technology might be a 'bedroom' technology rather than a family one.

3.3.4 CD-i Technology in the Micro-Social Phase

The final consumption phase - of users finding the technology - shows where the 'real' consumer interacts with the technology in the 'micro' phase of the model. The motives for purchase, use and evaluation of the technology reveals aspects of the technology's impacts on the household members and the impacts of the household relationships on the machine. The key issue is the examination of the consumer's conception of the multi-media technology and the placement of the machine in the household culture. Therefore the emergence of the multi-media technology in the environment where it was actually used, is examined in contrast to the imagined uses outlined in the earlier phases.

The key findings were that the novelty of 'interactivity' that the multi-media technology was supposed to offer, was seen in just the same light as existing games playing technologies and generally the technology was not seen as an alternative to television. Further, the home environment was seen to be a private and fragmented one where, rather than provide a 'family' basis for consumption, it was actually used on an individual basis. This meant that the technology was adapted to the mode of family life that already existed and reinforced this. It did not create a new situation. The history of the technology's movement and its symbolic meaning in the home - its domestic '*technological career*' - revealed that it was not static. Rather the machine had moved its location and pattern of use over time, either being sold or given to relatives to use. As the household patterns changed, the technology's meaning changed accordingly. The strategic role of software in the macro phase had its impacts on the 'micro' phase for affecting the uses the hardware could be put to. The lack of software support and providing enough novelty in it created some sense of disillusion with the significance of the machine and revealed an expectation that the machine would be supported after purchase.

3.3.5 Applying the Approach to the Study of Making Video Games

This approach applied to the construction of innovation in the ICT area and discussed above is used in this research to examine the first phase of the macro-social/producer dimensions of constructing a video game. Therefore, it sensitises us to accounting for the alliances that occur between firms in releasing software and especially the issue of software-hardware interdependence. The issue of uncertainty and construction of the technology by individuals and constructing user needs are relevant. Additionally it accounts for aspects of the impact of the 'meso-social' dimensions in releasing a game into the public domain and the impacts of national and foreign cultures upon the reception of the software and impacts on its design. These relationships seemed

relevant to the concerns raised by game developers in section (2.2) regarding video game production issues.

The actual implications of the model for the methodology and 'data needs' are addressed in the next chapter, which deals with identifying which people should be targeted for questioning and what type of questions would be asked. However, due to the finite scope of a Ph.D. thesis, there has to be a practical limitation upon what aspects of the research can be attended to in sufficient detail within time and financial constraints. Given the literature's bias to games' consumption and the cultural meaning of games, as noted in section (2.1), this model is applied mainly in the 'macro-social' phase in its exploration of producer firms' relationships and intentional design activities as they cope with the design of games for passing through the 'meso' and 'micro' phase.

The application of the approach cannot be mapped onto the research issue of video games without some critical appraisal. This involves clarification of concepts and the theoretical bias, as well as some concern with the particular nature of constructing computer and video games' software. The next sections seek to amend the approach by drawing on insights from the social studies of technology and media and cultural studies' literature.

3.3.6 Separating out Emergent Products from their Membership Categories. Product Space

One analytical resource outlined in the work above in section (3.2.2), was that of '*product space*', that sought to create a distinction between multi-media as a whole category and CD-i as a product emerging from within it. This application of the concept by Sussex University researchers, Silverstone and Haddon (1993, 1996) and Cawson, Haddon and Miles (1993, 1995), has been applied to innovation in consumer technologies that are in some way revolutionary in their potential for restructuring user - technology relationships and where there exists no precedent for their existence. This has been applied not just to 'multi-media' but 'smart-houses', and 'electronic-messaging'. These technologies despite revolutionary claims and a degree of open-endedness about their possible uses at the time of research selection, should not be confused with their actual identities - i.e. effectively just technical artefacts. In other words, the selection of what is and what is not a 'revolutionary' technology worthy of study as the section below notes on the ideas underlying the 'social shaping of technology' approach, is based on rhetoric which is a social construction. This cannot in itself endow the technologies with a special significance whereby they should be treated in an analytically special or privileged way compared with other technologies in the ICT realm. The point of the criticism is to allow for the reapplication of the concept to the emergence of any technology from its wider category, regardless of its *perceived* significance. Therefore what technologies 'are' cannot be defined in an 'essentialist' sense by virtue of their internal properties, for the same reasons that the meanings and definitions are examined in the case study above, for their flexibility of definition. In, for example, MacKenzie and Wajcman (1985, p.10), it is noted that the 'revolutionary' status of the jet engine relative to other antecedent technologies is not a complete break but part of a lineage of developing technologies.

Attention is given by Roy (1986, p.7) to the importance of examining the incremental aspects of innovation:

“...the importance of incremental innovations and design improvements have been underestimated. Attention needs to be focused on the research, design and development work in getting an idea or invention to the market for the first time. However, just as important are the process of successive redesign, component improvement and evolution of the product...”

The role of the concept of 'product space' usefully denotes how the scope for competing 'visions' of relevant actors coming into contact interact, and how these visions are negotiated by drawing on potentially different knowledge bases for choices over product design configurations. The actual class of product or its product space from which the individual products emerge, is not a fixed entity but is itself subject to shifts, Cawson et al. (1995, p.183, 247, 249, 273). The shifts can occur due to competencies acquired in inter-firm alliances or internal organisational factors in the firms. Further there is scope for shifts to occur after the product is released through market feedback. Processes of 'exclusion' can also occur that seek to 'freeze out' certain alternative definitions in the firm. The application of the concept of product spaces to 'radical' innovations such as multi-media's combination of the microchip and laser technologies, had helped provide some definition to outlining the subsequent boundaries of the technology's identity and capabilities and to gaining an understanding of specific product design within it.

This research borrows from the concept of product space for its utility to make a distinction between the overall category of 'computer and video games' and the specific emergence of 'a game' being analysed for the case study, which belongs to that overall category or product space. Although this is not applied to a hardware artefact like the above applications or to anything claiming to be 'radical' in design conception, it does have some similarity in that it is being applied to the software side of innovation in consumer IT. Also in their own industry, games have to provide the semblance of being 'new', (as with CD-I), in order to be sold and provide some 'novelty' with differentiation from other products which emerge in the category. Additionally inter-firm alliances and collaboration due to the mode of cartridge production (see chapter 5) are also a relevant issue in the market. Again with the advent of multi-media technology there is some uncertainty over what games should be with the access to the new technologies specifically CD ROM enhancements and the rhetoric over 'Virtual Reality' technology. The biggest difference is that the class of artefacts or product spaces as well as the individual products within it, that had to emerge concurrently (Cawson et al.1995), does not apply here. The need for the distinction allows accounting for the different pathways that specific game products can take with the resources available from the potential configurations within the dimensions of the category or product space. For example, technical resources and knowledge over design conventions and aesthetics can be drawn upon to construct a specific game. The aim of the research is to examine why games look the way they do and therefore examine the innovation process via the interaction of the specific game's evolution within its context. Therefore the main focus is the identity of the product which also happens to *illustrate the knowledge and technical resources of significant groups that affect the product space and provide competing product visions*. The focus is not exclusively upon the product spaces evolution over time. It is not intended to provide a general overview of all possible game types or a typology of the industry's game 'design paradigms', or a complete map of the boundaries of knowledge designers have of all games. However the definition of 'a game' and its product space boundaries are illuminated to some degree.

3.3.7 Definition Issues

According to Haddon (1998), there may exist problems in trying to identify a 'product space' that are not recognised by the relevant industry members but reflect the researcher's own definitions being applied to technologies that are not felt to be relevant by industry actors. This conversely raises the possibility of actors themselves mobilising a definition of a 'product space'. Therefore the issue is not so much one of validity, but of acknowledging that there are unresolved ambiguities at stake in its definition for research which reflect the 'real-world' problems of technology change. Even within an industry, actors themselves may disagree as to what should and should not be included in the product space. For example what counts as 'interactive entertainment' and what is 'a video game' is an aspect of definition that became directly relevant to design choices in relation to these general questions in the course of this research. The approach taken here in light of these points, is to note that the 'product space' for games is not a reified 'thing' but a category of design principles that actors relevant to the design process, and who come into contact with 'games', seek to define through either tacit understandings or explicit disagreement and negotiation. The scope for ambiguity and flexibility in trying to create a predefined boundary around an entertainment product is that the element of subjectivity interferes to a degree where clear demarcations exist between categories that have no utilitarian function. In other words games, films, music etc. despite all being 'entertainment' forms may have aspects that blur into other 'product spaces' that may, if excluded they will be missed. Therefore the emphasis on the actor's own relevant knowledge base and discussions of, for example, what is or is not 'a video game' formed the central basis of targeting the object of study and its boundaries for product definition.

3.3.8 The Concept of a Technological Career

A second area of note is the concept of a cultural biography or 'technological career' which attends to the process of change artefacts undergo over time symbolically and materially, Silverstone and Haddon (1996, p.67-68). The term originated from the work of Kopytoff (1986) which noted how the biography of a technology, such as a car in Africa passing along its life cycle from development to scrap yard would also account for the social shaping elements that reveals information about its socio-cultural and political context that influence its life cycle. An analysis of the same process of a car in other countries would give scope for a comparative analysis of those social shaping contexts. The application of the term in the above work on CD-i, had noted the value of tracking an artefact from its inception to its crossing over into the household and noted the dualistic changes of the temporal life cycle of the family environment as well as changes in the machine's identity and meaning in that environment. The application of the concept has been mainly to account for the domestic consumption side of the technology in the home and not really to account for it explicitly in the production environment in which it emerges, e.g. Haddon (1994). Therefore, an account of the game's emergence in its producer organisation as an idea to fully coded product also occurs in a temporal environment of an organisation that is itself changing in a wider national and international market. It is subject to the temporal effects of fashion, which influence operations and in turn effect the games meaning. The accounting for the game's evolution in appearance and meaning in its career as a project and commodity reveals insights about its changing environment, as well as the changes that it is experiencing. The case study approach with its use of interviews and documents to capture the temporal and symbolic

development of a game, was used to illustrate these dual relationships. This means that the firm's own temporal context as an historical entity undergoing organisational change, as well as those of the relevant actors such as programmers and designers, and the hardware technologies, that are involved with the software, need sensitive analysis.

3.3.9 The User

The issue of the research emphasis on 'where the user is' in the innovation process, how they are conceptualised and how their 'needs' are interpreted in design, has been noted above and is a concern with the research here. Silverstone and Haddon (1993b), Cawson et al. (1995), and Grint and Woolgar (1997) note that the user was not present in the early stages of the design process and the knowledge about the users was anecdotal, they were 'imagined users'. Where users were entering the design process was via marketing attempts to manage the machine's release, not on design issues. There was some attempt to note - possibly a researcher-inspired value judgement - that firms in search of elusive 'hit' products or 'hunting snarks', Miles et al. (1992), might possibly benefit from the user entering the design process at an earlier stage to help steer products to meet the target of successful consumer adoption and use.

This research on video games engages with this aim as it illuminates specific problems that face the design of entertainment forms. On one hand it will be a commodity for sale and use and this market test defines part of its success, yet on the other hand, it is a creative production reflecting artists' and designers' specialised knowledge seeking to create novelty through surprise for an audience. How the design process reconciles these issues and conceptualises their audience and the user in play is examined. An additional reason for the focus, as will become clearer in the section below (3.4.1), in the contributions from the social shaping of technology, is that the act of defining an artefact is political and involves a power relationship because it influences the user's relationship to the artefact or 'text' with the designer's image of the 'preferred' use and meaning and constructs aspects of their behaviour as they relate to it in use, Woolgar (1996). Silverstone and Haddon (1996, p46) place the emphasis on design as part of the domestication process that is not just restricted to the location of the home. Design is where the constraints upon use are embodied to a large degree materially and where the artefact is formulated for its intended use. Given the moral panic of addiction and holding power of video games by the press and some intellectuals, as noted in the literature review in section (2.1), the examination of the 'user' or player's needs in the design of games is relevant to how they are expected to use or play with the games. This explains where the origin of the fourth research objective about the user is derived from, and complements the first three objectives given at the end of section (2.3) and (1.1.2).

Woolgar's approach has been criticised for overemphasising the construction of the user in the design process and not considering how this actually translates itself in actual use to configure the user, which he left unclear, (Silverstone and Haddon 1996, p.52). This is the focus of the Silverstone and Haddon approach with its attending to the 'micro-social' phase, and has been noted too by Mackay and Gillespie (1992) in their call to extend the focus of social shaping of technology (SST) research into the actual use and reconfiguration of technology in the home. However, the actual amount of redesign and the open-endedness of redefining an object's use and meaning is not clear. There are parameters constraining use that are either in the form of social community or cultural norms of use that 'police' deviant uses or reading of the

technology as a 'text', (Woolgar 1996), or the actual technology itself that places some material limits or its use (Mackay and Gillespie 1992; Mackay 1995). Additionally the criticism is noted that accounting for '*who is the user*' can be too narrowly defined as the isolated individual in a pure functional relationship with the technology which misses other diverse contexts of consumption and use. For example, the audience may engage with technologies in many irrational ways, other than just the functional operation of the technology.

3.4 Extending and Criticising the Three Dimensional Model for its Application to the Study of Video Games Software

3.4.1 The 'Political' Nature of Designed Artefacts. The Contribution of the Social Shaping of Technology Approach

The issue of the political nature of artefact design in the innovation process and its negotiated nature between groups and individuals has been touched upon in the work above. The next section seeks to outline the premises of this account and make explicit the implications of this in accounting for the politics in the design phase of the technology's 'career'. The specific relevance of work by Winner (1985) and the utility of the 'Social Construction of Technology', (SCOT), approach is noted. These emphasise how design choices occur by revealing what options are blocked off or what branch points do not occur. These are important issues that need outlining, just as much as the decisions that are taken.

The aim of the Social Shaping of Technology approach is to make clear the social nature of technology development and to make apparent "*the influence of social factors on the design and configuration of these physical objects*" MacKenzie and Wajcman (1985, p.3). The implications of this approach create assumptions that are shared by researchers. These are broadly that technological development and innovation are not linear, set on a direction or trajectory driven by an internal logic by the automatic selection of 'the best' technical options or 'only' configuration or by the will of individual genius. Rather, innovation can be seen as "*a garden of forking paths*", Williams and Edge (1996, p.54), which is influenced by social economic cultural and political factors, as noted in Silverstone and Haddon's assumptions. This approach therefore argues against technological determinist accounts for technology development - that technology is a sole independent variable in effecting influence and change upon society. The dangers apparent in adopting a determinist line of argument is that it places research emphasis too narrowly on the effects of technology upon society and does not attend to the influences upon the construction and deployment of the technology *before* it has its effects. (This is the criticism levelled at the academic literature of the 'effects' of video games on society). MacKenzie and Wajcman (1985) note that this must at least be complemented with research, which focuses attention to the conditions contributing to the construction of the technology in the first place.

Winner's influential essay *Do artefacts have politics* (1985), has been a central 'plank' in the SST manifesto of research emphasis on the content of technologies. The aspects of 'politics' in design and the focus on the technology are covered here because it informs the research effort into examining specifically the technology and its constitutive environment. The premise of Winner's argument is to note that the critical analysis of a society's political system and legal system in the production of laws and its effects on society has a legitimate place in academic scrutiny. This level

of scrutiny should also be applied to technical artefacts which have been ignored by critical research as if they have a neutral status a priori to any social influence.

"...The same careful attention one would give to the rules and roles and relationships of politics must also be given to such things as the building of highways, the creation of television networks and the tailoring of seemingly insignificant features of new machines", (Winner 1985, p.31).

The design choices in configuring a technology are political because they can embody power and influence over decisions in their construction, which influence their design. Technologies are flexible because there exist a range of possibilities in their configuration and choices are made in implementing these. This affects what technologies are chosen and has implications for understanding their impacts in their deployment, which can block off certain uses for them. This is illustrated by Winner in his example of the designer R. Mose's configuration of overpasses in New York that blocked off access to certain sections of the poorer ethnic minority public. This is an example of how a design choice can influence use and have 'effects'. It illustrates how technologies are flexible in terms of the choices designers encode into the artefact. These choices can be political because they embody power and authority over those who use them. Winner (1985) notes that other wider factors influencing design can occur not just consciously, as with the Moses's example, but implicitly, such as from the subtle influences of economic imperatives, cultural values, ideologies and social structures. The design effort in being political does not mean that the researcher should look for and expect "*conscious conspiracies or malicious intentions*" (ibid., p.30), but note that the design of technologies can be influenced and predispose their adopting societies to a commitment that influences their environment. Once the commitment to design a technology has been made it loses its material flexibility.

Winner does note that while attending to the politics of social forces that configure an artefact, it must not be a pure focus of the research effort to those who "*flirt with the notion with technical artefacts have[ing] political qualities*" (1985, p.26). The mistake in this approach is to risk adopting an approach termed 'social determinism' and leave out the attention to the specific technology in its own right in the diversion of effort to the background factors influencing it. Winner notes that technologies are political in terms of their embodied configurations and attention should also therefore be given to that technology specifically.

3.4.2 The Social Construction of Technology (SCOT) Approach

The work within the research field of the SST termed the 'social construction of technology' (SCOT) offers a line of empirical work that adopts the above concerns with the accounting for technology development. The key issue here is to account for the social aspect of technology development and acknowledge the mix or 'heterogeneity' of political, economic, social, cultural factors that "*enter the melting pot when an artefact is designed and built*", (Bijker and Law 1992, p.3). Technology does not define itself in this approach rather it is seen as being created and made meaningful by social processes. Given this, the examination of the formation of technology unveils interesting questions and answers about its contingent nature - how else it could have been designed? Why did a technology triumph in one design configuration rather than another? What were the assumptions and practical constraints of the designers? One problem arises in acknowledging the social nature

of technology, that is, given its 'heterogeneous' nature how is it possible to study it without adopting some form of limitation or blind spot in an academic context that specialises its study of technology in disciplines including, economics, psychology and media studies. Bijker and Law in this light note the utility of the work of social historians of technology. This is noted for its non-blinkered approach to arbitrary boundaries around technology and its environment, because it deals with both the specific nature of the technology as well as its social context i.e. "it deals with both the rivets and the social relations", (ibid., 1992, p.5). The work of a social historian according to this approach is useful because it accounts for the heterogeneity of technology by grounding its basis for research empirically in the light of the evidence illuminated by the interactions of those involved in constructing a technology and influencing it.

"In particular they [social historians of technology] are less prone to treat technology (or one or another aspect of social relations) as unexamined variables. Instead they follow the scientists and engineers...wherever they go: into attempts to discipline the labour force, the character of business accounting, the nature of laboratory work, the shaping of workshop skills, professional organisation, methods for technological testing..." (Ibid., 1992, p.6).

The difficulty with the historians' approach is also its strength. In being concerned with the *"messy story wherever it leads"* (ibid., 1992, p.7), i.e. the complexities of the interactions of heterogeneous elements comprising technology, the historians task is less suited to constructing generalisations. The role of models and theories are to simplify the understanding of the 'messy' complexities and prioritise aspects within it. The SCOT approach is an attempt to trade off these two requirements. The implications of this for the research in adopting a social constructivist orientation to studying the creation of video games, are to bear in mind how far the researcher has traded off these requirements and become an historian as well as a social scientist seeking simplifications of the 'messy' case studies. This is to be kept in mind until the conclusion. However the SCOT approach illustrates how simplification can be imposed and the adoption of this is applied to this research.

The core aim of attempts at simplification of the 'messy story' is to examine how a technology "firms up" (ibid. 1992, p.8), or stabilises out of a contingent sea of heterogeneous influences that combine offering up alternative scenarios or design configurations. The underlying assumptions here are that there is a mix of heterogeneous actors that interact and from these interactions emerges a technology. The nature of technology development is one of conflict and resistance as the relevant actors - or social groups - seek to impose or resist an implementation or type of technological configuration occurring. How these conflicts are resolved and provide one or another design configuration reinforces the almost doctrinal phrase in this approach, that "they would have been otherwise had other plans prevailed" (ibid., 1992, p.9). That is, the development of technology is not deterministic, but open-ended in the sense that choices are made, or unpredictable changes of plan are enforced upon the emerging technology. The 'mapping' out of the different groupings' competing notions or plans for the technology illustrates specifically how else technological arrangements could be and has been termed as a "multi-directional model", (Pinch and Bijker 1987, p.28). The resolution of these options that are blocked off are accounted for as the technology 'firms up' or stabilises. In other words, a consensus is reached over the meaning or identity of the artefact and the dispute evaporates, this is termed, 'closure'. Bijker and Law (1992) note that the actors'

strategies are not imposed uniformly but liken it to a game of chess - the state on the board results out of a combination of the two strategies and the actors' own strategies are reflexively formed in their dialogue with the game's progress. Unlike chess players, however the 'rules' of the game and power relationships between actors are not known beforehand, stable or equal. Therefore technology development as well as the actors' strategies emerge together contingently and reciprocally influencing each other in 'messy' complex ways.

(The methodology section in section (4.4.2) deals with the implementation of this SCOT approach).

3.4.3 Clarification of SCOT Terms

As has been noted, the SCOT approach proposes a 'multi-directional model' for accounting for selecting the branch points and choices that occur in the development of a technology. This approach has its roots in a previous research project from the social studies of science termed the 'empirical programme of relativism' (EPOR). The research effort here was to challenge the privileged nature of scientific knowledge and examine how it is a socially constructed phenomenon, rather than just 'discovered' laws of nature. This approach became mapped onto the examination of technology and minor adjustments were made in its transposition to account for the different topics.

The term '*interpretative flexibility*' relates to the different meanings that could be applied to a scientific finding. In technology, this refers to a technology's design, which means that there is more than one way to design it. The relevant actors or 'relevant social groups' apply different meanings to a technology and construct the 'problems' associated with it which influence its configuration. These 'social groups' combine with the artefact and other groups to form 'technological frames' - not unlike the concept of 'network', and these interactions between the groups in the frame have a dialogue with the artefact and can themselves be changed as a consequence (Bijker 1992, p.76). Identifying the relevant social groups and their interpretations of the technology is the first stage of the research effort.

The second stage of emphasis on 'stabilisation' and "*mapping the mechanisms of closure*" (Pinch and Bijker 1987, p.44) relate to how a choice is made out of the range of flexible meanings. It therefore examines how social processes come into existence to close off an option and reach a consensus over the technology's formation and meaning and the problem no longer continues to exist. (Although the two terms are used interchangeably, 'closure' strictly originates from the EPOR scheme where scientific debate is ended, and 'stabilisation' originates from the SCOT approach as applied to technology). The closure can occur in two ways, either rhetorically - i.e. a relevant group no longer appreciates that a problem exists and perceives it as being solved, or can occur through 'redefining the problem' where the debate moves on about the technology's significance and another relevant issue takes its place.

This research put an emphasis on the alternate scenarios of technology design that *could* have occurred but were not explored in Silverstone and Haddon's (1993a,b) approach. These give some illumination to the implications of the specific design choices by hardware and software groups as they interact and seek to negotiate the configuration of their software. The SCOT approach has been applied to the case study of the emergence and closure of the typewriter keyboard (Knie 1992), the bicycle (Pinch and Bijker 1987), fluorescent lamps (Bijker 1992) and Bakelite plastic

(Bijker 1987). Video games as a class of technology are in many ways different and the implications of this are examined below. However, the appropriateness of the application of SCOT to this field exists, in that the demonstration of interpretative flexibility - or competing notions of design and problems - occurs best for the researcher engaging in controversial technologies or failed technologies where a pathway is not easily seen as 'natural' and unproblematic, (Pinch and Bijker 1987, p.27). Section (2.2), and more prominently chapter (5) on industry structure, demonstrate the 'controversy' surrounding video games' design and these problems make it 'ripe' for the application of the SCOT approach.

Some criticisms need to be noted about how the approach accounts for the status of technology. Woolgar (1996) notes that the practice of 'closure' is not an event that occurs and then all can be forgotten. Rather, the technology can undergo further flexibility in interpretation of its meaning after its configuration. In other words, as noted, if the technology is perceived as a 'text', it is open to other readings and interpretations. This is noted in Silverstone and Haddon's attention to the post-production phases of the innovation process. This research acknowledges that 'closure' and 'flexibility' are not ended in one phase, and does place some emphasis on the reception of the games as they were received in other markets and magazine reviews that related meaningfully to the producer firm's frame of reference.

In contrast to actor network theory approaches, social constructivism has had criticisms for biasing the social - seeing it as a layer of "*onion rings*" to be stripped away (Cockburn and Ormrod 1992, p.8) in order to explain technology's existence as part of culture. In this scenario the danger for the researcher is to totally concentrate on the issues surrounding the technology and as a consequence the technology is susceptible to "*vanishing*" from the research focus, Button (1993). Instead, the researcher can be in danger of merely studying an aspect of the sociology of work, for example, examining issues of patriarchy in the work place - as Button criticises some of the work in MacKenzie and Wajcman (1985). Attention therefore must also be given to how technologies can have a constraining effect on social actors' conduct (Akrich 1992; Orlikowski in Silverstone and Haddon 1996). Therefore it is appreciated that some degree of interaction occurs between technologies and actors that influences reciprocally their relationships and the boundaries between them. SCOT does account for the attention to the 'rivets' of technical artefacts but needs also to account for how a technology has this 'dualistic' property. Therefore, in the analysis, 'non-human' actants are accounted for in terms of the 'influence' they have on actors' conduct in designing artefacts, for example the presence of a competing game design which influences organisations and the designer's own conduct in configuring their own game.

Approaches such as actor network theory try to tackle the 'problem' of the status of technology by totally collapsing the category of 'technology' and non-human 'artefacts' as a special separate entity and regarding them as on par with other 'actants' that combine 'heterogeneously' in alliances. This also has been criticised by Button (1993) for failing to acknowledge the specific status of the technology. Actor network theory, according to Button has problems in being unable to draw a clear boundary around the actants that does not eventually encompass everything. Therefore, his caveat is to make clear what it is that makes up the technology in itself. Technology's content must be attended to and this occurs in the day-to-day mundane interactions at work that enable the technology to emerge. Although this research in video games was not undertaken in an ethnomethodological and ethnographic manor to account

for the minute intricacies of this process, the research did acknowledge the aspect of video game construction as a part of working interaction among labour, i.e. the interactions of individuals in organisations. The implications of this are attended to with the brief note about the political nature of the labour process below.

In as far as it is possible to describe the politics of artefacts through their specific configurations which are responsive to their environment, the attention to the work environment is also political. The aspects of 'negotiation' and 'politics' have been touched on, but here some of the dimensions of this at the work place where design occurs are spelt out. The analyses of media organisations have examined the interactions between personnel as they allocate scarce resources in the firm to their work. The concept of 'power' and its form of expression is offered, to explore how the intentional conduct of workers and managers influence the operation of the design and content selection activities in the firm. The issue of power in the organisation - in relation to the work practice - relates to the capacity for decisions to be enforced upon others to control their actions which may entail the use of threats or sanctions from managers or others. The expression of power may not necessarily be enforced in a raw manner using coercion but by the expression of authority that enables the subordinate parties to co-operate willingly without sanctions being used. For example designers may confer consent to the authority to managers and obey their decisions as if it was their duty to do so in the work place. However, a subtle note needs to be made that the issue of willing consent to the decisions of those in authority may not be present even though, there is compliance to the orders or conduct required. Hence the issue of 'legitimacy' entails an attention to the underlying acceptance of a consensus of the right of authority over decision-making to be accepted without any essential disagreements. (Fox 1971; Shoemaker and Reese 1991)

These issues are important because, although subtle and 'sticky' concepts, they do relate to the political issues of decision-making involved in design and content selection that are 'negotiated' in the firm. These are examined in the research as they do reveal that the sources of power and authority are both formally and informally manifest in the firm's employees and relate to their various knowledge-bases, roles, rules and competencies. How these are resolved relate to what content selection occurs and what is blocked off. Also of note is that these power relations exist between firms and go beyond the immediate context of the work place, (Shoemaker and Reese 1991).

It is possible to question the examination of the expression of power, and the SCOT and actor network approaches have been criticised for "*agnostically*" ignoring the a priori effects of ideological power in design such as patriarchy that exist over and above knowing actors' conscious design decisions, (Cockburn and Ormrod 1992 p.10). This research is guilty of this too, yet the meaning of intentional actors and their activities have to be explained as closely as possible to their own perceptions in order to meaningfully understand their circumstances rather than risk a second order analysis that distorts the meaning of their actions. For example the gendered psychoanalytic approach of Kinder's (1991) meaning of the 'Teenage Mutant Ninja Turtle' video games, noted in section (2.2), does not really attend to the meaning of the actants or relevant social groups as they see them, but rather as Kinder reads them via her theoretical framework. However wider issues of globalisation and capitalism's influence upon decision-making are noted, as these wider trends are relevant to the explicit and 'conscious' design decisions made.

3.4.4 Contributions from Media and Cultural Studies

The following section examines some of the influences from the making of entertainment media. This was drawn upon for an initial understanding of the process of making entertainment media in organisations. It was undertaken to gain some insights, in the absence of academic work, into the making of video games and used other entertainment software as a source of those insights. The compatibility of the literatures are noted in that they attend to the construction of artefacts and the use of the metaphor of 'texts' to account for technology has been noted by technology theorists e.g. Grint and Woolgar (1997), in that it is originally derived from literary and cultural studies. Similarly the literature tackles the notion of artistic creativity not being the result of sole individuals conduct but stresses there being a 'diffusion of authorship', i.e. there are other social and 'heterogeneous' influences involved, (Jones 1992).

Two useful insights were drawn, one touched upon how media organisations allocate resources to attempts to innovate or create 'new' entertainment media. The second relates to the actual media texts themselves and was drawn upon to examine the logic behind making choices of 'sequels', 'copying' or 'cloning' and 'licensed characters', for example, as they became increasingly relevant in the research activity.

3.4.5 The Production of Culture, Media Studies and Media Texts

The underlying themes of work in the areas of the sociology of art, (Wolf 1993, Becker 1982), media studies (Shoemaker and Reese 1991) and the production of culture (Newcomb 1992, Peterson 1982, Saunders 1982, Ettema and Whitney 1982, Gitlin 1983/1994, Turrow 1992, 1978, Ryan and Peterson 1982, Tulloch and Alvrado 1983), examine the issue of (artistic) entertainment media creation. This is undertaken by exploring, similarly as with the innovation literature above, the role of individuals and the social contexts that individuals and organisations work within to influence the content of media products. The emphasis on the tensions between 'creativity and constraint' and 'innovation and control' are the recurrent themes in this work when applied to creating entertainment media, such as fiction books, films, music and popular TV.

These approaches downplay the 'auteurist' vision of artistic and entertainment media as the sole creation of genius, but rather see the production as a negotiated and mediated process. There is a balance of both individual and structural forces in accounting for allocating creative resources to the production process of entertainment media. The immediate context of the individual's conduct is the organisational one: e.g., Saunders 1982, p.67:

"...this production of culture model focuses on organisational constraints which affect production activities. Available resources, the division of labour, power relationships, and technological developments within and among production organisations are central structural elements emphasised within this analytic approach. The central foci of the production of culture perspective then, are the co-operative social interaction ...which makes up the production process...and the structural features (work roles, technological change, organisational arrangements, distribution channels, and so on) which contain this process".

One aspect of power examines the unequal stratification of control various groups' may have in firms e.g. in bureaucratised firms or in a wider context such as broadcast networks. One key notion of 'gatekeepers' has been reapplied in this approach to note

how key content decisions are made by key actors which is an expression of power in its control over the product's form, (Hirsch 1972). This is one example of how content decisions are controlled in interactions with other significant personnel. Other notions are applied to the role of conventions in both production and in the product. These note how regularities occur in actors' work behaviour in production that provide work routines and rules to act as a form of control upon the work by making various personnel responsible for specific tasks. The function of these work routines in the organisation is a way of controlling risk (Turrow 1992) in that the communication process in deciding what should be done, by who and how, is simplified. Secondly, product conventions serve as a way of minimising risk for the firm in terms of creating a consensus over the products form that provides a degree of predictability, such as the choice of a 'thriller genre', which provides a model or 'formula' to work towards. The issue of risk and innovation and the need for predictability and conservatism in content choice reoccurs in this literature. The location of firms in a business context that seek profits or audience share (e.g. Gitlin 1983, Blumler 1991) is often pitted against the need for innovation and diversity in content, e.g. often with the production of risk averse content in 'sequels', 'clones' and 'spin-offs'.

Other attention has been given to the role of the audience as an influence of the market, in how they are constructed by producers into 'typifications' and how this conceptualisation influences the content selection of media. Turrow (1992, p.98) notes how these interpretations serve as guidance to how to target a single product to a 'mass' of people and influence the degree of innovation or 'newness' needed to meet a particular type of audience. Or, alternately, the audience is, in effect, a key 'gatekeeper' with power over vetting programmes similar to that of, for example, TV executives (Turrow 1991). The influence of institutional arrangements (Newcomb 1992) has also been noted. One study, Tulloch and Alvrado (1983), examined the emergence of the TV science fiction drama *Doctor Who* as an example of innovation in children's programming from its initial context of the BBC's competition with ITV and maintaining its public requirement to produce certain types of programmes with a commitment to historical and science content for educational reasons. This study is an example of the complex influence of macro and micro factors that mix to influence the content of the *Doctor Who* drama. This illustrates how individuals can influence their content choices while also wider influences come into play, such as other media like *James Bond*, the BBC's changing organisational context, pressure groups, the enrolment of new script writers, actors' individual influences, the role of technology for special effects, and so on.

The crucial point to remember is the significance of the interactions are important to note for their results of influence upon the content of the media and not on just the interactions for their own sake, (Saunders 1982). The media 'message' is taken seriously, just as 'technology' is seen as serious in SST studies. Additionally, the specific medium has to be accounted for in its own right to understand the specific logic or strategies employed in the industry, which differ from media to media, (Miege 1989).

The influence of the above literature therefore was to gain an appreciation of what to examine inside 'the black box', by analysing interactions of situated individuals in organisations producing entertainment media, the artefact's construction context and its specific attributes. Therefore attention to the aesthetic aims and values of creative personnel as well as their mediated choices in the various contexts that they and their organisation were situated in was used to account for the construction of the video

game. However, in this literature, there is no attention paid to the implications of the multi-directionality or the emergence of entertainment media, in the sense of exploring the 'what ifs' or 'how else it could be different' of the SCOT approach.

A final branch of the media studies literature was examined very tentatively to examine the role of content conventions in entertainment media. This was undertaken to understand, for example, the implications of 'seriality' and 'continuity' in texts over time, as in comic books and how 'new' changes in the product could exist while continuing to belong in a familiar frame of reference for the audience as with sequels or works belonging to a 'genre' (e.g. Reynolds 1992, Eco 1985). These were undertaken once the video games in question for the research came under discussion and some understanding of the implication of managing the issue of repetition and familiarity and novelty in the game's content were explored. This was not an attempt to deconstruct the game's codes in a full blown textual analysis which examined the game's meaning aside from the designer's motives but rather to understand the implications of the given content, such as 'intertextuality', that, for example, borrowed from other media as a tactic to create surprise and novelty.

3.4.6 Theoretical Summary

Figure (3.1) is a visual representation of the conceptual framework used in the thesis as informed by the SCOT approach and the work by Silverstone and Haddon. The Silverstone and Haddon model was amended by the SCOT approach to attend to the situated nature of innovation and explore the multi-directional process of technology development. Due to the limited resources available to a researcher doing a Ph.D., the examination of the consumption of technology, or here games, in the micro-social phase of Silverstone and Haddon's model was excluded. Insights were also drawn from the creation of other entertainment media to gain further understanding of what relationships to be sensitive to in exploring the creation of games. This allows the production of accounts about the reasons for designing what people will eventually get given as entertainment. It provides an understanding of the complexities, and the reasons for the complexities involved in its provision.

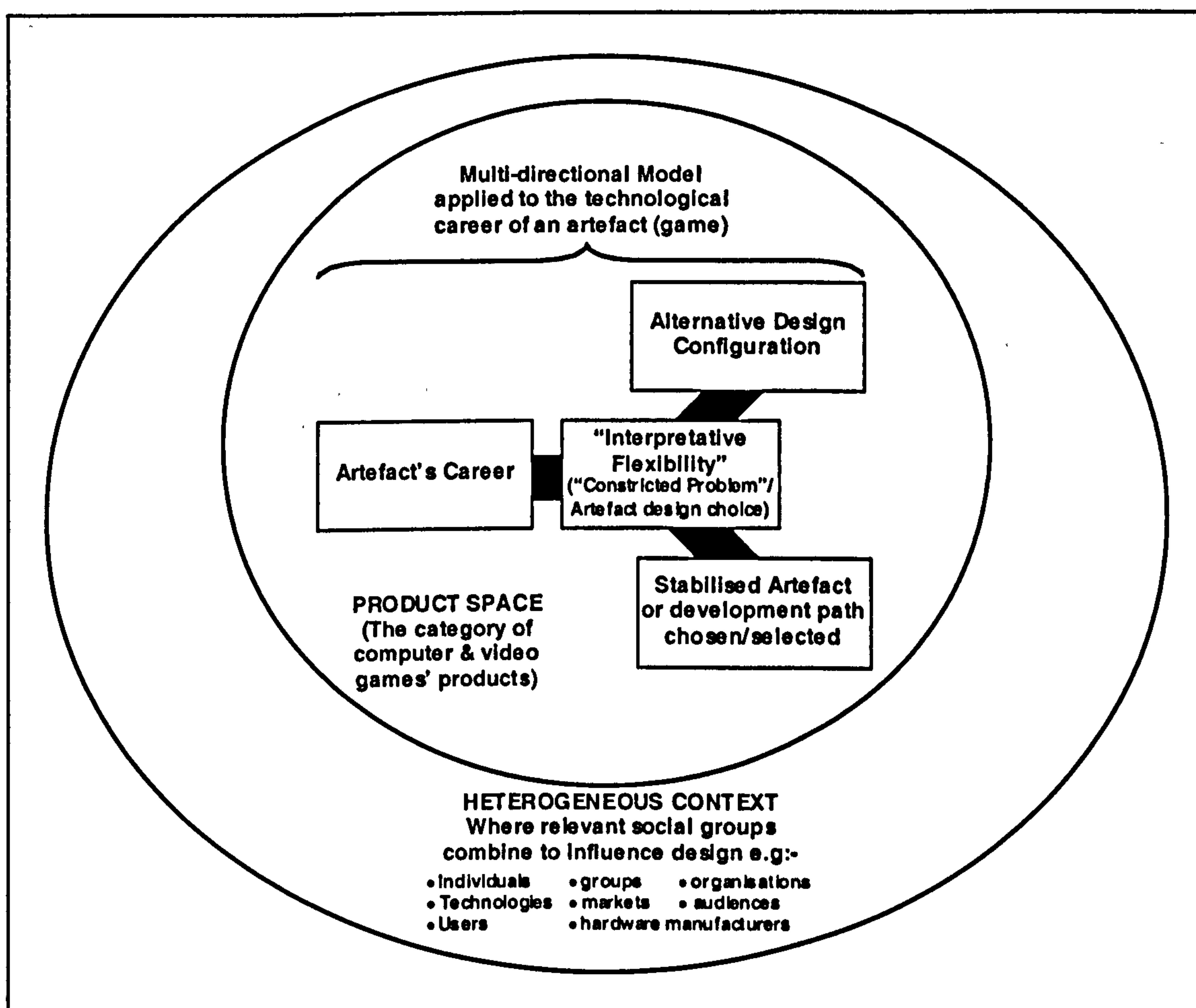


Figure 3.1: Conceptual Model

The synthesised approach undertakes the examination of the emergence of a video game's 'career' in its 'macro-social' context and accounts for the choices in its evolution as it emerges in its 'product space' and seeks to understand the reasons for the branch points and their implications. The research also intends to note the designer's individual motivations in creating the game and the interactions made that mediate these aims along the game's production 'career'.

This chapter then has served to give a theoretical basis for the substantive objectives that were made provisionally at the end of section (2.2.4). In chapter (2), it was noted that the literature had largely neglected the making of games and the explicit ideas behind them; and that the brief examination of industry concerns had seen that industry structure and institutions were potential influences upon the design of games. This chapter sensitises the thesis to acknowledge that the examination of developing gaming technology must take into account the interaction of heterogeneous influences from individuals, groups and artefacts as they interact to construct the technology throughout its career.

The objectives of the thesis then, are to understand:

- (1) The motivations of the designer's content choices and see how these were mediated by the following :
- (2) The influence of the development context in relation to technology, group and organisational impacts.

(3) The influence of the console manufacturer's licensing conditions and the software quality control or approval process.

The most explicit contribution from the theoretical literature in this chapter in section (3.3.9) on the research objectives, is the examination of the user and their place in games' design. So the fourth objective is to:

(4) Identify where the user or player entered into the development process and how their 'needs' were considered in design.

The next chapter examines the method in which these stated objectives were captured in the research activity. In order to do this consideration is given to what data sources to examine, how to collect and analyse it and what strategy was employed to perform all this.

4 Conducting the Research

4.1 Methodological Concerns

4.1.1 Introduction

This chapter of the thesis concerns itself with a discussion of how to enact the study of the design of video games. This is done by drawing on research undertaken in media studies and the social construction of technology.

The growth of studies that have looked at the production of media products has occurred since the 1970s and 1980s with the growth in media and cultural studies. Again, in parallel to the 'social shaping of technology' approach (discussed in 3.4.1), these studies do not take a 'black box' approach to media construction that only looks at 'effects' of the media, but considers the influences upon their construction. These studies differ in their degrees of resolution. Approaches to media construction from a purely political economy approach have been complemented by more micro, ideographic, 'contextualised' studies focusing upon perspectives that account for organisational and individual elements of choice and negotiation as well as historic concerns. The range of questions tackled by the examination of production media is broad. For example, Newcomb (1992, p.94) in suggesting the examination of a drama program throws up a number of possible aspects open to study via the 'production of culture' research perspective, mentioned in section (3.4.5):

- *What is the specific industrial organisation of TV drama production?*
- *How do writers, producers, executives, actors and directors influence content?*
- *How do external pressures from special interest groups, networks, and advertisers shape production?*
- *What is the role of technological development in shaping content or organising production?*
- *Historical concerns over production of media*

These typical aims match the objectives applied in this research, regarding the individuals' aims of content selection in design and their contexts of mediation in the development process, as outlined in section (3.4.6).

4.1.2 Finding an Appropriate Methodology for Studying Media Production

Newcomb (1992) contrasts three model studies of production of media texts that throw the salient issues of this type of research into light. Each of the following studies - Elliot (1972), Cantor (1971) and Gitlin (1983) - carry implications and trade-offs that are useful to examine. The merits of these research 'models' have relevance for the approach here to studying the production of video games and the implications of these research strategies are discussed below.

Elliot's book *The Making Of a TV Series* (1972) adopts a chronological case study method to explore the origins, production, post-production and broadcast of a documentary. In this examination of the biography of a TV program it was possible to grasp the key decisions made by significant actors in its production. Elliot's study focused upon decisions influenced by issues concerned with personnel, technical concerns, aesthetics and the labour process. This highlighted the role of power,

negotiation and social choices made in production. The implications of this type of analysis of media production at this 'micro level' are that wider generalisations are problematic. Different programme types have different imperatives in terms of continuity, costs, audiences and production logistics, (e.g. Tunstall 1993). To generalise from conclusions made from examining the production of a documentary to a science fiction children's program can mistake a range of issues as being relevant when they may not be - and vice versa.

A second relevant model is Cantor's *The Hollywood Television Producer: His Work and His Audience* (1971). Here rather than using a case study approach, this study used 52 taped interviews with TV producers. This was complemented with documents and field observations of behaviour in TV studios. The advantages of this research method is that by adopting the perspective of producers and representing their views, knowledge of a particular 'class' of workers which are significant to the production process is obtained. Examination of these production histories yields factual information on the range of projects they have worked on, knowledge of costs and timing as well as choices made and crucial decisions made in the negotiations with other personnel and departments. These observations have to be accumulated to produce data that yields a 'wider/generalisable' picture. The advantage here is that the large number of producers interviewed would divulge experience and knowledge over time of working on different programme genres. This gives the breadth and generalisability to the data missing from the isolated case study as in Elliot's work. Also by using documents such as trade and industry papers the contextualisation of individual perspectives within wider industry development is possible.

The final model - T. Gitlin's *Inside Prime Time TV* (1983) combines elements of Cantor and Elliot's work. Here the sample size of 180 was comprised of the 'multiple perspective' accounts of all the key actors involved in programs as well as the division of labour in its production. Additionally as with the Elliot (1972) case study, material is offered from (fictional) programmes such as *Hill Street Blues*. This work allows for wider generalisation than the other studies. It goes beyond occupational sociological approach to link evidence to the wider industry and beyond to wider culture and society. Applications of these approaches to the research are discussed below.

4.1.3 Main Data Gathering Tools

With the exception of supplementary questionnaires as in Levy and Weingartner's (1991) toy's study and some supplementary textual analysis in Tullock and Alvrado in *Dr. Who: The Unfolding Text* (1983), the two main research tools in production research are participant observation and interviewing.

The merits of these two approaches and applications of these to this work is considered.

4.1.4 Considering the Viability of Participant Observation.

The use of this method (as in Elliot's work in 4.1.2) allows the researcher to grasp the process of mundane work routines as well as the negotiation and decision-making processes between workers that impact on making media. It illuminates who has power in the resolution of conflicts over content and production practices. Also the choices made by staff through the production 'life cycle' can be registered. In this way the research process can adapt its questions and directions en route.

Using this technique in examining the design of video games would be useful, for the above reasons. Data about key decisions concerning what the game content should be, how this should be implemented, what market it should be targeted at and when release could be obtained. Reasons for revisions and changes of plan could also be obtained. This would show what was excluded as well as what was included. Finally the data would ideally be obtained in the spatial and temporal context in which it occurs. The use of ethnographic data to represent the design process would capture insights not available from other techniques.

The success of this tool is dependent on what level of access is available. Access can be facilitated in two ways:

(i) The researcher's own knowledge of what is important for study and their understanding of the procedure of how games are written can facilitate targeting who is observed and over what time frame. On the former point the correlation between the researchers understanding of how a video game is produced, by who, with what technologies and what the researcher is looking at and recording is vital. This is because it ultimately contributes to the level of understanding the researcher will have of their observations of the production process.

At the beginning the research I acquired some basic knowledge of how games are written from initial industry contacts, industry and hobby press and electronic mail. But how this process differs from one organisation to another and its informal procedures of regulating development needed attention.

(ii) The question of duration of access, as well as access to whom, is problematic. Computer games now can take over 18 months to produce and cannot be guaranteed to finish on time. This complicates any attempt to organise access for carrying out observation in terms of synchronising the researchers own budget and time constraints to the game's development cycle. Further many games are produced in 'teams' which can mean that the graphics and sound components of the game could be contracted out to an external development team in a different organisation or to people working freelance at home or even abroad. Also the question of secrecy during initial stages of a current design project may be problematic. This may stifle communication of how the 'key innovative hooks' or embellishments of the game are to be operationalised or how specific technologies or techniques will be chosen.

For example in one interview (22) the issue of what was 'new' in the Formula One game being written was glossed over and further probing questions caused some 'stonewalling', which at the end of the interview was explicitly mentioned for fear of me going to a rival software house and divulging their 'hooks'. Another subject mentioned in an interview that contacts in other rival firms did occasionally discuss ideas but not their specific expression such as the type of graphic engine used, (8). [NB. The numbers in brackets relate to interviews listed in A.4 in the appendix].

Further, there is no guarantee that the game will be released or even finished as projects can be shelved. This occurred in one example in the research regarding the game *New Day*, that was subject to media attention on BBC television's *Tomorrow's World* programme. Had this project been chosen for a case study for the thesis, then the final stabilisation and closure mechanisms would not have been mapped. Also an issue with attempting observation of the design process is that the informal and tacit decision making process may either be unobservable or exist in informal areas such as the local pub or midnight e-mail dialogue and be beyond the grasp of the researchers

scrutiny. For example in this research, one subject had mentioned that they had “no-go” areas that were only accessible to senior members of the firm to avoid knowledge being given away to other firms, (8).

These drawbacks aside, access to design meetings and progress meetings where decisions are made, along with observations made in the game’s production would be invaluable, but only if consistent access to the key actors and technological process of development could be guaranteed over time.

Indeed my five-hour stay at the digitisation of the actors of the Philips / Bits game *New Day*, gave useful insights into the work practices of applying this form of technology to graphics’ design. It showed how the actor/director negotiation process resembled a film set model. This, if perpetuated over time to all phases of the design process, would be very enlightening. Unfortunately, the complex nature of the game and the technologies used meant that 40 people were involved in its design, and the time scale of development had to be extended. Also, despite signing a ‘non-disclosure agreement’ some information such as budget allocation was not forthcoming due to its sensitive nature. This sensitivity is not the case so much with an ex post facto research design, whereby the research occurs after the release of the game.

The final consideration over the validity of the data would be in the issue of observer bias -i.e. would my presence influence the behaviour and actions of those actors I observed. This could be reduced over frequency of visits and familiarity with the sample.

Therefore, the key reservations concerning the potential use of observation in this study were over the time frame needed, the problems of gaining perpetual access, generalisability and the practical limited attention the researcher could give to observing the design process. This would be best suited to an industry-actor that could combine their work role with that of researcher as in Woolgar’s membership of a project team working on a new IBM compatible 286 computer, (Cooper et al. 1993, Grint and Woolgar 1997). The implications of using observation and its potential problems for the study therefore necessitated the consideration of relying on interviews for data collection, which this research mainly used.

4.1.5 Considering the Approach of Interviewing

Again the advantages of using interviews are similar to those described in Cantor (1971) or Gitlin’s (1983) work above in (4.1.2). By interviewing a mix of actors involved in production a ‘multiple perspective’ data set is obtained. This reflects an historic set of factual accounts on a variety of projects over time, which designers and development members have worked on. This in turn broadens the validity of the data for generalisation. Also it captures the changes in design fashions and work practices and technologies that have affected the process of the design of games.

The process of interview can be flexible when new leads can be followed-up and relevant questions updated and substituted. Answers can yield highly detailed information beyond the scope of observation alone as counter-intuitive explanation and motives can surface.

Newcomb (1992, p.101):

"Interview data further facilitate the gathering of historical perspectives. Subjects have usually been involved in many projects often for many years. Thus they have been able to point to changes caused by technological, financial or regulatory factors.

In this way they actually do some of the researcher's comparative work. One of the pleasures of interviewing is to discover how analytically aware practitioners are".

This last point of 'awareness' is reflected by MacKenzie's (1987) note that successful engineers who were able to take into account the overall market they worked in beyond the technical "*nuts and bolts*" side of their activity and present an awareness of their circumstances, (Edge, D 1995, p.27).

This approach of using interviews to gain a multiple perspective account of the design process of games is tied to the mixed disciplinary approach of contemporary games' development, where many personnel are involved. Games undergo redesign during development and are not developed in a totally sterile preplanned fashion. Inputs to the design can come from a variety of sources. Further, video games exist in a variety of design genres and are not singular entities. They have a set of design conventions which carry implicit and explicit 'rules' and content considerations which are accounted for in considerations of their structure, similar to TV programmes, (Tunstall 1993). Interviews with a number of designers can reflect this as well and provide an historical element to compare designs of games over time.

The potential drawback to interview data is the influence of time on subjects' memories and also inaccuracy caused by misunderstanding questions or giving preferred 'typical' answers, for example when discussing the issue of 'originality' and 'creativity', which is a perennial industry concern. This can give rise to rhetorical responses in discussing the producers own work that serves to maximise the skills and status of the respondent and / or externalise criticisms to others competitors or superiors. This was a concern with accounts musicians gave in making pop music, (Frith 1978).

One example of this was a subject giving an account of the best critical review of the game of *Terminator 2* for the Nintendo Game Boy - while neglecting to talk about the poorest conversions his firm had produced for the Super Nintendo (4) - which was discussed with another team member (1). This gives an example of the value of 'subject triangulation' in a multiple perspective approach in extracting competing accounts of subjects concerning the same events (e.g. Tullock and Alvrado 1983).

Also, an industry related influence on interview data was the reluctance of some subjects to talk about projects under development due to their having to sign 'Non-Disclosure Agreements'. These can vary in scope over what they prohibit, ranging from anything about a project to the specific technical details used in a project, (3). This can be of particular importance when dealing with personnel that have recently entered the industry as their range of active design practice will be under the influence of such agreements. (However, it was possible to talk about such topics 'off-the record' with some subjects.) Given a choice over sample construction then, where possible preference was given to the more experienced designer over the lesser experienced one.

Again on the topic of data validity, cross-checking and cross-referencing of interview information is necessary to double-check dates and facts that might be intentionally or unintentionally incorrect. In the research on game production this can be, and where possible was, minimised with interviewing fellow colleagues, or looking at primary source material such as magazine reviews and documents.

The location and timing of interviews has to be negotiated and in media production organisations, where deadlines are part of the work routine, access and duration of

interviews can be affected by this. In this research, for example, the willingness of potential subjects to talk on the phone in taped interviews was also noted in two occasions but not used. The locations of interviews were either in subjects own houses - where freelance - or in the workplace or in a pub and cafe. The influence of the location upon the rapport and nature of the interview did not appear to vary significantly to attribute any bias on the interviews but this is a consideration that the researcher has to keep in mind. The cafe location however did not provide resources or cues to aid the interview compared with the workplace. In other cases the proximity of design materials to two of the freelance workers for instance meant that these could be used as resources to aid the discussion and jog memories. These included for example a notebook of programming notes, feedback letters from publishing houses, and pictures of games or games actually running on a computer. This use of memory cues was borrowed from similar ideas in work by Silverstone et al. (1989). (Sections (4.2.4-5) go on to discuss other issues that were involved in obtaining and carrying out interviews for the research).

4.2 *Research Design, Method and Analysis*

4.2.1 The Overall Plan of the Research

The insights of the above section viz. Newcomb's (1992) recommendations for carrying out production research are enlarged upon here in relation to this study of video game production using specific case studies and general development interviews.

The research sought to adopt a similar approach to Gitlin's (1983) work and interview a range of personnel with various skills involved in game development. This was to gain a range of data from various types of games in different contexts across firms. The target was set to interview approximately 30 personnel, (although there were actually finally 32 taped interviews).

From these 30 planned interviews, it was intended to construct an historical case study of the creation of a whole game, aiming as in Elliot (1972), to account for its development from idea to market commodity. The aim of this was to give the fullest possible account of technology development and to account for the chronology of branch points and choices made in its creation. (An additional motivation was that these personnel would have worked on other games, which would provide some additional insights). The interview data from the case study material of making one complete game from the accounts of the design team would be used, therefore, to contrast with the general accounts from the remaining 'general' interviews of personnel who had worked on other games. The criterion for selection of the game for the case study was that it had to be a completed and released Nintendo or Sega game. This was in accordance with the SCOT approach on 'controversial' topics to demonstrate their 'interpretative flexibility' - as outlined in the pervious section (3.4.3). The subsequent chapter on industry structure (chapter 5) outlines the political factors surrounding the design configurations of the Sega and Nintendo machines and their systems of production and diffusing games.

In addition to the interview data, the research also undertook some historical desktop research to account for the industry structure that influenced the design of games. This served to highlight the background problems of the conditions of production that was relevant to the case study games production. Specifically this outlined the evolution of

the closed architectural hardware systems of Nintendo and Sega and the ‘problems’ associated with it for software production and the potential problems for innovation and creativity. This context is outlined in chapter (5). The consideration of materials used in the research of chapter (5) is covered in (4.3.2). Figure (4.1) illustrates an overview of the research design.

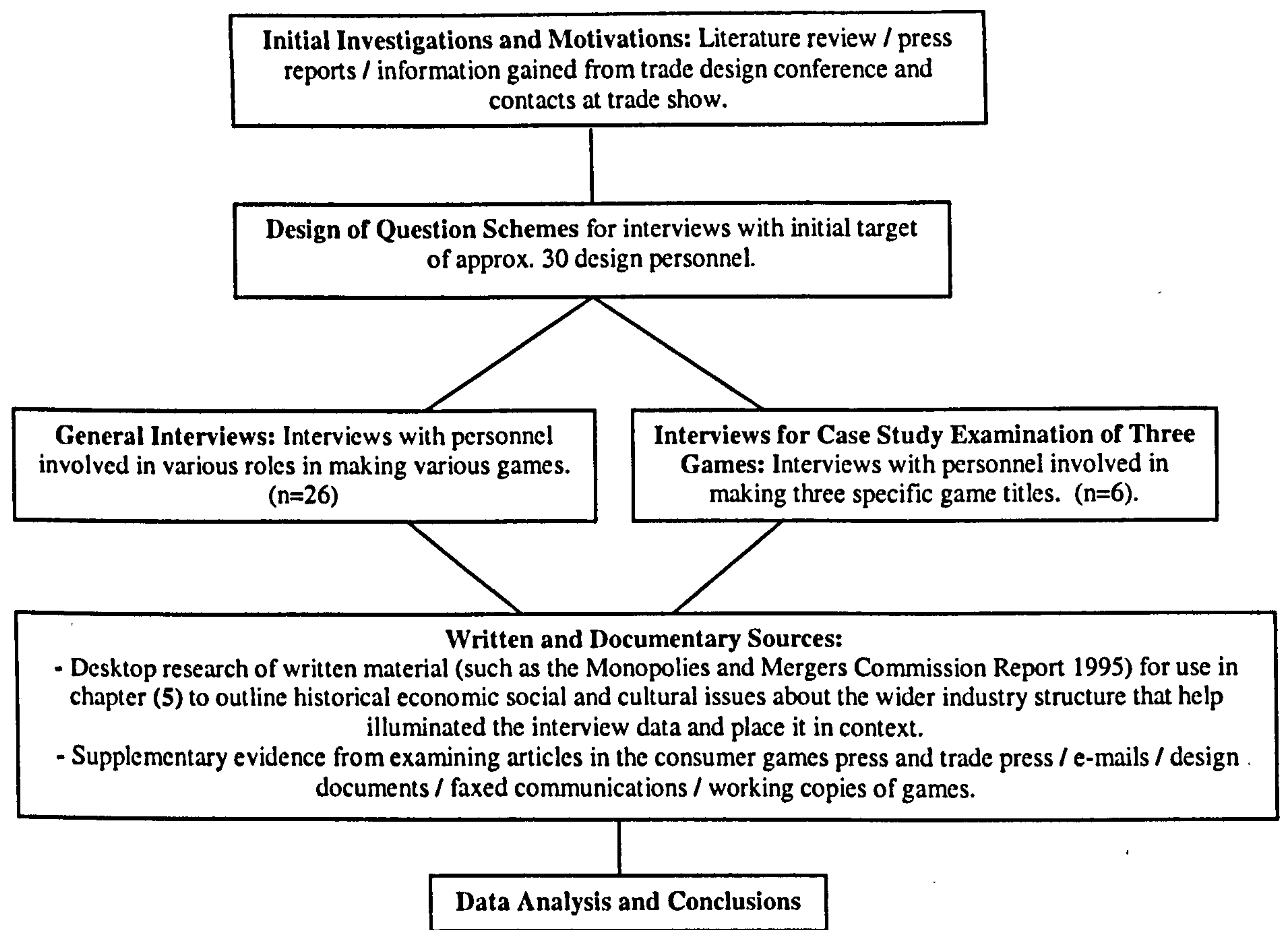


Figure 4.1: Diagram of the Research Design and Research Activities.

4.2.2 Gaining Initial Access to Subjects

The method of gaining contact with interviewees was through the initial contacts made at trade conferences. (Section 2.2 and appendix A.1 give a discussion of the first trade conference attended and details of these initial contacts). To recap, these served to highlight salient issues in the development of games and confirmed that these would be a useful focus for the prospective thesis.

This also provided an opportunity to start to meet personnel involved in making games and initial contacts. In a few cases, extended e-mail exchanges occurred between myself and interviewees to build a rapport and gain information about industry practice and news of further events, and to make other contacts. Examples of information I obtained were copies of articles written for a trade publication about the state of the games’ design industry, as well as a C.V. of one programmer’s games’ production history, which served as a useful source of questions. The e-mail

correspondence itself provided a written record of my dialogue to follow-up on later, but was mainly helpful in gaining some understanding of industry routines and jargon.

Newcomb (1992, p.100) warns that a high level of "*specific knowledge*" of industry workings and industry organisation is essential before going 'in' to interview busy media professionals. Again the dialogue with games' producers on e-mail, or approaches made to people at trade and specialist shows aided me in filling the gaps in my knowledge. The industry or 'non-academic' literature on the actual writing of games was very sparse e.g. Crawford (1984, 1986), and to some extent Levy (1984), Carlston (1985). So such knowledge was not readily available, in contrast to other media, given the relative 'newness' of video games as entertainment media. Newcomb stressed that there should be virtually no time 'learning' from professionals the mundane details about their work and the focus should be upon the questions regarding the research objectives. Therefore, a knowledge of 'who is who' and what technology does what and knowledge of technical terms and key milestone game designs helped considerably in the communication process of the interview. Subsequent to the beginning of the research in early 1995 some insight was obtained from the MMC report, HMSO (1995), Lavroff (1995), Skurzynski (1994) and Katz and Yates (1996). These gave some formal accounts of how games were written and developed (although the latter three were more entertainment based texts). The knowledge obtained in this initial phase from these first contacts was useful for forming the details for the question scheme used in the main research, (see section 4.2.3).

4.2.3 Construction of Questions

This section concerns itself with outlining how specific industry issues and the theoretical issues of media innovation were linked into the question scheme. The research objectives outlined in the theoretical approach detailed in section (3.4.6.) were influential in structuring a set of general questions to ask designers. These were influenced in their structure by Silverstone and Haddon (1993b, p.54-55), Newcomb and Alley (1983, p.all interviews) and Turrow (1978, p.122-4). They were set out to range from individual aims to the influence of wider contexts on development and are included in the appendix. In addition, details derived from the initial understanding of the design process mentioned in section (2.2) and (4.2.2) were used to determine detailed questions for the overall question scheme that were industry-specific in nature. The general order of the questions asked corresponded to the order of the research questions. The purpose of the questions was to examine designer motivations and aims in structuring content, the implementation and mediation of these in the labour process - observing the influence of organisational imperatives, considerations of the user and influence of Sega/Nintendo in the approval process. The questions are listed in appendix (A.2).

The factual questions were aimed to gain a profile of the designer and to help in the process of building a rapport with them. An awareness of some background information about the subject gave an indication of what stage they had entered the industry, what tools and technologies they had used and what they had done. These were a useful resource to follow-up on and helped indicate the level of experience of the designer, which was useful in gauging the possible length of the interview.

The questions were designed to act as stimuli that would loosely aim to follow the design process or 'career' of the game from initial ideas to their embodiment in

software in development. Additionally this would capture the emerging game's interaction with technologies, other developers, managers, publishers, and finally their release, as well as to question how the user was considered in the design of games.

The first section of questions aimed to look at the motivations of the individual's behaviour. The designer's ideal aesthetic choices concerning styling and product formation were examined. This related to choices of the symbolic content and what should ideally be included or excluded in games' software. Further it covered the area of game design at the 'ideal' level of structuring games and not the actual process of operationalising it.

The questions were designed to be asked in relation to past/present and near future contexts. This related to the changing patterns of technology and demand and design fashions that act as models and resources for the designer - (as seen in the theoretical section 3.2.1). This section then, was largely about perceptions of the designer: what they want to do and where this 'fits' in reflectively with the creative efforts of others in the market.

The following section of questions, in contrast, looked at the actual process of operationalising these ideals and perceptions. It was at this point where the questions sought to explore where negotiation and mediation of ideas and perceptions occur. The need to look at the mundane process of crafting the game within the organisation or workplace, needs to be addressed as the typical 'rational' and linear model of design that is used to describe work activities may not (and frequently does not) apply in actual case. Also the activity of operationalising a game, is in itself, part of the design process as the 'disembodied' ideas and prototypes have to be interpreted and demarcated between individuals.

The questions examine the interactions between development members in choosing and negotiating what to include and exclude, then the political element in the design of games is concluded. The final element of the section looks at the technological issues in game design.

The rationale of the section about 'the audience and the user' relates to the major concern of the research - the place of the user in the design process - and how the user is considered in the game's design. This covers issues of identifying who 'the audience is' and how this impacts upon the design process and examines another aspect of mediation from the market. For example, the questions try to anticipate how the designer aims to structure the content and accommodate the player in the game. Also the questions aimed to elicit if the design of the game were entirely at the discretion of the designer.

The final set of questions looked at the wider institutional elements of the industry that operate beyond the control of designing individuals or groups. These include legal issues and the model of relations between firms that the industry has adopted. Therefore the questions tried to capture aspects of design as an interactive process responsive to various types of heterogeneous contexts.

The case study questions were largely derived from the general questions with amendments appropriate to the specific game's context. These questions served a similar purpose to the general questions and the experience of their use was similar. (The case study questions are included in the appendix A.3).

4.2.4 Gaining Access and Asking the General Questions

This section concerns itself with the task of obtaining interviews with the design personnel who were involved in a diversity of design roles for various games.

Knowledge of industry time cycles was of help in the process of gaining access to the interview subjects. Knowledge of industry calendar events, such as the Spring and Autumn European Computer Trade Show, was used to construct initial meetings with contacts, as well as to gain a source of information on latest game design trends and to see what firms were releasing. Also knowledge of the traditional industry design / release timetabling of games for e.g. the Christmas market, helped. Although games were frequently late and control over deadlines was not effective, many of the interviews that were undertaken occurred in the winter of 1995. Additionally, the contemporary complexity of games has meant that design timetables are not as seasonal as they may once have been. Typical lead times were 15 months or more, rather than 6-8 months, which means that there is less scope for a firm having a 'quiet time' which was suggested to me as a suitable time for obtaining interviews, (Haddon 1994 personal communication).

Contacts were followed up with formal letters of introduction and then a supplementary phone call. The firms selected were mainly in the London area as this was where the main geographical location of the development 'community' was said to be and was in close proximity to my home. The letter was for authenticating identity and gave a brief explanation of my research aims. The phone call was used to negotiate the timing and location of the interview. The name of a contact within a firm was either obtained from a previous interview or from ringing up firms listed in the European Computer Trade Show exhibitors' guide and asking for the name of the person best to contact.

With the general interviews, the respondents were usually pleased to take part and once a rapport had been established the enthusiasm for their interest in games showed. On a few occasions, I was shown work in progress as a testament to the subject's design efforts. In one firm, I was encouraged by team members, who were interested in my presence, to write a book and on a few occasions they asked to see the conclusions or said that the research was interesting. In one of the large publishers I visited, I was thought to be a journalist of a game's magazine as the larger publishing firms had periodically invited journalists to preview games and work in progress.

Also, given that some development work was freelance and performed at home or that some programmers are 'free spirits' with unorthodox life styles (e.g. Levy 1984) with nocturnal working habits, making contact and achieving a rendezvous was sometimes problematic. The time stamps left on e-mails give evidence of time shifted activity. One programmer left his phone unplugged so not to disturb his sleep, which meant that I had to e-mail him and get him to contact me. A final element of the issue of timing involved a rescheduling of subjects' work timetables - such as managers' project meetings. Two planned interviews with the MD of one firm were cancelled due to trips abroad. Conversely, there existed scope for unplanned interviews such as my talks with a designer and director at the filming of the game *New Day*.

Obviously there were many questions in the scheme, and thus these were time consuming to go through one-by-one. The idea behind their structuring was to acknowledge that many questions might have become irrelevant once others had been asked: e.g. the answer to 'How do games get written?' did subsume the following questions 2-7, and a verbose answer by the respondent might mean that there was no

need for follow-up. The range of questions were to act as prompts should short answers be given and provide resources should my mind 'go blank'. Additionally the line of questions provided a set of semi-structured questions or areas to direct the interview along, so that all the interview were to some extent standardised across designers. (This was not the case in Newcomb and Alley (1983) with their interviews with TV producers).

The aim of having some prior knowledge acquired from the initial contacts with industry personnel and from magazines, of terms and industry events and milestone games was helpful. For example subtle but significant replies can be noted for their relevance and followed-up so as to avoid the descriptive consequences of continual questioning. Therefore knowing about the latest games shown at the trade events which structured the industry's time cycle and displayed the latest 'innovations' helped create mutual reference points as well as confirm some degree of rapport over a basic knowledge of the significance of the characters *Sonic* and *Mario*.

Questions were asked that were not pre-planned but which were follow-ups to new response leads. The topic of reverse engineering for example was discussed upon the initiation of one subject rather than at my intimation - due to its potentially sensitive nature. Also the encouragement I gave to preceding the main bulk of interview questions with a discussion of actual experience made many questions in the schedule redundant. For example when asking about what games one respondent had written - in the factual question section - the interview had effectively 'jumped' to the second section with the designer explaining what they did and why whilst describing chronologically their career development in terms of their projects, (2). Given this spontaneous restructuring, it became apparent that relating the questions directly to the subjects experience of making specific games, rather than generalisations or typifications of their experience and then asking for examples for each statement, was a viable method of conducting the interview.

In this way, for example in interview (2) by talking about the design of computer games such as *Risk* and *Diplomacy* a comparative analysis is possible. This has advantages over seeking only general answers to questions. This 'game' by 'game' procedure was less successful with one producer who had worked on over 30 games. In this case only a few of his games could be discussed in detail with general answers given to some questions, (4). An exhaustive interview of all the questions with verbose exploration of the games produced by two designers took over 3 hours each as in interviews (2), (1). With the shorter interviews of 30 minute to 1 hour duration, follow-up questions on e-mail were used to cover issues not explored. This worked well on one occasion but on others it proved a clumsy method of communication, as the responses were vague and selective in nature.

The interviews were tape-recorded and accompanied with note taking. This was used to give a 'visual' overview of what had been covered and to enable the making of contrasts and links between issues that could generate new questions and leads. For example the interview with, (4) had a 'branch' at one point that could be examined for its technological implications for game design as well as its organisational implications. This helped keep track of the interview and encourage 'active' listening and focus concentration during long interviews.

Additionally the notes also helped when the tape recording reproduction became poor, for example, when the interviewee moved away from the speaker or external noises caused disturbance. For example, the answer given to a question by interviewee (5),

about the role of the audience in providing design ideas, was obscured on the tape by the director in the background shouting actions to the actor on stage. The notes I made at the time helped to make sense of the recorded speech.

In some instances, it was possible to conclude the interview with the questions being used to 'mop up' uncovered areas or to stimulate any new areas of discussion. This was done by giving the list of questions to the subject at the end of the interview. In practice, the interviews were flexible in nature and not rigidly dictated by the interview scheme. This was mainly due to the subject's experience or role, such as artist or game tester, which limited the relevance of some questions.

In short, then, securing access to the subjects was often outside of the control of the researcher. Also, as the work continued and new research links evolved out of the initial interviews, access had to be negotiated and renegotiated. To this end re-interview with subjects on e-mail, to clarify comments and establish a line of questioning on new topics, was attempted as the research continued, although as noted below (4.3.8) this was not as useful as anticipated.

4.2.5 Conducting the Case Studies

The three case studies of the games in chapters' (6), (7), and (8), were constructed after initial contact with personnel taking part in the general interviews. These agreed to help set up interviews with available 'team' members. Relevant contacts were managers who had access to these workers. One manager suggested that obtaining all the personnel concerned would be difficult as 'teams' often disperse after a game's completion, and this proved to be the case here. Additionally the managers expressed reservations about the time needed to take members off work to be interviewed and this may have played a part in failing to obtain a successful return visit to one firm to secure a final interview with a programmer. This does illustrate the conflict between media routines and the researcher's interview practice. In one case, a phone call before embarking on the case study of one game had provided useful information about what to cover and also that there were no recorded documents as the games was 'inspirationally' designed. This game was a sequel and it was advised to ask questions about its predecessor, from this it was possible to grasp enough interview data for covering both games - this was unanticipated. This aided the formation of a set of stimulus questions (i.e. A.3 in the appendix) that amended the general set of stimulus questions asked to other industry developers, (A.2 in the appendix), so that they fitted the specific games. In one case, I had deliberately acquired the game (second hand) prior to the interview to understand its general style and 'keep up' with the designer's account without stalling him with extra questioning on details.

The games were both primarily for the Sega and Nintendo console formats that were part of the global 'boom' in the home video games market in the early 1990s, (as section (1.1) and chapter (5) explain), but also they were additionally replicated for other hardware formats. This gave a degree of comparison concerning the implications for design of producing for different machines and served, in one of the case studies, to illustrate an alternative scenario to publishing between open and closed hardware architectures.

The case studies were incomplete in the sense that it was not possible to gain access to all the team members and documents were not kept. Although the principle designers could be interviewed and used to reconstruct the game's creation and some of the additional team members were available for interview, in the case studies there were

personnel missing. The reason for this was a co-artist at one point in the game's development had moved to Canada, and a game tester was not present that day. In the other case study firm, the programmer for one of the games was in the north of England and not accessible, also the programmer was not available to interview for the sequel game. This was despite two return trips to the firm to conclude the work before the research deadline. The consequences of these were that some specific details of the micro-social interactions of the work process could not be cross-checked. This did not hinder the overall description of accounting for the games design choices but has to be born in mind. It is also worth noting that, in the other case study firm, the programmer/designer and the artist, who were the main two responsible for the game's 'official' content selection, did not disagree on issues at all or contradict each other. The only case where this had occurred was where the musician had not accounted for a dispute over a sound effect selection that had been mentioned by another team member. However, the spread of issues across the case studies and additional materials illuminate the different problems involved in designing games and in this sense they are complete.

The interviews took place inside the development organisation and they were undertaken in work time. The locations were in the manager's offices, in a musician's studio and in the programmer's office. The interviews were very explicit and did not appear to be inhibited by the presence of the managers as they entered and left the office. This may reflect the nature of authority between managers and creative personnel. On occasions the managers did chip in and enter the dialogue to add facts or details, which were welcomed. Neither of the managers were involved in a direct power / producer role with the specific games.

4.3 Supplementary Data Sources

4.3.1 Introduction

In the case study reconstruction other sources of data were consulted to provide a "*thick description*" (Pinch and Bijker 1987, p.5), to give a firmer account for the heterogeneous economic, political, social and technical contexts influencing the design practice. Chapter (5) explicitly serves to illustrate some of the wider historical, social and economic concerns that places in context the specific events of creating the games in chapters (6), (7) and (8). These latter chapters in addition include within them documented detailed evidence that gives a wider understanding to the games creation. The following sections examine the data sources used to complement the interview data.

4.3.2 In-house Design Materials

In one case study, early design documents were available, along with faxed communications negotiating redesign and corrections. This was exceptional as on only three other occasions had interviewees kept their materials. These were useful because they helped provide accounts for the games 'alternative' design branch points that could have been taken and the motivations behind these suggestions. The faxed materials reveal the 'negotiated' aspect of the political process of designing the games and identifying their completion as 'approved' games and obtaining 'stabilisation'. The dates and times on the documents gave some indication of what time frame some aspects of the development occurred in - but this was only for a slim portion of the official process of testing and approval. These dates were the only firm source given

in any of the interviews as providing specific dates and times for ideas. Debates and meetings were all kept in memory and recalled by word of mouth. Very often specific times of these events were not able to be recalled with accuracy. This has implications for the researcher trying to recover the interpretative flexibility of an artefact as this "*vanishes*" over time, as memories fade if not documented, (Pinch and Bijker 1987, p.27). In other words, here due to work practices, interview data was the only source available for gathering evidence of the game's creation and delay here affects the evidence available about the disputes over the artefacts design paths. The analysis of the faxes and design documents highlighted the 'problem' areas, redesign requests, disputes and alternative designs the actors made in regard to the game. These were noted for descriptive detail in the case study. The process of analysis is outlined in the relevant section below (4.4.2).

Prototype versions of games were not available and, in one case, I was informed that this was a policy to avoid mix-ups over the latest corrected versions. Therefore they could not be used as memory cues.

4.3.3 Written Sources

As with Haddon's (1988a,b) history of the microcomputer and the history of video games that was relevant to it, this research had to account for the industry's historical context to explain the contexts of games' development. These accounts were on a macro-institutional and organisational level. The chapter on industry structure (chapter 5) was written to account for the institutional and technology changes of the context in which games development occurs - as the previous chapter section (3.4.5) noted that the production of culture approaches attend to such issues. To write this a search of literature about the history of the market and the development of Nintendo's and Sega technology was needed. The main sources of data for this were authored books about the industry, the trade press and the Monopolies and Mergers Commission's report on the supply of video games.

The two main books that dealt with the specific histories of the rise of the Japanese game hardware and the strategy in its design and diffusion were Sheff (1993) and Hayes and Dinsey (1995). Sheff's historical work has been consulted by other academics that refer to Nintendo's games' machines (e.g. Kinder 1991 and Flemming 1996) and it was referred to in the MMC report. The book was written from material accumulated from interviews with active industry personnel and members of the hardware firms. Where appropriate, cross-checking and examination of the references in the book were undertaken or followed-up upon, e.g. Levy and Weingartner (1991). The work examines the emergence of Nintendo's games playing technology and its business strategy to control software production for the hardware, and it follows the diffusion of the hardware from Japan to the US and to Europe. The account does offer critical insights and facts not obtainable elsewhere.

Hayes and Dinsey's (1995) book was consulted as this specifically dealt with the emergence of these technologies in the UK. One of the authors was also the editor of a respected trade magazine and also had access to trade data in the form of household hardware penetration and market sales' trends. These supplied statistical evidence to qualify accounts in interviews such as 'the markets was in trouble' or 'market boom'. The co-author was involved in marketing at Nintendo and privy to some of the strategic motives behind the firms' operations and open to some sources of 'inside' information that would not be accessible otherwise. The tone of the book is not

rhetorical or triumphalist as a consequence of his inclusion, seeking to downplay mistakes and over emphasise successes, as in Tomczyk (1984).

The MMC report was created as part of the inquiry of the Department of Trade and Industry into complaints over the practices in the industry. The report was created after the spending of around one million pounds in researching the industry (which included statistical evidence on firms' statuses, user purchasing patterns and household penetration figures) and hiring a consultant to estimate cost structures and alternative supplies. The account is extremely thorough and written from largely an economic perspective in relation to its brief of examining monopolistic practices, barriers to competition and distortions of market operations. Some of the evidence was censored and only available to government officials due to requests by one of the firms (Sega) that certain statistics should be confidential. This prevents, for example, a direct knowledge of how much cartridge prices to certain firms varied and did not allow for a specific number to be used in statements such as "*significant profit margins*". The value of the report was its provision of facts about the formal operations and practices of the hardware firm's official practices. Also, it was a source of research evidence in its own right as being an exemplar of the wider social and political response to the product innovation's introduction into the UK and its impacts on business practices and social leisure implications. The evidence provided by third party software firms also was noted as these spelt out official grievances and gave some alternative scenarios and choices, as did the report's conclusions that the case study evidence could follow-up on.

The trade press such as Computer Trade Weekly and Computer Retail News were periodically consulted as these often provided statistical evidence of the market and its status and gave critical interviews with key actors in the industry. This was used for chapter (5) and the case study chapters, (6), (7), and (8). These were specifically useful in providing interviews and re-interviews with the case study's MD's that were not accessible to me. These trade journals gave accounts about the status of the development organisation in relation to market trends and provided evidence of the organisational context that design activity was situated within. These accounts from the trade press according to Cantor and Cantor (1992, p.6) "*...are absolutely essential because they provide 'hard data', as hard as it can get on the industry, which are not found elsewhere*".

The strategic role of the trade press in the industry is to provide industry actors with data and information about the industry as well as the retail sector. This does mean that there will be some scope for rhetorical accounts to present aspects of the firm in the 'best light' if they are coming out of a stagnant phase - as both the accounts mentioned in the case studies tended to do, when the firms situation improved after the games were created. For the most part, the interviews with industry actors were frank and illuminating, with the admission of mistakes in strategic decisions and problems in operating in the industry. Also worth noting is that the trade journals take advertising, which can influence what articles are written and what issues are not explored, (Curran 1986). Given this, the value to the research of this source was that it provided a wider scope of information than I could hope to accumulate from press sources or interviews alone.

An additional press source was consulted - the hobbyist press. According to Newcomb (1992, p.99), this is a data source that "*scholars interested in production research will find extraordinarily help in material overlooked from an academic*

perspective". The historical account of the Amiga, for chapter (6), was constructed largely from the hobbyist press - such as 'Amiga Format' - which was a very popular magazine in the mid-1990s, covering the development of the machine and its supply of software. Because there were no academic accounts of the machine's history as it developed into a games' machine, these sources were examined for journalistic articles that gave a factual account of the machine's hardware changes and development, as well as illuminating the meaning of the Amiga as it was constructed by the press. Again, where possible, cross-checking was employed to ensure facts were correctly recounted. The sources of the hobbyist press are often trade magazines with statistics being reported in them, (Cantor and Cantor 1992, Haddon 1990). Some articles were written also by means of contributions from trade journalists such as Dinsey (1992), who wrote about the European sales of the Amiga in relation to the US. Other contributions were made from the MD of Amiga UK who had a regular place in the magazine explaining the firm's strategy for the machine and acknowledging the problems of competition from Japan. These accounts were useful for noting relevant dates and the strategic changes in the Amiga hardware and its deployment, as this related to the development context of one of the case study game's content selection criteria.

Additionally, the reviews of the case study games were examined, where possible, for accounts about the public meaning of the games as they are diffused and how the press constructed this meaning. This was important from both the theoretical perspective and the actors' own value, which they gave to the press reviews. The reviews were obtained from the designer in one case study or from scanning back issues of games' magazines. Obtaining some back issues proved difficult as publishers did not hold stock for more than six months. These were analysed for their critical accounts about the game, how they categorised the game, what criteria they rewarded the game for - either reinforcing the designer's aims, ignoring them or criticising them.

4.3.4 The Video Camera

At one point for one of the case studies, and one other game, a video camera was used to try to clearly understand what specifically the designer was referring to with regard to the game's designed attributes. The idea arose after talking through design choices with a programmer who was demonstrating the working game on a computer. The interview transcript, which was recorded on tape, could not relate the speech to the details on screen and much information was missed. In order to avoid this a video camera was used as an addition to the interview by including some notes about what was happening on screen alongside the text. This was also undertaken because the firms did not have a supply of the games to give away - in one case only three copies of the cartridge were given to the developer firm by the publisher. It was intended to at least see the games for myself and gain some understanding of them. The obtaining of the games second hand, however, made the need for a visual record redundant over time - although one subsequently non-released game was recorded.

4.3.5 Acquiring the Case Study Games

The case study games (along with some of the other 'general' interviewee's' games) were acquired, after much searching, in order to play them to examine attributes of the games that were referred to in the interviews or to provide an example of the things which the designer talked about generally. Due to the industry's operation and the

production of games in 'batches', the researcher's task is complicated here and second-hand shops were frequently scanned, and in one case, of a game released only with a magazine was acquired from a public domain library. The games when played through were 'paused' at relevant points and notes made about the issue displayed on the screen. This was useful for example, in one case where specific changes were made between two versions of the game for different machines and with another game where changes were made for its sale in a different territory. Changes between versions of the game were noted and descriptions written down.

4.3.6 L. Haddon's (1988a) Research

As noted above, the research in the work of Haddon (1988a) had involved an examination of the firms making games for the 'new' innovation, the home microcomputer. One of the firms was involved in the case study and the transcript of the interview with the managing director was examined for an understanding of the firm's historical 'mission' and strategic objectives. These were relevant in that it gave some indication of continuity in the firm's conduct and illuminated some changes in terms of immediate problems the firm faced 10 years later. One issue here is that the interview objectives may differ in this type of examination and so large chunks of the transcript are no longer relevant or tackle different issues.

4.3.7 Utilisation of the Internet

The World-Wide Web was speculatively explored with a relevant term in the search engine to find information about the relevant games or firms. The Web's information base has a large percentage of sites based on hobbyist interests and 'video games' interests are large among these. The sites gave some information about development and software availability and the hardware firms themselves had put advertising about their products on this. This was of some use in gaining an understanding of why one of the case study games versions had failed to be released and some backdated advertising on the Sega Mega CD. However the information sites on the Internet are in a permanent state of flux and in referencing them there is a probability that they may be deleted at a later stage. Additionally much of the trawling for information on the web is slow and unless a predetermined objective is set by the researcher beforehand, it may prove a distraction. If the research design for the games was not an ex post facto one, then the web may have been more useful, as from the mid-1990s onwards, it became increasingly used as a marketing and advertising tool, of providing advertising and demonstration versions of a game in order to build awareness it.

4.3.8 E-mail

Beyond the initial contacts made at the trade show, the e-mail was not as successful as hoped to re-interview subjects. When replies were made to sought-after issues and new ones explored, it was found that if a reply was forthcoming at all, it was usually shortly worded. Alternatively if a long set of replies were given, (as the musician gave (25)), then these were a 'once and for all' reply, with further questions not really encouraged. In the case of the musician, e-mail was useful in requesting a copy of the CD sound track to the game. Other use of e-mail was to confirm interview times and dates and post thanks.

4.4 Analysing the Data

4.4.1 Phase 1: Data Management

The taped interviews were transcribed onto a word processor. These were initially intended to be fed into a spreadsheet for aiding analysis. This proved cumbersome and eventually the transcribed interviews were analysed with pen and paper and crayons for colour-coding to account for heterogeneous relationships in the case study data. Also, extra notes were hand-written on paper to draw sketches of interactions in a diagrammatic manner to create memos for my own purposes. The analysis required identifying heterogeneous social groups and noting historical descriptions and chronologically linking their interactions between the game and other actors and groups. Consequently the need for a computer was not essential, although a suitable qualitative data analysis software, such as 'Nudist', can aid the research effort in terms of manipulating and presenting the interview data, it must be remembered that it cannot actually *perform* the analysis. Given the time needed to learn how to use a software package and the nature of the analysis undertaken, that was felt to be straight forward enough not to need such a package, the decision was made not to use a computer for analysis. If the data was to be analysed for examining statistical frequencies of events or verbal utterances, such as in some forms of content analysis, then extensive use of a computer would have been essential.

The process of post-interview transcription, reading and rereading the interview data in analysis encouraged familiarisation with the detailed nuances of the accounts of the game's development. This revealed that the actual accounts, due to their semi-structured nature of the interviews, were not in a logical 'tidy order'. This reflected both the empirical reality of the non-linear 'messy' complexity of the development process, the non-linearity of human speech and memory and my breaking up the interview's flow for necessary follow-up questions. Therefore, the accounts would 'jump' in the chronology of the game's development.

To represent and analyse the process of development in approximating its chronology, an index was created that 'mapped' the accounts in the pages of the transcript to the game's evolution and interaction with other groups or actors. This meant that I could 'flip' to relevant pages without rereading large chunks of data.

4.4.2 Phase 2: Analysis Strategy

Yin (1994) notes that the researcher has to demonstrate a systematic strategy which has been imposed upon the data. The data analysis that was applied to the case studies in this phase of the research activity was conducted with reference to Bijker's (1992) directions for applying the SCOT approach to demonstrating the social construction of artefacts. This served to give a set of priorities to 'look for' in the design accounts.

To recap on the main concepts and theoretical implications of the SCOT approach given in (3.4.2): The main premise is that technologies are not independent of their social environments and that the social interactions of the 'relevant social groups' define the technology through their attributed meanings of the technology and define its 'problems'. The resolution of the problems means that the technology 'stabilises' in its configuration and meaning and to an extent the problem 'disappears'. The interpretations or 'interpretative flexibility' of actors or 'relevant social groups' with regard to the technology needs 'mapping out' or identifying.

Bijker, notes that mapping out the 'relevant social groups' is undertaken by "*following the actors*", (ibid., p.76). In dealing with accounts of the subject's interactions in the technology's development, the researcher notes down specifically the significant groups that the designer mentions.

For example, in the account in Biker (1992, p.76), given by an executive involved in creating a fluorescent bulb, it is shown how a 'social group' of 'utilities' who supply electricity are involved in influencing the design of the bulb and how the researcher ascribed them the status of being a 'social group':

E.g.

"I have delayed replying ... in order to co-ordinate with the rest of the boys..."

or, in explicit reference to another group:

"It is apparent that dealing with the fixture manufacturers, as a group, involves delicate negotiations"

Therefore the first starting point of analysis in examining the social construction of a technology involves the identification of 'relevant social groups'. This is, in part, an indigenous "*actor category*" (ibid., p.77) and it is useful for eliminating research blind spots. Therefore, in the analysis of designer and developer accounts and documents, the identification of these groups was undertaken. This was done simply by following the text for references to others involved in the interaction in the design of the artefact until the end of all the recorded data. For example the sentence:

"The Japs [relevant social group - hardware firm]

didn't like it [flexible interpretation of the game],

they wanted changes" [interaction with the configuration of the game and constructing 'a problem']

This issue deals with the approval process of a game through the hardware firm's mandatory approval phase and reveals and identifies the designer and artefact's interactions with another significant group. Also it highlights the 'interpretative flexibility' of the other group to the game and locates the constructed 'problem'. The 'mapping out' of this identification process was undertaken along the product's design 'career' from start to finish.

This undertaking, through interview and documentary material is termed "*historical snowballing*", (ibid. 1992, p.77). In the case studies, for example, if the game's review was mentioned, or the faxed communication about approval mentioned, then this was followed up on for sources of its alternative meanings or 'interpretative flexibility'. Bijker does note that this is not a 'foolproof' method and reservations and amendments are noted. The researchers own 'intuition' may be applied to the identification of groups which will mean that there will be some simplification or interpretative scope for narrowing down which groups are directly relevant to the artefact's specific definition. Also, groups may have to be put into one category or split up which means again some scope for amendment by researcher is needed. In my analysis, for instance, the role of formal in-house testing in one of the games was kept separate from other informal influence from peers. This could have been lumped together under 'organisational influence' as a whole 'social group', but was kept separate for reasons of detail and illustration of the formal and informal operations within the firm demonstrating issues of interpreting the game 'flexibly'. Therefore the category of the

'relevant social group' is also noted by Bijker (1992, p.78) to be an "*analyst category*".

A secondary researcher amendment to this process, under the theoretical biases of actor-network accounts of technology, was to actually take non-human elements, such as the 'Sega MegaDrive' or competing games, as relevant 'social' categories. This was done even though they were not 'social' in relation to SCOT's ontology, but just 'actants' in the ontological emphasis applied in actor network theory, (Law 1992; Woolgar 1994). This gave a richer account for the heterogeneous nature of technology design in the video games industry and accounted for the actors' own mentalities in a clear way as they related meaningfully to non-human artefacts in their everyday design activity and discourse. Therefore the analytical strategy in this approach was motivated to take technology 'seriously'.

Another issue to do with 'social groups', is that only "*vocal*" (ibid., p.77) groups should be mentioned according to Bijker. This has implications for not inputting influences that for example Marxist or feminist oriented researchers attend to (such as Cockburn and Ormrod, 1992) in analysing influences of patriarchy. Bijker notes that in examining explicitly mentioned groups selective 'voices' are listened to, in a selective way, that this does not account for examining the 'hidden interests' or motivations of certain groups that alternative theoretical strategies may focus on. Although, this research did not use ideological categories or motivations to elicit second order groups from the analysis accounts, the analysis *did* explore, as part of its research question, the point at which users entered the design process and how they were thought of. This issue, although not explicitly or systematically part of the designer's own accounts, was examined in the interview and the 'imagined user's presence as a social group examined. As mentioned, this also applied to, hardware artefacts such as the target machine's status as a consumer electronic or fashionable game machine, even if it was not mentioned 'vocally'. This second order analysis of actor's accounts is a deliberate bias to Bijker's method. Further angles for examining the data were along the dimensions of the research questions that probed the role of the individual's aims, interaction with groups in the organisation and hardware manufacturer's influence on design, whether they were explicitly 'vocal' or not. These were undertaken to provide evidence of power and influence upon the game's design.

The interactions of the social groups, either in combination or singularly, upon the technology were recorded and the choices that emerged from the competing definitions of the proposed direction of the game noted. This was necessary to account for 'how else the games could have looked', and relates to the issues of influence upon creativity that were mentioned in the previous chapter. What these 'problems' were, their source and their solution or 'closure' were noted.

The main brunt of the research effort went into the three case study materials and the remaining interviews were analysed in relation to the issues that the case study analysis had drawn up. Therefore, for example, the 'relevant social group' of game magazines' influence - which was a researcher blind spot - was examined in other cases. Another example is the flexible interpretation of graphics in games and the orientation to these in design choices. This gave some scope for examining generalisability of findings to other design processes in other firms.

The analysis of documents and historical sources has been mentioned earlier.

4.4.3 Data Presentation

The case study data was presented in chronological order to present the 'career' of the game from concept to initial release. This was done by the mixing of data from documents and accounts from the multiple actors in this chronology. At certain points in the case study, accounts of relevant groups' historical development was given to illustrate the broad context of the game's development and its relation to changes in the group's predicament. For instance, the case studies have accounts of the dynamic changes in the publisher firms or game-playing consoles' histories or 'careers', that put into wider context the actors' accounts of the game's development. These represent the aspect of conjunction in the design process of the games 'career' with specific synchronic moments in time with events by actors or groups that are themselves diachronically changing. This means that the narrative of a game's development in chapters (6), (7) and (8), can appear to take detours into 'sub-histories' of other histories of actors and events, but this is to a degree a reflection of the 'messy', non-linear process of innovation that can conflict with ease of presentation. The accounts in the case study were designed to explain the antecedent conditions of the choices made affecting content in a chronological fashion.

The amount of detail and length of reproduced accounts from the interviews were *consciously* kept quite long to include for the whole description and the interactions that are contained within it. This was to clearly reflect the respondents' motives and communication concerning an issue, where possible. The names of games were included here in a similar fashion to their inclusion in Tulloch and Alvarado's (1983) accounts of names regarding *Doctor Who* episodes. This was to give some point of reference to me and prevent confusion in analysis and possibly give some future point of reference to those who may have encountered the games and be curious over their design choices.

The discussion in chapter (9) adopts a breakdown of the game's development chronology concurrently in three parts. This splitting of the historical process was to allow for some comparisons to be made. A breakdown of the influences on an actor or group per group basis was rejected because it would not include the context of the game's time-frame and pattern of events, and so would lose aspects of recounting the *process* of innovation.

4.5 Summary

This chapter sought to discuss the possible ways to gather evidence for researching the making of games and reaching the objectives noted in section (3.4.6). It did this by examining the methodological issues encountered in researching the construction of other entertainment media. From this two main data collection strategies and two research strategies were considered for this thesis. These were participant observation and interviewing for data collection; and an ex post facto case study of game creation, compared to examining a game while it was being made. Other considerations were given to examining just one game compared to an array of games and how these related to problems of generalisation. It was decided that the research would compromise by examining the creation of specific games *and* consider the creation of other games by interviews from a spread of personnel involved.

This chapter explained how the research was undertaken, problems and issues that emerged and discussed the merits of the data sources that were used. The final section of the thesis explained how the data was analysed by drawing on work influenced by

the social construction of technology approach as outlined by Bijker (1992). The next chapter examines the broader problems of the industry structure, in order to highlight how these are relevant to the construction of video games that the subsequent chapters (6 to 10) directly attend to.

5 Industry Structure - The Problem of Production

5.1 Introduction

This chapter gives an overview of some of the problems associated with the construction and successful diffusion of console video game playing technology. As mentioned in section (4.2.1), the aim of this chapter in the research strategy is to outline the events that existed in the industry explaining the wider context relevant to the construction of the case study games in the next three chapters. This is to be done by following the emphasis in chapter (3), (i.e., (3.2.1), (3.2.2), and section (3.4) onward), by explaining the historical development of the broad industry and institutional context of games' development. This highlights the significance of the 'relevant social groups' and interactions of heterogeneous factors and artefacts that led to the political issues and structural power relationships surrounding technological innovation and the construction of 'problems' regarding the construction of games' software. This aim, therefore, necessitates the identification and explanation of the significance of the strategy in the design and emergence of hardware platforms, hardware firm's publisher and software production strategies and the political implications of these strategies for influencing the content of game software. Further other 'relevant social groups', such as the Monopolies and Mergers Commission, are identified as they provide examples of alternative or 'interpretative flexibility' in the meanings given to the games console hardware design and the 'problems' of its construction regarding software design issues are examined. The basic issue to keep in mind though, are of the implications of the competing interpretations of the motivations behind the design of the games console and the licence and approval system of software development. That is, these competing interpretations are framed in a way as to suggest that it *either* encourages software innovation, *or* it inhibits it and is exploitative.

5.1.1 Chapter Contents

This chapter on industry structure looks at:

- (1) The global diffusion of the Nintendo and Sega video game cartridge-based production system. This covers the historical process whereby product innovation - i.e. a new proprietary computer hardware unit, became successfully deployed by securing a software production base. Also explained is the emergence of consumer demand from the late 1980s and early 90s that helped reinforce the monopoly market structure.
- (2) How the successful market and industry conditions in Japan were attempted to be recreated in the US and at local level in the UK, to promote the hardware unit's adoption. This helps place in context the industrial environment in which the research's case study firms' design activity was situated, in their provision of complementary goods for the hardware.

Part of the issue at stake here is to show how a hardware technology became configured as it did and adopted globally as a platform to distribute software on. Part of the successful diffusion of the technology has its basis of success not intrinsically in the hardware technology's configuration *per se*, as in a technologically determinist explanation, but instead, examined here are the additional mobilisation of economic, social, cultural and legal resources that support the hardware's successful diffusion in

a competitive environment. By spelling out the strategy of the allocation of resources that was used to create the mode of console hardware and software creation and the political implications of the decision-making concerning what software is available on the machine, it is possible to explain how such a configuration or production 'system' came into existence in the form it did. As was seen in section (3.4), the explanation of 'why things look the way they do' is one of the aims of the social shaping of technology approach to the political process of technical design and innovation, (Winner 1985, Bijker 1992).

Outlining the historical preconditions pertaining to the emergence of the games in the next three chapters, gives us an illumination of the influence of extra-organisational decisions of actors outside the case study development firms design conduct. This will help to understand the historical basis of the global - macro issues that formed part of the market conditions that third party software firms operated within, as they allocated resources to the creation of their games for these systems. How the firms did this is covered in the subsequent chapters' case studies.

5.2 *Strategies of Design*

5.2.1 Introduction

This section examines the background 'social shaping' elements that constituted the conditions that led the Nintendo and Sega cartridge based consoles to come into existence in the form that they did. This entails a brief outline of the producer toy firms' history and change in strategy to creating video games' technology. Secondly, it outlines the strategic objectives that influenced the hardware design of the 'Nintendo Entertainment System' (NES) and the implications of its design. Following this the strategy relating to the ideas behind software creation and its control are discussed. Finally the attempts to transplant the conditions of the successful diffusion of the product innovation to the US from Japan are covered. The aim of this part of the chapter is to outline both the 'globalised' affect of the Japanese and US markets', and the firm's strategy of its hardware and software preconditions for creating games.

5.2.2 Hardware Firm History

The history of Nintendo is briefly outlined. The focus primarily upon Nintendo is due to the overall impact and dominant influence this firm had in the 1980s and early - mid-1990s, upon the console games sector, reviving it into a global market and influencing subsequent behaviour of firms such as 'Sega'.

The Nintendo Corporation had its production roots in the 19th century as a Japanese playing card manufacturer. In the 1960s its set up an engineering division, as with other toy firms it, started adopting other technologies in toy creation that used electronics and batteries (Levy and Weingartner 1990). Examples of such creations were an electronic hand that grabbed objects, the 'Ultra Hand' and a periscope. The wider use of semiconductors in other industries including entertainment forms, such as early home video games systems in the 1970s had set the firm to examine the use of such technologies for toys in 1975. The US market had seen the emergence of firms such as Atari (Cohen 1984) and Magnavox (a US Philips brand name) creating a market for home game playing technologies and the latter firms' games technology was licensed to Nintendo for manufacture in Japan.

This set the firm on a path of product development, that they had competence in, to start to develop their own games' playing technologies such as the Colour TV game 6 released in 1977, and a follow up to that, the Colour TV game 15 (with improvements). The formation of the Nintendo Entertainment System or 'NES' (or 'FamiCom' in Japan), was a subsequent product development that sought to improve upon previous in-house and competitors' designs.

5.2.3 The Famicom. The Strategic Issues Behind the Artefact's Definition in Japan

The design rationale of the new game console was driven by the president of the firms' strategy of enlarging its operations. This was to create a unit as cheap as possible so that it would be diffused into as many households as possible. This involved targeting a price point of 75 dollars, which was cheaper than competing products, which were around 200 dollars, whilst the hardware specification had to match or improve upon the competition. The emphasis on the design of the machine sought to place its innovative merits on the graphical abilities of the machine so as to show detailed characters and backgrounds. This partly stemmed from the influence of coin-operated arcade machine software that was seen as the ideal design model to emulate, with its perceived ability of "*capturing players consciousness*" by using "*fast action*" or "*fast action and intellectual challenge*", (Sheff 1993, p30). The role of the graphical abilities of the machine in providing more colours and detailed graphics was felt to be a part of the hardware design's 'needs'. The research and development effort was directed to mimicking the coin-operated hardware.

The design parameters of the microchips had to compromise between relative graphical advance over other machines, and yet stay within the limits of the proposed release price. Part of the compromise involved using a cheaper, 'old' central processor based on an 8-bit 6502, used in other machines at the time, rather than adopting a more advanced line of processors that were emerging for use in personal computers and coin-operated machines, such as the 16-bit Motorola 68000, (Defanti 1984). To compensate this, 'new' custom built chips were developed in experiments designed to determine exactly what would be needed to manipulate a given number of characters and of a given size that competitive products could not manipulate. These chips had to be mass produced to keep their unit cost down (2000 yen), and to meet the target price set in order to reach as many households as possible, (Sheff 1993, p.31). The wider implications of this had repercussions that would later be regarded as a 'design philosophy' that was against the public interest – in the subsequent Monopolies and Mergers Commission report (5.4.12).

The minimum order of chips to meet the price point was 3 million, which committed the firm to being able to sell the same number of hardware units. This involved a degree of risk because competing products were only able to sell 20 to 30,000 hardware units and Nintendo's own previous machines had sold a maximum of 1 million. Further hardware design commitments to keep the price down involved excluding a keyboard and disc drive used by home computers, which could have been chosen as a possible design pathway. Also the hardware units' memory was kept to a minimum, as it was expensive at that time. The chosen mode of software delivery, as with other consoles, was by cartridges as these were not copyable (in theory) unlike cassettes or floppy disks. One exception made to the design of the hardware was the inclusion of a data communication port that would enable any future communications applications to be added to the hardware to enable it to be used as a terminal. This

'vision', or the inspiration of including this in the hardware design, originated from the firms' president and was felt to be of speculative value as its inclusion was of minimal marginal cost.

The account of the design and development of the hardware unit, shows similarities with that of other products e.g., the Sony Walkman (Du Gay and Hall et al. 1997). That is, driving 'vision' of the president for the artefact's market viability was made in the absence of sustained initial market research as to the possible uptake of the machine. Commitment to the creation of the machine as with other Nintendo products was seen to be based on the 'intuition' of the president.

Part of the aesthetic of the external design of the hardware were to give the machine a toy-like appearance rather than associate it with the home computer or other 'consumer electronic' goods. This was an association that was both engaged with and rejected in the machines subsequent 'career' and once diffused to other territories (5.3.3 and 5.4.3). The physical appearance of the machine used red and white and rounded edges, (rather than black and sharp edges, as many of the Japanese MSX computers had at the time in 1983, e.g. Toshiba, Sharp and Yamaha models. Yet paradoxically the name for the Japanese machine was 'Famicom', short for 'Family Computer'). Therefore the interior and exterior machine design embodied the economic strategy of seeking to provide the semblance of product innovation within the constraints of the economic criteria of mass production, *and* proposed a diffusion pathway of mass consumption. This differentiated it from the home computer 'product space' which was emerging during the early 1980s.

The strategy for the firm's growth was intended to depend upon being able to sell both the hardware and software, which it alone would seek to control by attempting to provide sole creation of innovative games. (In this respect Nintendo copied Atari's initial stance on software supply). The proposed method of profit making, to encourage wholesalers to distribute the machine, was to accept low profit margins on the hardware and regard it as "*just a tool to sell software*" (Sheff 1993, p.35). Software would be priced to recoup profit, finance the research and development (R&D) and the cost of the hardware. Warner did not adopt this strategy when it acquired the Atari 2600, which had created the first boom of interest in console games. This was despite the original hardware designer's efforts to adopt such a strategy). This whole approach to the strategic value of software in relation to its dependent hardware base was one other manufacturers subsequently adopted. Once the subsequent 1983 release of the hardware had proved a success, outperforming the fourteen other competing products in its category, (which subsequently withdrew from the market), the focus of the firm's strategy was to establish the supply of software. The final price of the hardware unit was slightly higher, at one hundred dollars, than the intended 75 dollars but still cheaper than competitive products.

5.2.4 The Strategic Role of Software for the 'FamiCom' and its Design

The role of the software and game design was to attempt to create very high quality games by focusing on a small range of titles. The firm would have control over the creation of games itself and the initial input for the games. As with the hardware at R&D level, it was deliberately not market led. The emphasis in the firm on R&D was on the 'creative individual' and their innate abilities to 'zero-in' on novelty and innovative concepts. A justification for the approach being based on the point that the

'future needs' of games' players were not known by players themselves and so could not be extrapolated from market research. 'Intuition' was needed to allocate resources.

One Nintendo employee noted about the president's strategy:

"And if we make the game based on what's popular right now, the games will not be new and fresh", (Sheff 1993, p.38)

Also on strategic decision-making and product design, the president's decisions were legitimated with recourse to his insight:

"It's like a sense for the fashion business knowing what will become hot and popular next season. He can read a few years in advance. He is so certain that he is right that he listens to no one", (ibid.).

The firms R&D sections were set up to contribute to innovations that would extend the life cycle of the FamiCom hardware by providing innovations in cartridge capability to support advances in software. These included advances in chip designs so that the cartridges would carry new chips to make the hardware unit able to perform 'new' graphical techniques that subsequent games could use. These included splitting the screen, 'scrolling' or panning the screen diagonally, providing more memory in the cartridges for the software; creating battery back-up to save the game to a lithium battery in the cartridge, and creating the ability to have more characters on screen. These R&D efforts focused on 'problems' that were defined to be mainly graphical in nature and aimed to reinforce the initial design emphasis of the hardware unit. This also reflected the industry-wide emphasis on improving the standards of graphics in the coin-operated and home console and computer industry. (This design emphasis is reflected in the case study in chapter 6).

What is of note (Flemming 1996, p.181), is that the R&D groups set up in the firm were segregated and secretive competition between them was encouraged to create innovative products, this was unlike other Japanese business philosophies toward innovation.

In this R&D effort, the focus on expertise and technology was to enrich software designs in games such as the *"Legend of Zelda"*. Yet focusing beyond the individual's innate creative merits, (Sheff 1993; Flemming 1996), indicated that US popular culture had influenced the designs of Nintendo games, e.g. 'Mario' in his cartoon 'cute' style of character formation. This relates directly back to Nintendo's previous licensing of Disney characters for playing cards in the 1950s in seeking a commercial audience. Also this acknowledges the wider influence of American popular culture upon post-war Japan that occupation had encouraged. Therefore the software design had some scope for recycling recognisable symbolic media images from popular culture that would benefit its diffusion. Beyond this, other aspects of popular culture such as folklore and literature were used by the firm's principle designer to give a narrative-like quality to the game designs and help structure them. For example, the use of mushrooms in *Alice in Wonderland* were reflected in their role of Mushrooms in *Super Mario* giving the players character special powers.

5.2.5 Changing the Strategy of Software Support

Due to overwhelming consumer demand for games and only limited production of games, a strategic shift was made in production policy. Nintendo changed its decision to be the sole supplier of games for its hardware by creating a licensing system. This

allowed third party firms to create games that were compatible with the hardware for a royalty payment of twenty percent. The incentive to commit to the strict terms was that it allowed access to the growing user base of players that demanded games. The initial demand for games was high for the first firms that exploited this growing market. The volume of sales possible was higher for the console than home computer markets, e.g. one firm sold 1 million units of a game where previously sales of only 10,000 units had been possible for home computers, (Sheff 1993, p.61). The first firms that had begun making games for the hardware had made large profits, prompting another change in the licensing agreement, which now sought to control the manufacture of the cartridges for the hardware unit. Third party firms would now have to obtain a licence to develop their games' software and then pay Nintendo to encode the software on chips and manufacture the cartridge. The reason for this was to obtain revenue from the manufacture of the cartridges as well as control the quality of the games being produced. The implications of the change now created an element of risk for the third party during production because the criteria for the production of cartridges had stipulated that a minimum batch of 10,000 games be ordered and the order paid with cash in advance. Also the prices of the cartridges, which Nintendo subcontracted for manufacture, was twice as expensive than if they had been independently created. Consequently Nintendo would make money from the game's production regardless of the game's success. The third party manufacturer would have to try and predict the nature of demand for their games and if they under-ordered then there would be a delay before a new batch could be produced. Conversely, if they over ordered then the third party firm could be left with too much inventory, (HMSO 1995, 9.48, p.170; Hayes and Dinsey (1995, p.40). Further, a small firm would be hard pressed to find the financial resources to pay for manufacture before sales were made, (Roberts 1995b, p.29).

The figures given by Sheff (1993, p.62) shows the profitability of the mode of cartridge production that the licence system created for Nintendo: for a game selling 300,000 units, 2.2 million dollars was made, and for a game selling 1 million, 7 million dollars was made. Despite the costs incurred by the third parties, the numbers of Japanese firms that signed up to become licensees grew from 17 in 1985 to 50 in 1988 and more than 90 in 1991. Compared to other Japanese firms, Nintendo by 1989 had been rated as the most profitable by the Japan Economic Journal, beating other previous leading firms such as Toyota and Honda. The UK MMC report also noted the comparatively very high profitability of Nintendo (viz. other computing, consumer electronic, toy and entertainment and leisure firms), that illustrated Nintendo's market strength into the first half of the 1990s, (HMSO 1995, 6.61, p.119). This was due to the fact that Nintendo's economic operation was not tied to a committed fixed capital outlay such as production plants, factories and large numbers of employees, which made the firm relatively flexible in its use of sub-contractors and third parties for production and creative material.

A further amendment to the licensing agreement was made to attend to quality issues by seeking to restrict the number of games any one firm could make to 5. This was aimed to force firms to focus their resources on a limited number of games and encourage quality titles, rather than produce too many and dissipate their finances on supporting advertising and packaging.

5.2.6 Backlash in Japan. Problems of Innovation at the Macro-, Meso- and Micro-Social Levels

The response to Nintendo's production strategy and its increasing influence on the supply of games created a backlash that was reflected later in other territories that the hardware was diffused into. Firms made allegations of unfair practices and the restraint of competition created by the control over the production of game cartridges. This was exacerbated by a chip shortage that affected the semiconductor industry and meant that the volume of available cartridges was reduced by Nintendo who rationed the numbers of games each firm could produce. This diminished the numbers of games that were made. One large firm in the industry, Namco (which invented *Pac-Man*), had sought legal action against Nintendo for monopolistic practices regarding the stifling effects the licensing system had on competition. The firm had to withdraw the lawsuit because of its own economic dependency on production of games for the Nintendo hardware unit - its own sales base was 40 percent dependent upon Nintendo game sales and the Nintendo machines market share was 95 percent in 1989, (Sheff 1993, p.74).

Further influence upon the industry beyond software creation included the wholesalers and distributors who were threatened by Nintendo with the withholding of stock, if they carried unauthorised cartridges that had been 'reverse engineered' or produced without a licence. Additionally magazines were discouraged from carrying adverts of unauthorised games by withholding information about games' 'secrets' and cheats, which were a selling point magazines were dependent upon.

Despite the influence of Nintendo's successfully diffused machine, it is worth noting that not all of Nintendo's strategy for the proposed use of the hardware unit occurred as intended. In 1986 a disk drive add-on which promised cheaper games and greater depth to the games, (as CD delivery also was to promise later - see chapter 6), was released. The production strategy involved Nintendo owning half the copyrights to all games made for it. This did not receive popular support and it introduced uncertainty over demand for third party licences, to produce either on cartridge and / or disk. Also, the best games were only subsequently available on cartridge and retailers objected to the large size of the units that re-programmed the disks' games once a new one was required and subsequent increase in cartridge memory sizes decreased the advantage in memory size that the disk games had initially.

Further, the intended use of the base unit as a communications' terminal network a feature once successfully adopted in households, did not operate as hoped. This had been intended to merge the possible uses of the hardware beyond entertainment to finance, shopping and banking applications. Only 130,000 communications' adapters were sold, barriers to these alternative uses of the machine were attributed to adults not regarding the machine as a serious technology. It was initially designed to be toy-like. Also traditional methods of finance and banking were preferred and families were reluctant to have to commit their phone lines to the machine while on-line.

Therefore while being a successfully diffused games' playing technology, the hardware unit faced problems in amending its initial proposed identity and use, which the peripherals that were designed for it were seeking to amend or complement. This became an issue that all proposed peripherals to console hardware base units - either from Nintendo or Sega would face, (see section 6.5.5).

5.3 Diffusion to the US

5.3.1 The Artefact in the US. Diffusion of the Nintendo Games Technology and Production Practices to America

Before the decision was made to expand the home game playing technology to the US, Nintendo had already set up a coin-operated subsidiary 'Nintendo of America' to gain access to the 8 billion dollar market in 1981. This had given a limited base from which to access the US market (using subsequent consumer products that Nintendo created) and set up a consumer division. The experience gained from attempting to release a calculator style game device, the 'Game and Watch', in 1983 had proved useful, because efforts to release that product were problematic. This was because the attempt to define the product as a 'toy', by releasing the product in toy retail channels, had meant that the firm was committed to that sectors' financial routines. This involved providing a dated invoice for December the 10th - no matter when the retail order for stock was made. Additionally it was expected that in operating in this retail sector, the firm would compensate the toy retailers attempt to sell off unwanted stock by maintaining profit margins in the advent of price cutting - 'mark down money'. Therefore the risk was less on the retailers side if overstocking occurred in the face of unpredictable demand. The implications of this, regarding the attempts to transfer the console game playing technology to the US, was to avoid this categorisation of the product as a 'toy'.

The construction of demand for the games' playing technology had taken place in the context of an industry slump in 1983. This had seen media conglomerate Warner and its subsidiary Atari, (the market leader in the supply console game playing technology), enduring huge losses, which retailers, software developers and distributors also shared the effects of, (Provenzo 1991, p.10). The attempt of the Japanese firm to judge the feasibility of releasing the product in the US would have to overcome barriers to its diffusion in the light of this.

5.3.2 Communicating the Meaning of the Machine in Design

The initial design strategy for the US release of the hardware had attempted to adapt to the US market by seeking to differentiate the design of the hardware and software from existing known competition. This involved emphasising the software as the key to demand and how potentially different it was from existing games. The quality of software was seen and used as an explanation for why the Atari gaming system had eventually become unpopular. Yet also symbolically the Nintendo product was attempting to be defined as being a discrete artefact, as a 'consumer electronic' not a 'toy' in opposition to its initial Japanese design. This was intended to differentiate it from its key competition from Atari and two other toy firms - Mattel (who also made *Barbie*) and Coleco (who later made the *Cabbage Patch Kid* dolls). Part of the reason for this was to avoid the effects of having to comply with the toy retailers credit system if the hardware were defined as a 'toy'. Also it could be diffused to a wider distribution network via electronics shops and department stores other than just toyshops.

This consideration of the artefact's diffusion was reflected in the symbolic nature of its exterior design form, by giving it an appearance of, "*high tech....sleek... like a stereo component*", (Sheff 1993, p.160) and naming it the 'Advanced Video System'. Further, the intended 'imagined user' for the hardware was seen to be either the child

who would use it, or parent who would buy it. The function of the hardware would reflect the possible idea that it would be able to perform other functions beyond games by offering the functions of a home computer. Consequently a keyboard and tape system for data storage and a piano keyboard were designed for it also to allow 'sensible' use. Although a 'Zapper' gun and infrared controller were also included for 'new' games playing activities.

This allowed the hardware able to be placed in the 'home computer' stream of technology designs that had developed into a growing market at that time. In conjunction with aspects of manipulating the original Japanese hardware design to fit the US market, another change to the hardware architecture also related to the strategy of controlling the supply of software for the machine. This involved the creation of the 'security' or 'lock-out' chip that acted as a barrier to access, preventing unauthorised unlicensed software from running on the hardware unit. The cartridge would 'shake hands' with a chip in the hardware unit and if any incompatibility occurred in the data transfer between the chips then the software would not run. The security system was protected by patent.

This sought to take a technical solution to the issue of controlling software design beyond the legal method of licensing contracts. This was partly legitimated by the fact that illegal Taiwanese games that worked on the Japanese hardware unit would also find a market on the US system if there were a compatible hardware unit for them to run on. Therefore the 'security chip' differentiated the US hardware on territorial grounds to partly discourage these. Criticisms regarding the legitimacy of these hardware design revisions were later challenged in law – (these are detailed below).

The subsequent trade viewing of the hardware unit, at two trade shows in 1984, revealed retail scepticism of the market viability of the Advanced Video System (AVS). This was in light of the video games industry crash and the attempt to place the unit in a new category away from that industry, and was not read in the way the producer firm intended. Therefore again the aspect of the hardware suppliers strategy at controlling the diffusion and use of its hardware was subject to resistance.

5.3.3 Redesigning the US version of the Hardware. Emphasising 'Entertainment' Applications

The redesign of the hardware unit was based on the feedback of the rejection of the AVS and interpreted to mean that it had attempted to be part of both 'camps', 'computer' and 'games machine', a duality which diluted its meaning. The new emphasis on the hardware unit was to seek to reposition it, directly emphasising it as electronic 'entertainment', hence the name 'Nintendo Entertainment System' (NES). The exterior of the unit was redesigned with children in mind as the key target group and simplified to create an impression of being a 'consumer electronic' rather than a toy, as before. Using grey it was more box shaped and had cord controllers rather than infrared ones. Additionally the unit had sought to emphasise the peripherals that came with it - e.g. a robot activated by the player's movement on the screen and the 'Zapper' gun.

The redesigned unit when presented at the major industry event - the Consumer Electronics Show - in June 1985 again met with retailer resistance. Additionally focus testing of the unit revealed a lack appeal to children. This was ignored in view of the Japanese president's appeal to 'intuition' for the universal appeal of play-things to both Japanese and American children. The NES was to be targeted in a pilot sales' test in

New York and demand was to be created with a 10 million advertising budget. (Hayes and Dinsey (1995 p.16), offer a competing view of why only a pilot release was targeted, in that Nintendo was short of funds and the President of the firm did not think that the US would be a successful territory for the product. This, again, is like the explanation of the Sony Walkman's 'career', (Du Gay and Hall et al. 1997) as it offers an alternative account regarding the machines release and design strategy).

Resistance to initial retailer scepticism was softened by lessening risk by offering money back on unsold stock, providing 90 days credit and in-store product displays. Further tactics to diffuse the NES included placing pressure on toy firm buyers to gain awareness of the product and hiring famous sporting personalities to demonstrate the unit playing games visibly in shopping centres.

The advertising strategy sought to differentiate the meaning of the hardware away from previous products by creating a symbolic use of language that tried to define the unit as an 'entertainment system' not a video game. The software was described as a 'game pak' not a 'cartridge' and the unit was a 'control deck' not a 'console'. The preferred meaning of the NES's identity, offered to the press in previews, was to emphasise the units attempt to be a new entertainment concept similar to video recorders and music stereos or as a category which was different because of its quality control on the software, (which supposedly was the reason for Atari's demise).

After a modest success with Christmas 1985 sales at the first site, (100,000 units), other US cities were targeted. This yielded 1 million sales in the first year and 3 million in the second. The key to gaining wider credibility before national promotion of the NES could take place was: (I) the need for commitment from larger retailers and department stores to adopt the unit; and (II) the need for financiers on Wall Street to obtain credibility from market analysts regarding this sector of the market with the appearance of the strength of the Japanese firm's operation. The snowballing of credibility from market analysts created a situation where they influenced other 'experts' who influenced retail buyers to invest in the hardware and stock it. Once the big stores had bought it in their inventory other toy firms followed to compete.

By 1988, 7 million hardware units and 33 million cartridges had been sold. By 1989, 25 percent of US households owned an NES and this had increased to over 33 percent by 1990. Part of the unit's appeal was the success of games such as the *Mario Brothers* games series creating a unique identity for the hardware. Partly responsible for the large diffusion of the NES and the resurgence of interest in video games was explained in demographic terms, by the growth in households with children who had not previously experienced the first wave of video games production. In 1982, of the 35 million US households with children aged 6 to 16, 30 million games systems were sold and saturation point had been reached. Later the number of non-video game owning households had increased to 154 million, thereby helping to create a new base of demand, (Provenzo 1991, p11).

Sheff (1993) uses the example of the successful diffusion of the NES into the US market to illustrate the comparison between a Japanese firm's business strategy and a US firm's business strategy. That is, the Japanese firm ignored the focus testing and market research in favour of a commitment to a long term strategy and long term profit seeking where absorbing losses in the short term was more acceptable. In comparison, a US firm may not have adopted such a strategy. Beyond this explanation of the NES's eventual successful release, it is worth noting that the 'space' for the NES to find cultural meaning can be placed in the wider US-Japanese trade

relations and the diffusion of consumer electronics and trade barriers that had worked against US firms trading with Japan. When the Atari '2600' games machine was performing well in terms of sales figures, Sheff (1993, p.174) notes that Japanese trade tariffs pushed up the price so as to make it uncompetitive in Japan. If this had not been so then the situation may have been different with Atari emerging as a serious competitor for the NES, that the NES could not compete with on price in Japan to subsequently launch to the US. The crash in the video games' market sector had meant Nintendo faced no significant competition, as the sector was not thought to be viable. Instead the use of home computers for 'serious' use was seen to be the new strategy that Commodore and Atari were adopting in positioning their products. (See section 7.2.3).

5.3.4 Consolidating the Successful Diffusion of the NES

Despite emphasising the value of its software to sell the NES, marketing strategy also played a large part in its successful diffusion. One aspect involved using a strategy that had also been used in the toy industry, one of creating 'a store within a store'. 'The World of Nintendo' in shops like Toys'R'Us gave exclusive focus and in-store presence to the Nintendo range of products and its third party cartridges. This was seen to be an innovative approach to providing a sampling opportunity for the hardware unit and software. The 'point of purchase display' for the Nintendo systems had won advertising awards seven years in a row for its approach. Additionally, official Nintendo distributor personnel kept vigilance over the presentation and pricing of Nintendo stock by taking pictures of booths in stores to ensure no infringement or deviation took place with respect to official sales and presentation policy. Additionally the stock surveillance enabled feedback of stock movements, which were monitored with handheld computers and modems for brisk re-ordering.

A further approach was to institute a visible 'seal of quality' to the official products to gain consumer confidence. Warranty cards were used to gain user addresses to later send official magazine 'Nintendo Power', this effectively acted as advertising to a known user base that used the 'news' in the magazine as pre-advertising of a few highly focused games in their development process to build players' anticipation. Additionally a phone network was made available to players to ring in for help on games, which received at one point 500,000 calls a week. Other attempts to gain awareness and credibility for the hardware system came in contracts with Pepsi, which widened the awareness of the Nintendo product to the drinks' older consumer base of 12 to 34 year olds, as did tie-ins with Tide detergent and McDonalds, as well as the creation of a film *The Wizard* and a cartoon series, Kinder (1991).

In this way the symbolic identity of the Nintendo Entertainment System was widened to other potential user groups and created a link to the firm on a basis that sought to create continued demand for games' cartridges. The aspect of creating a 'club' or 'extended family' of users of playthings had been known with older playthings such as Meccano. This had a newsletter and further construction projects for players that encouraged contact and maintained interest in the product. In this sense the artefact is given a wider framework of relevance to the user other than just one purchase point within the producer-user relationship.

5.3.5 U.S. Controversy Over the Diffusion of the Nintendo Entertainment System

The reaction to the successful diffusion of the hardware unit and subsequent monopoly over the supply of video games in the US territory, as in Japan, had also created criticisms that the success had been built on unfair business practices and maintained by abuse of a dominant position. The sources of these allegations had been made from actors in the industry at retail level, software development level and subsequently at state level. What was at stake was the issue of the competing definitions of what was acceptable practice in the Nintendo strategy in diffusing its technology and how this encroached upon the practices of other aspects of the economic and industrial practices. Additionally, the resolution of these competing definitions of acceptable practice served to highlight what business model could operate in the supply of video games entertainment and what aspects could be regulated by extra-organisational sources.

5.3.6 Retail

At the retail level part of the criticism directed toward the supply of Nintendo games came from firms that had seen the toy market affected by the rise in popularity of the system and had become dependent upon the game system. For example the large toy firm Toys R Us derived 22 and 17 percent of its profits and sales respectively from Nintendo hardware and software. Many of the top selling toys for the year were for a larger period dominated by Nintendo related products, (Provenzo 1991, p.12-13). The overall sales of the toy market revealed that 23 percent of sales were of Nintendo products. This is unusual given Nintendo's deliberate attempt to divert the definition of the NES away from being a 'toy' in the US. Part of the reason, Sheff (1993) suggests the cutting back of R&D by toy firms in the recession of the late 1980s and early 1990s which lessened competition to Nintendo (which had itself seemed impervious to the recession in the US as well as in Europe). Levy and Weingartner (1990) noted that toy designs had later started to try and adopt microchip innovations enabling them to start to compete, while (Sheff 1993) noted the trend in toy tie-ins from Nintendo products. Further influence upon the retail sale of the Nintendo system came from the explicit withholding of stock of games if prices were lowered or unauthorised products stocked.

Given the economic and cultural influence of Nintendo products, the firm withheld stock voluntarily to increase demand in the long term by making certain games more sought after and to influence an aspect of their perceived value. Sheff (1993, p.193), notes that the practice of deliberately keeping some of its games on its inventory inactive actually gave rise to a situation in 1988 where of the 33 million cartridges sold, actual demand would have been able to absorb 45 million and retailers wanted to stock 110 million.

5.3.7 The Influence of the Environment on Games Development

This next section highlights the macro- and meso-social level aspects of the innovation process as it notes how the production strategy of the NES was responsive to the cultural and geographical context of where the NES was diffused.

The incentive for third party developers to support the NES by making games for it was obvious once the large numbers of hardware units were diffused. Additionally the scope for the user buying more games once they owned a unit was the key incentive:

Sheff notes (1993, p.213), that in the US, a NES owner bought, on average, 7 cartridges at a price of 40 dollars, compared to 12 cartridges in Japan. Half of Nintendo's profits came from the production of cartridges. The virtuous circle here would be that the range of software available for the hardware unit would sell more hardware units, which, in turn would increase demand for software. Software houses would benefit from the installed user base of NES users and by being part of the symbolic 'system' associated with the Nintendo brand.

Yet, the diffusion of the licence system from Japan to organise software creation, access to know-how and patented technology in the US, had some territorial amendments attached to it. The development of the 'security chip', (mentioned above), had restricted the access to developing games for the system and this was intentionally researched by Nintendo to find legal precedent to legitimate the practice. The aim, as well as preventing illegal copies from countries such as Taiwan, was to enforce control over the quality of the software in terms of searching for bugs, poor design and censor unsavoury content. For permission to publish a game, it had to score over 40 points in a quality control test and have a 10,000 unit minimum order to be manufactured in Japan. The cartridge could cost from nine to fourteen dollars. Again sales and inventory management were at the third party publisher's risk. Further, the game's packaging, artwork and advertising also had to be approved. Another explicit licence condition was that just 5 games a year could be made and these had to be made available only on the NES and no other competitors hardware, in addition, the games could not be sold outside the US or Canada.

Initially in 1985 these strict licensing agreements were not entered into quickly by software firms. The first firms to sign up in the US were software firms that were subsidiaries of Japanese companies which wanted to operate in the new US market and knew the Japanese system. The first firms to exploit the US market had made large profits with little competition from other licensed games. The first firm of US origin to become a licensee, Acclaim, did so in 1987. The number of US licensees grew from 25 in 1987 to over 100 in 1991. Firms that delayed entry into the growing cartridge games market, such as Electronic Arts, did so because they could not see the advantage in hardware capability of the cheaper mass produced consoles relative to home computer technology.

Despite the promise of profits from releasing games to a network of NES users, allegations of uncompetitive practices occurred. Some firms alleged that they could be subject to poor reviews or have coverage of their games withheld if they criticised Nintendo, or started to support rival games systems such as the Sega machine. Indeed it was felt that Nintendo's own games were disproportionately successful in relation to third party games, which despite being released for the same hardware were in competition with each other. One out of three Nintendo games were a success in comparison with one out of twenty third party games.

Other more serious allegations involved preventing firms finding alternative methods of cartridge production once the chip shortage, mentioned above, had created a situation of rationing cartridges. Alternative sources of chips, that third party firms tried to locate for Nintendo to use, were deemed as being 'inferior' Korean and American chips not of suitable quality allowed to be used. Further, Atari had cited that the 2 year exclusion of releasing games onto other gaming consoles had prevented competition. One firm, Tengen, had sought to sidestep the licensee system by reverse engineering the hardware architecture of the NES to release its own games

and simultaneously launched a legal case against Nintendo for violation of anti-trust laws. The thrust of the allegations was to argue that competition was stifled by Nintendo's practices of price controls and managing the supply of games.

5.3.8 State Level Regulation and Scrutiny of Nintendo's Operation. Design Becomes a Political Issue

The investigation into Nintendo's practices sought to ascertain how far its attempts to successfully diffuse and maintain its innovation remained within the rule of law, and this investigation now went beyond court level to legislative level. The sources of scrutiny here were Congress, the Justice Department and the Federal Trade Commission. The background as to why these bodies should have interest in games' playing technology are that it demonstrated the adverse state of Japanese-US trade relations. Specifically, the balance of trade was no longer in favour of the latter and this highlighted an example of the questioning of the status of the US in the global economy. Other Japanese firms such as Panasonic, Mitsubishi and Minolta had been found guilty of price fixing operations. A further issue was that one of the lobbyists at Congress level was Atari, an American firm with a once dominant market share of the industry. Another source of controversy was the wider meaning of the games' system beyond it being just an 'entertainment' artefact, but rather the specific model of the software production which had wider implications for producing all software.

The focus of the initial Congress level investigations into Nintendo's practices to support the NES design strategy, was on the 'security chip' and the licensing agreement that inhibited third party software developers from writing software for the machine. Further, drawing on a legal precedent set in 1969 (made against IBM which ruled that the restriction on creating software for the IBM machines was illegal), and the fact that under Nintendo's retail practices, customers were paying higher prices (up to 30% higher), for goods than they would otherwise.

The issues at stake in this controversy have wider implications that are worth elaborating upon. These related to:

- (1) Access to information and IT design,
- (2) Creativity and open markets

They reveal boundaries that exist between the perceived ideal structures and actual industry structures that can foster or inhibit creativity. The question is directed to the influence of Nintendo's practices which were seen to have been constructed in order to manage product innovation (i.e. the emergence of the NES) ; and the 'problem's with this were derived from firms that voiced arguments against Nintendo's practices.

The first point revolved around the impact of the 'security chip' and licensing agreements on the creation of software and the control over information transfer. The line taken by a committee investigating violation of anti-trust laws by foreign governments regarding the video games market, deemed that the implication of an absence of an open hardware standard to be conducive to the creation of information (games) that tied US firms to foreign industry control. This was in contrast to IBM or Apple computers that had software available without barriers to third party firms. In conjunction with this, by stretching the category of the hardware to being a 'computer' rather than a 'toy', the implications of the debate were widened because the games playing unit could set a precedent in the US where the dominant production model for

software was a closed one and the market concentration, in favour of Nintendo, had stifled competition.

Point (2) is tied in with the above issue and related to the notion that by controlling access to the creation and diffusion of software for the NES, Nintendo could dictate the form of what designs could be created. This would discourage potential innovation. Part of the rhetoric surrounding the implications of the business model becoming legitimated used examples beyond the computer industry:

For example, Sheff (1993, p.278) cites one example of a software publisher's explanation of the implications of the mode of operation:

"It's as if a writer could not publish unless he owned the printing press. How much poorer would our civilisation be? In the computer industry the most creative things often come when small groups of people, not necessarily associated with big companies that could get a licence, get together to create. The best games - 'Tetris', 'Bamboozle', 'Dungeon Master' - all came from individuals or small development groups. Nintendo's policies could block out the most creative people. It could kill the industry".

This type of argument or belief about innovation (which was reflected by those making games in the games industry (e.g. Stevens and Thomas 1992 given in section 2.2.2), reveals two competing industry discourses regarding quality control and game creation. One arguing that quality control was one of the manifest aims of the Nintendo operation in order to avoid poor quality games which were supposed to have badly affected Atari. The other was the complaint that it inhibited creativity. (This is again reflected at the UK state level once the technical and institutional practices were diffused there and the Monopolies and Mergers Commission become involved - see 5.4.11).

Due to the allegations raised against Nintendo's production practices at the Federation of Trade Commission (FTC), (which had targeted price fixing as its main concern), the terms of their production agreements were subsequently relaxed by Nintendo. These gave some autonomy to some of the largest third party publishers to manufacture their own games - but still the components had to be purchased from Nintendo. Additionally the two-year 'exclusivity clause' for games to be solely available to the NES was relaxed. Yet, despite this, scepticism still existed regarding the autonomy of decisions made by third parties. For instance, there remained the use of reviews in the magazine Nintendo Power to cut off coverage of games or exclude a company's adverts if they showed dissent or started supporting rival hardware systems, or Nintendo could withhold a retailer's stock 'accidentally'.

Additionally in the light of the FTC investigations into the legality of Nintendo's influence on the industry, the firm sought to intensify its territorial operations into Europe as a safeguard against a negative ruling in the US. Sheff (1993, p.412) notes that this element of strategic planning of the global diffusion of its operations made the firm flexible to changes in its market environment and was similar to Sony's approach.

In order to avert harsh sanctions by the FTC, an agreement was reached to give price autonomy to retailers selling Nintendo products. Additionally the FTC made Nintendo pay a rebate via coupons for 5 dollars off Nintendo products. This was to cost Nintendo a maximum of 25 million dollars and a minimum of 5 million. (This latter

aspect of the FTC action received ridicule, as it appeared to perform the same function as a Nintendo inspired sales' promotion in encouraging yet more sales).

Beyond this, the legal action of the Atari Corporation that sought to test the legality of the licensing system citing restraint of trade, too was subsequently quashed in court in May 1992 and prevented a successful legal challenge against the model of cartridge production and third party software creation. Attempts to reverse engineer the NES hardware to get around the 'security chip' by Atari games failed because the method they applied was deemed illegal, although the principle is acceptable if applied correctly. In this vein one firm had managed to create and survive Nintendo litigation over a compatible cartridge. Other attempts included 'zapping' the 'security chip' with a negative voltage to confuse it and sidestep its lock mechanism to overcome the need for 'know-how' to access the protection system. To counter this sidestep there were periodic changes to the NES hardware - over 14 revisions were made.

5.3.9 Conclusion to US Section

The aim has been to show how the hardware system came into being using an integrated approach concerning the intended use of the machine and control over software supply. The social shaping of the hardware design and its subsequent revisions do highlight how the Japanese strategy in hardware design and software use were not imposed but involved some revisability or negotiation with 'market forces' and government bodies. The eventual diffusion of the Nintendo and Sega systems and the creation of games for them, included disputes involving the exercise of power and influence over the allocation of resources, (that even spilled over to state scrutiny at EC, UK, US level). Contesting the legitimacy of the hardware and software design, and the influence of the distribution system that was integral with it, was political, as Silverstone and Haddon (1996) note.

5.3.10 The Emergence of Competition. Sega and the MegaDrive as an Alternative Relevant Social Group

The attempts of firms to gain market share in the industry in the late 1980s had promoted technical innovation in hardware as the basis of innovation to compete with Nintendo. The main competitor 'Sega Enterprises' had only gained 5 percent of the Japanese market with its rival machine, the 'Master System', that was similar to the NES in capability and used the same '8-bit' processor technology but with some extra graphical ability. Its attempts to gain market share in the US had also gained little success, with the NES gaining 90 percent plus of the market there (Hayes and Dinsey 1995, p.23). This subsequently meant Sega sought to target Europe as a territory for its products (which gave it a head start over Nintendo in that territory).

The specific creation of the Sega Genesis (or 'MegaDrive' in the UK), represented an attempt to compete with the NES by creating a higher specification hardware unit. The use of the more advanced '16-bit' based central processor provided faster and more powerful calculations, giving more speed and detail to the games. Again as with the NES's design, the model for the design of the hardware for the new Sega machine was coin-operated arcade technology. This provided as a result more advanced graphic and audio capabilities that gave the semblance of 'new' technology to generate demand by creating a sense of 'relative deprivation' in users who still owned the older systems and so could not experience 'state of the art' games. Sega had an expertise in

creating coin-operated arcade games and these served as the basis for creating software for the machines and were thus easily recognisable for users.

The release dates 1989 in Japan and 1990 in the US, gave a time advantage to the Sega Genesis / MegaDrive, allowing it to become one of the first firms in this category operating in the '16-bit' console market. The attempt to establish the new competing hardware in the market place used a large 10 million-dollar advertising campaign with the unit distributed by the toy firm 'Tonka'. The unit was to cost initially 199 dollars. The proposed user base was intended to be an older age group than that of the NES, as they could afford it, as well as appreciate the 'state of the art' games. In order to construct demand the machine was placed within a niche user base which was exclusive or perceived to be elite and 'cool'. The exterior hardware design also had an aspect of symbolism that reflected the marketing approach of the 'new' dark horse competitor. It used a jet-black finish and prominently displayed the phrase '16-bit' to highlight its innovative merit in processing power.

Part of the process of attempting to build software support for the machine involved using licensed characters from Disney and creating a Michael Jackson game based on the pop star. The creation of a 'flagship' game with a mascot character - *Sonic the Hedgehog* was designed to emphasise the machine's advantage in processing speed and also gave the machine a unique identity and trigger sales. Additionally the basis for gaining third party software support for the Sega machine was that it offered an alternative to Nintendo's regime of production, although the same type of restrictive licensing and approval process existed again for manufacture of the cartridges. (See section (6.4) for an example of this).

5.3.11 Nintendo's Design Strategy. Building a Constituency to Support Technology Change

In the face of competition based on technology change, Nintendo's strategy of obtaining profits from third party software support for its NES could have been inhibited if it entered into competition too quickly with a replacement. Therefore the issue of timing the replacement to the NES was critical both in terms of competing for market share with Sega in the new category of '16-bit' console hardware, and also for obtaining a basis of third party software support.

The proposed replacement machine's design choices for the Nintendo 'Super FamiCom' or 'Super Nintendo Entertainment System' (SNES), in Europe, had to trade off novelty and continuity, while creating obsolescence of previous machines. The new hardware included custom built chips which again promised improved graphics' capabilities, as well as an improved sound chip for the software to use. These would not be useable by existing NES software and in order to keep costs down no circuitry was included to make the existing stock of NES games compatible. Other design inclusions were an improved security chip and the exterior styling of the unit being both 'sleek' and able to "*fit next to a VCR*" (Sheff, 1993, p.358), for creating mass market appeal. Again the unit used grey like the NES, which is perhaps not totally compatible with the colours of other consumer electronics.

The entry of Sega into the market and its head start in the 16 - bit sector created some change in the relationships between third party software houses and Nintendo. The latter firm now needed third party firms to support the SNES in order to compete against the Sega machine's catalogue of games. Aspects of the licensing agreement were changed with the ending of exclusivity of software support for machines and

now games scoring over 30 points in the approval process would not count in the total number of games a firm could release (3 from each firm for the SNES).

5.4 Diffusion to the UK and Europe

5.4.1 The Diffusion of the Two Cartridge Machines to the UK and Turbulence in the Cartridge-Based Console Industry

The next section examines the entry of the two firms into Europe, the diffusion of their console technology and the influence it had there on the industry. Therefore this section accounts for both the macro- and meso-social level contexts of innovation mentioned in sections (3.2.2-3). Part of the main emphasis of this section is directly relevant to the change in the domestic market conditions that the two case study firms in chapters (6), (7) and (8) experienced as a consequence of the two hardware vendors' market entry.

5.4.2 Building an Infrastructure to Support Technology Transfer

Part of the difference between Europe and US territories was that the user bases for games were younger than the US or Japan (i.e. under 16 on average). Also home computers were the main game playing technologies, with floppy disk or tape based delivery rather than cartridges (Sheff 1993, p.412-414, Hayes and Dinsey 1995, p.16). Another aspect relevant to diffusing the hardware was that the number of countries that Europe contained meant there were a number of language and cultural differences influencing the marketing and advertising strategies for the heterogeneous user bases.

The attempts of Sega and Nintendo to diffuse their hardware from the US to Europe reveals how important the network of other actors, such as a receptive user base, software developers, retail and distributors, was in gaining acceptance for the technologies. Also it shows how the differential success of Sega in this territory, over Nintendo, provided an illustration of how these networks revolved around particular hardware configurations and contributed to that success. It therefore reveals the importance of other actors and social groups in the success of innovation diffusion that is *extrinsic* to the hardware itself. Further, the decline of the market influence of cartridge based hardware and the decline in demand in the industry is mapped out, as this relates heavily to the context of design of the case study games' environment.

5.4.3 Market Success. Coming to the UK - Building Support for Sega and Nintendo

The first attempts to seek European markets for the Sega and Nintendo console machines of the first generation NES and Master System occurred in 1987. The initial success of the Sega machine in gaining popular support relative to the Nintendo machine had repercussions for the subsequent success of the 'next' generation Sega machine, the MegaDrive, when it was released. The initial attempts of the NES to obtain retail support had floundered because the existing home computer hardware that was available was seen to be more powerful than the console hardware. Consequently, Nintendo's attempts to obtain successful distribution of the machine had to be revised with 3 different firms taking over distribution until some success was achieved in 1990 with a game that used the *Teenage Mutant Ninja Turtle* characters. One initial problem the NES had in finding a retail outlet was the definition of the hardware as a toy, and the initial use of 'Mattel', a toy firm, to

promote and distribute it. As with the US release of the machine, the category to associate the console hardware with, proved a difficult issue and traditional retail toy buyers did not see the attraction of the hardware over orthodox toys. Other issues carried over from the US mode of releasing the NES in the UK produced a barrier to competing with Sega at retail level, in that Nintendo's retail policy committed retailers to buy the minimum order of 1,500 pounds of stock and point-of-sale merchandise from them. This made them less flexible than Sega which gave the retailer more autonomy over managing sales of the machine and software, as well as offering better profit margins. Nintendo initially lagged behind Sega in obtaining access to high street shops and the number of outlets that Sega products were available at, by 1993 was 8,000 retail outlets - outnumbering Nintendo by almost 50 percent, (Hayes and Dinsey 1995, p.97).

The basis of mobilising support for the Sega machines had been more successful in that its initial distributor Mastertronic had pre-existing links with the home computer games industry, as it had previously produced budget games for those formats. These helped to gain initial acceptance of the Sega console at retail level in high street stores such as Woolworths, and later Dixons (who were seeking a product replacement to cheap Amstrad computers), as well as small, specialist, non-high street chain, computer shops.

Further to this, Mastertronic management had institutionalised links to build a basis of software support for the Sega machine by means of alliances with third party publishers. Sega additionally had some history of licensing out its coin-operated arcade game titles to computer game publishers, as well as having a library of games for its machine that were recognisable to users. These games were seen to be more compatible with European games' players' tastes than Nintendo's largely American catalogue of games. The initial success of the Sega machine gave it a known brand name to users and gave recognisability to the MegaDrive when it arrived in the UK in 1991, (18 months ahead of the Nintendo replacement machine the SNES). In 1991 Sega eventually took control over the distribution of its machine, as well as setting up its own UK based headquarters to give it some autonomy and responsiveness over operations in Europe. These were advantages that Sega had over Nintendo's operation. Sega's advantage in the European territory was seen to be very important in terms of acting as a springboard towards aiding global competition:

(Hayes and Dinsey 1995, p.21)

"Without success in Europe, and huge support from the indigenous software development and publishing community, it is questionable whether Sega would have ever been able to have taken on Nintendo globally, and eventually score a famous victory or two in the biggest markets of all".

Part of the conventional explanation given for why the console machines succeeded in gaining a market foothold in the face of competition from home microcomputer hardware was explained in terms that were intrinsic to the machine, in both the MMC report (HMSO 1995) and in Hayes and Dinsey (1995, p.22), e.g. *"Consoles were better games machines"*. The basis for this was the lack of any loading time, with the cartridge giving immediate access to the game (as no disk changes or waiting for tapes to load were required). Further, the price of the hardware, as seen in the design rationale for the NES, with the absence of keyboard, disk, printer interfaces made the hardware relatively cheaper than the home computers. Commentators also felt that this cheapness contributed to its success, (Hayes and Dinsey 1995, p.21). These

explanations ignore the social aspects of the creation of alliances needed to secure the diffusion of the hardware. (Chapter (7) explores the validity of the first explanation, in terms of the design and play experience of the game for both console and home micro machines).

5.4.4 Conditions of the Market. The Meso-Social Level basis of Demand for Games

This section examines the nature of the supply and demand for games. This illustrates the elements of risk and uncertainty involved in software production that affects third party production of software, such as for the firms in chapters (6), (7) and (8).

Hayes and Dinsey, (1995, p.31) estimate that between 1987 and 1995, 250 licensed software development firms had made around 4,000 games for console hardware machines and each of these firms were seeking 'to find' a typical consumer who on average bought around 8 games for their machine. Geographically Europe was, as mentioned above, an important location for software development for both Sega and Nintendo. For example, by 1994, 40 percent of Nintendo's games were designed in the UK (ibid., p.45).

5.4.5 The Uncertain Nature of Demand for a Game

The nature of competition between software firms was made more sharp given that the nature of demand for a game was unknown before release and thus there was uncertainty over whether the game will be a 'hit' or not, and this was exacerbated by the "80:20 rule" (ibid., p.32). That is, twenty percent of all titles obtained 80 percent of all sales. Additionally the aspect of uncertainty in demand meant that a game's 'life cycle' could range from being six months in which it achieved high sales, before being deleted from production ('a sparkler' (ibid., p.41)), or typically sell around 5,000 for 6 to 12 months - around half of all game releases were estimated to be of this type. Beyond this at the extremes (ibid., p.42), were 'Classic' games titles, where demand remains stable over time and the title could be sold for a number of years. Or conversely the game could sell fewer than 3,500 units and be regarded as a 'flop' from the point of its release. Two of the industry's largest third party software publishers, Virgin Interactive Entertainment and Electronic Arts, stated that, on average the duration of a game's life cycle was about 90 days and that around 90 percent of a games sales occurred within the first or second month of a game's release (HMSO 1995 9.27, p.167; 9.63, p.173).

One aspect that Hayes and Dinsey (1995) note about the nature of demand for most titles is that it is relatively price inelastic, i.e. the demand for a game is based on quality of the game rather than how cheap it is. Given this, the attempt to manage and forecast the successful diffusion of a game was difficult, given the short life cycle of games. Price cuts did not work to increase the overall volume of demand of games sold, but were used by retailers to clear unwanted 'old' stock. To compensate for the uncertainty of demand games' publishers could seek to create a number of games in the hope of cross subsidising those that do not perform well. However, given the increasing cost of designing and developing games and the inherent chance of not creating a 'hit', one trend in the industry was to cut back on the number of games developed and target resources on these to increase their quality and maximise the chance of creating a 'hit', (Mellor 1995). One of the main qualitative aspects behind the consumer demand and their choices of software titles was the importance of

graphics' quality in games and this had scored very highly in surveys of reasons for purchase (Hayes and Dinsey 1995, p.70). Evidence offered by Sega to the MMC, noted that demand for a game was increased where it had scored 90 percent or higher in overall quality ratings in magazine reviews and these games achieved the highest proportion of sales. (This aspect has relevance in the case study interaction of design firms and the press (chapters' (6), (7), (8)). Additionally another aspect of consumer demand mentioned was the ratio of demand along gender lines was about four to one in favour of males over females, (HMSO 1995, 8.21, p.148-9).

One aspect of the UK market and the nature of demand was that hardware platform ownership affected the number of games a user would buy per year (Hayes and Dinsey 1995, p.37). The annual pace of consumption of games per user for the Sega MegaDrive was a ratio of 4 to 1, compared to 3 to 1 for the Nintendo machine. Hence, for every hardware unit sold, 4 games were bought for it in a year for the MegaDrive, compared to three for the SNES. This meant that the Sega machine was more profitable given the amount of software consumed for it. However, this ratio was seen to be a puzzling figure given the relative consumption of games to users in other territories such as France, US and Japan which consumed more games per hardware unit for no apparently explicable reason - given the non-verbal based nature of video games that removes language as a potential barrier. This relatively low ratio in the UK made prediction of demand again more difficult to forecast.

The mode of cartridge production that was outlined above compounded the problems of managing the supply of games to market because of the need for pre-ordering and producing in batches. Given that prospective demand was unknown and the games' had short life spans, delays caused by a three month re-order made it imperative that the first order met demand accurately to maximise revenue. A statement made by one publisher mentioned that as little as a 5 percent error in anticipating the volume of demand could make the difference between profit and a loss, (Noonan 1993a, p.44).

5.4.6 Market 'Crash' and Technology Change

Despite the growth of the console industry due to Sega's and Nintendo's success, the problems, outlined above, regarding uncertainty and risk in production and consumption patterns made the eventual petering out of the 'boom' and the decline in demand for console hardware and software understandable. The causes for the decline in the console industry reveal directly part of the volatile industry environment that the case study firms operated in 1994 and 1995.

The value of the video games market in the UK had grown from its 1988 - 90 state of 135 million pounds to peak at 560 million in 1992, (See section (1.1.1.) and Hayes and Dinsey 1995, p.3). The '16-bit' MegaDrive and SNES were the main basis for the successful growth in popularity of video games. By 1993 the demand for console games technology had plateaued and from that date on, went into decline to around 310 million by 1995 in the UK. The decline was also reflected in other world markets and the period between 1993 to 1995 saw the value of the industry decline by one third in the UK and, at best, estimated to have dipped to around one fifth globally, (ibid., p.121). Both Sega and Nintendo suffered dents in their profitability with 1993 being the start of the severe downturn, with for example Sega's profitability on turnover falling to 3.3 percent, from 13.8 in 1992, (HMSO 1995, p.119). The appreciation of the Yen, relative to other currencies, was identified as exacerbating this downturn. These currency fluctuations affected third party cartridge

manufacturers especially in 1992 to 1993, when the pound was devalued by 20 percent against the Yen, as they had to pay in Japanese currency in advance for the production and importation of their games, (Hayes and Dinsey 1995, p.38, 44).

5.4.7 Retail Issues

The main reasons for the decline reveal the difficulty Sega and Nintendo had in managing the production and demand for hardware and software. One intentional strategic point behind the control these firms exerted over the supply of software and retail sales of their licensed goods, was the attempt to maximise the life cycle of their game systems, so they did not come to be perceived as obsolete or 'old' and provide poor quality software. As was mentioned in (5.3.2) the aim of avoiding a decline similar to that of the Atari-based console boom in 1983, which commentators and industry actors had felt was due to over-supply of unregulated, poor quality software that undercut profit margins for all titles and created a consumer backlash. Therefore, Sega and Nintendo tried to control the supply of software to avert this situation and had felt, despite criticisms of creating a restrictive practice, that they had helped the market category become a world-wide consumer phenomenon, (Hayes and Dinsey 1995, p.43).

However, the market had been seen to 'overheat' by the end of 1993 and the aspects of 'control' that had incurred criticisms of the cartridge industry in the US, at retail and software production level, were not apparent here. At retail level, one of the events that created the decline in profitability of the console sector was high street shops cutting the price of hardware. This was not manufacturer-led, but had occurred at Christmas 1993 with Woolworth reducing the price of the MegaDrive 'bundle' of hardware unit and game by £30, from £120 to £99, which Nintendo responded to with its own hardware and software bundle, and other shops similarly. The price cuts were described as creating a "*huge loss in revenue*" (ibid.p.64) because they did not create an overall increase in volume of demand but instead cut profit margins, and in turn made the cartridge software look more expensive in comparison, (usually £40 to £60). Price cuts on software occurred from the beginning of 1994. The price cuts were illogical given that the basis of demand was relatively price inelastic. However, the use of retail price cuts served to increase the number of consumers to a particular shop. Savage price cuts were applied to end of line clearances for old stock. By 1994 many of the high quality games' titles themselves became discounted and further reduced margins on games. Many high street shops competed with each other with 'price matching' offers.

A further strategic problem high street stores suffered in committing themselves to stock video game products was a mistaken 'either/or' emphasis on stocking *either* hardware *or* software and not both. Stores such as Dixons, Comet and Argos which focused on selling hardware, were seen to have problems from failing to acquire a large line of games and therefore did not make the possible high profits from selling software with their machines. The hardware did sell in large quantities, but they did not carry high profit margins. Conversely, stores such as Woolworth, WH Smith and Boots, which focused on selling software were felt to be committed to too wide a range of games which led to high discounting on unsuccessful titles and they also lacked the ability to demonstrate games and offer advice on them, (Hayes and Dinsey 1995, p. 94-95; HMSO 1995, 2.16, p.9).

With the success in video games' sales, the production of games had increased and game titles were competing for limited shelf space in high street shops that similarly competed amongst each other for a share of the prospective consumer base. In the face of growing demand and the rise in output of games' titles, retailers were seen to have over-ordered games stock, (HMSO 1995, 2.50, p.17). This partly arose as a consequence of being offered discounts on bulk purchases which created inventory 'bottle necks' for titles that were not in high demand. Hayes and Dinsey (1995, p.100) suggest that poor retail management by large retail outlets in forecasting sales or managing stock, once demand had plateaued, was a major problem. The retail-induced price cuts, that affected the market, had been described as occurring prematurely and gave the impression that the market sector for '16 bit' Sega and Nintendo hardware, was in decline or becoming symbolically 'old' in meaning. Despite Christmas sales in 1993 for games being the highest yet, there were very many games still left unsold in warehouses, and in comparison to hardware, the attempt to sell the stock of games was more difficult as price cuts did not effectively influence demand.

5.4.8 Weaknesses in the Production Strategy

The problems of attempting to manage the production of cartridge games and their release by Sega and Nintendo had contributed to a situation of over-supply and the weakening of the market sector's fortunes. One contributory factor to the problems was the heightened expectations of the demand for games in Christmas 1993 after unprecedented success in the previous years. This had created over-optimism in setting sales targets and ordering stock.

The head of Sega Europe noted about the industry condition at the time:

"The market got very tough. One tends to be lulled into a false sense of security in a market that grows 100 percent every year. When you're making a plan that says that the business is only going to grow 50 percent you think you're in danger of being too conservative. When the market actually shrinks 20 percent it takes you a month or two to change strategy, and digest the difference ... that's what we had to do last year [1993], and it's difficult. It's like a car going forward in fifth gear then suddenly going into reverse - there's a bit of scraping of gears. I don't know how anyone predicts changes that are that extreme in the market place. I can't think of anything that's as volatile as our business. You end up being nervous about being cautious because, if you are you lose. It's a very difficult business, and it's a cycle that the industry keeps going through".

(Hayes and Dinsey 1995, p.125)

The difficulty in managing the volatile market conditions was manifest in the relationship between local and global level communication between the Japanese parent firm and the UK based European subsidiaries. Both Sega's and Nintendo's European subsidiaries had experienced some differences with their parent firms, who, in the Nintendo's case with advertising, had a centralised strategy based on focusing on the product which gave little autonomy to compete with Sega's brand-led style of advertising. Another aspect of local-global tension, was the setting of sales targets which were seen to have no relation to domestic demand but rather seek to boost the base firm's export sales' targets and get stock out of Japanese warehouses. This created a situation where excess stock was 'dumped' into the European market undercutting prices. Hayes and Dinsey (1995, p.73) quote one senior source at Sega:

"They should have written off the overstocks and buried them somewhere. We knew there was going to be trouble at the time, but Japan insisted in selling it off and they ended up dumping a million units into distribution at 3 pounds a time"

The knock-on effect to third party publishers, such as for example Electronic Arts, (HMSO 1995, 9.28, p.167), was that the influx of these cheap cartridges affected the perception of the value of their own competing stocks and put pressure on the prices of their own stock.

5.4.9 The Problems of Advertising to Manage Demand

Over-supply of games from Japan was also relevant to Nintendo (ibid., p.40) and in 1993 when Nintendo took over the distribution of its products, the over-supply of outdated games sent from Japan also began to occur. The role of marketing was seen as a contributory element in the problem over-supply. Marketing sought to create a growth in demand in a market that was in actual fact becoming saturated. Both Sega and Nintendo had spent large sums of money on marketing and had created innovative adverts to promote their brands that were in competition not unlike 'Pepsi' and 'Coca-Cola'. Yet the cost of marketing to acquire market share was criticised when it occurred at the expense of product innovation. The marketing battle was seen to have occurred in the years between 1992 to 1994. Advertising was described as being misallocated to products already well known by the target audience and became monotonous and repetitive. As the basis of demand was dependent on quality of games' software, advertising could not be used to create demand for a product that lacked good software. Hence, the introduction of the CD add-on for the MegaDrive (see sections 6.5.5-6), was accompanied with a high cost advertising campaign but the lack of innovative software for the expensive hardware add-on unit subsequently inhibited its sales.

5.4.10 The Incentive to Over-supply Games

A further problem with managing the demand and supply of games was that the over-production of games was exacerbated by the need to respond to legal pressures to lessen the restrictive controls over the number of games third party software firms could release. Because Sega and Nintendo could make profits on the production of these games, they also had some incentive for maximising output of cartridges available for their machine. Over-ambitious software targets set by third party firms hoping to 'cash-in' on the 'boom' in demand for games had also created over-optimism for the possible demand for games, with an almost *"anything would sell"* approach (ibid., p.126). By 1993 software had become the larger part of the console video game industry (as against hardware), with over 50 percent of the market value. Because many games did not really offer too much in innovation over other competing titles, demand was seen to peter out despite the large hardware bases of potential purchases available and the prices of games in 1993 remaining high. Due to the time delay in production of cartridges, firms paid for, and so were committed to, games that they would have to wait to have shipped over from Japan - some waiting up to 6 months for orders to be made up and delivered. The combination of both Sega and Nintendo over-supplying games to local subsidiaries, together with an over-supply of third party games, created a situation that led to retailers receiving too many games and hence the use of price cutting as was mentioned in (5.4.7).

In conjunction with the fall in demand for '16-bit' based Sega and Nintendo console games, the industry was becoming aware of new innovative hardware units on the horizon that aimed to create 'the next generation' of games' machines. The influence of technology change - especially the use of CD technology and faster processors - had created a mood of change in the industry. Press coverage - such as in 'Edge Magazine' - sought to construct demand for the new developments in hardware by anticipating the 'new' possibilities of future games. Firms started to change their production strategy by shifting development focus away from the risk-associated cartridge consoles to newer CD based machines. For example, Sony Electronic Publishing had released one million cartridges into the European market at £8.25 each (where the RRP was for £45) in preparation for shifting production to its CD-based games' machine away from cartridges, (Charlesworth 1995). By 1995 the cartridge format had dropped, at one point to 40 percent of all games' sales, whereas in 1993 it represented around 75 percent, (Hayes and Dinsey 1995, p.131).

5.4.11 UK Response to the Successful Diffusion of Video Games and Attempts at Regulation of their Supply

As with the US experience of state level investigation into allegations of monopoly practices against Nintendo, the UK experienced similar scrutiny over practices in the video game market. Here, however, both Nintendo as well as Sega's business practices were under investigation, as in the UK, Sega had acquired a large market share. Additionally, Sega had adopted very similar practices to Nintendo in regulating the supply of video games for its machines by use of licences, patents and the design of its hardware, (HMSO 1995, 2.99, p.29).

The involvement of the Monopolies and Mergers Commission (MMC) was a response to the Office of Fair Trading's (OFT) initial investigation of the market in the winter of 1992, due to complaints from parents, software developers and retailers about the industry. The final results of the OFT's investigation led to an investigation by the MMC, beginning in January 1994. The MMC had legal powers to support its recommendations against findings deemed to be against the public interest.

The function of the MMC was to identify aspects of business practices that distorted competition between firms and business due to their large scale and thereby in doing so, operated against the 'public interest'. Sega and Nintendo were together identified as parties creating a 'complex monopoly' situation - i.e., controlling over 25 percent of the supply of video games to the UK market. The recurring themes balanced against each other in the investigation were: (i) the rights of firms to protect their intellectual property rights (IPRs) on creative materials which they had invested R&D in, by use of patents and copyrights and licences; versus (ii) the distortion and barriers to competition caused by the abuse of exercising such rights could have on other firms which could have adverse effects for society. The state level investigation of Sega and Nintendo as 'monopoly firms' raises some interesting issues. These questions are concerned about how video gaming technologies intentional design in the 1990s need to be scrutinised and how the concept 'public interest' is articulated to created a possible 'alternative scenario' where a 'better' state of affairs could exist in making recommendations, so as to provide an alternative to the present set of institutional relations, that could be conducive to the production of video games that would be of more benefit to society. In this sense, the MMC does adopt, to a degree, an ironic similarity to the concerns of the SCOT approach mentioned in (3.4.2), in that alternative scenarios for technology design and its arraignments are examined.

Therefore the MMC's investigation of a set of 'problems' in the video games' industry raised by the two firms' mode of operations reveals, in effect, a 'theory' of how the successful diffusion of game innovations 'really' occurred and were sustained - by abuse of a dominant position in the market - rather than by any intrinsic merits of the hardware or software itself.

5.4.12 The Case against Sega's and Nintendo's Practices. The UK Response to the Effects of Sega's and Nintendo's Attempts at Technology Management

The five 'practices' seen by the MMC report influencing the supply of video games all have a common theme relating to how they are perceived to be against the public interest in either restricting choice, artificially distorting prices by keeping them either too high or too low, or restricting competition. These practices related to: (HMSO 1995, 2.23, p.11)

'(a) Establishing a discriminatory price structure for software and hardware which results in prices for software that are excessive in comparison with prices for hardware.

(b) Requiring persons or companies wishing to publish software compatible with the company's hardware to acquire a licence to do so from the hardware producer.

(c) Controlling the supply of third party software through the conditions included in such licences, including limits on the number of games approved, approval of the software concept, program and packaging and restrictions on the manufacture of cartridges.

(d) Incorporating technical features in their products, some of which introduce territorial segmentation, which make it very difficult, independently and without breaching IPRs, to produce software that can be played on their machines; and

(e) Restricting the rental and part-exchange of software.'

Practices (a) to (d) are of relevance to this thesis in that they are described as interrelated practices in the intentional design and diffusion strategy of the gaming hardware and software creation scheme. This was deemed to create a situation where both Sega and Nintendo could expect to create healthy profits and control the supply of software that reinforced their dominant position and stifled competition.

The initial issue of (a) the practice of creating a differential pricing structure on hardware viz. "excessive" software prices - described by Nintendo as an intentional design 'philosophy' (HMSO 1995, 2.28, p.12) and a strategy outlined by Sega's chief executive in 1994 (ibid., 2.28, p.13) - was seen to create a situation where the dominant positions of the two firms were reinforced and which created barriers to entry into the market for other hardware suppliers. The high proportion of advertising spent on flagship characters such as *Mario* and *Sonic the Hedgehog*, were said to create a high profile for the Sega and Nintendo brands which acted as a deterrent to hardware competition, (ibid., 2.44, p.16). For instance the two firms had spent around 17 percent of turnover each at the peak in 1992 on advertising. The licensing conditions reinforced the situation where the Sega and Nintendo brand name's were more relevant to consumer awareness than the software developer's own brand - which both Sega and Nintendo acknowledged - (ibid., 8.48, p.153, 7.53, p.135).

The effect of this was seen to create a deterrent for competing firms that needed to create a credible 'track record' in order to mobilise retail and software support in the face of such competition. It was noted that competing firms such as, Atari and Philips and the '3DO' alliance of mainly Japanese consumer electronic firms, were seen to be either unable to enter and remain in operation in the market in 1995, or described as facing difficulties. The absence of competition from other hardware suppliers was interpreted to mean that price competition was not encouraged and that software development firms and publishers would lack any alternatives and have to seek licences from either Sega or Nintendo. (Chapter (7) reveals relevant issues in the design of a game that was targeted initially for hardware that competed against the console technology). The licence system created a barrier to market entry by controlling game production and meant that high profits could be earned from charging royalties and manufacturing the games' cartridges and these had contributed to making Sega "*very profitable*" and Nintendo "*exceptionally profitable*" (ibid., 2.55, p.19). Margins on Sega cartridges were stated as being around 30 percent (ibid., 2.54, p.19). Also it was felt that, even despite the downturn in economic fortunes, the two firms were well placed to overcome these in the near future due to their entrenched positions and that the downturn would be temporary.

The above point, (a), was reinforced by the restrictions in the licensing system's operation that (b) and (d) attended to. These points were framed in relation to the ability to control the source of third cartridges and their pricing, giving a grounding for the differential pricing in point (a) to remain. The implications of these issues were described to be against the public interest because they discouraged competition from other hardware vendors entering the market, and made the consumer bear the brunt of this situation with increased total costs to playing games once they became an owner of one of the artificially cheap machines.

Another issue relating to the pricing structure was that the absence of competition created a situation in the UK where the price for the hardware, and game bundles that accounted for 60 percent of hardware sales in 1994, were "*substantially higher in the UK than the USA*", (ibid., 2.59, p.20). (Due to design modifications of Sega and Nintendo hardware units destined for Japan, USA and Europe, importing the basic machines in an unmodified state would not work - see point (d)). The consequential high cost to the consumer made games expensive, so that they were usually acquired only by being presents, which was mainly why the market was seasonal with Christmas being the peak time.

Crucial to sustaining the above situation and the basis of the hardware firms' monopoly profits was, the commission believed, the use of licences by the firms in points (b) and (c), which had legitimated the regulation of third party supply of games for the hardware units. The unusual aspect of the use of licences in the video game sector was not felt to be their use to protect the original designers IPRs over creative works in Nintendo and Sega hardware and software. *Rather, it was their additional pro-active application to control the future prospective production of original works or games' software from third party software publishers contained in complementary goods or cartridges.* The secondary aspect was felt to be a barrier to competition because the licences were used to regulate access to the know-how to program the hardware operating system and understand how the chips worked. The regulation of access operated by use of copyright, trademark and patent protection. Both firms provided the defence, based on industry lore, of the demise of Atari's dominant position in the early 1980s being due to inability to control the quality and quantity of

third party cartridges (e.g. HMSO 1995, 2.72, p.23) and that quality of games could be ensured by the hardware firms' regulation of the content of games. Such activity was defended in that it would 'sustain' the value of the brands in the consumer's eyes and the firms could offer advice in 'managing' the supply of games (e.g., in terms of timing should a particular type of game be too numerous and ought not be released to prevent over crowding) and on games' proposals (ibid., 8.80, p.158). Further, the existence of the regulation of the quality of games was described as in the consumers' interest in that it protected them from poor quality games. The arguments forwarded by the firms were that they had the right to protect the brand value of their hardware by regulating the quality of software made for their machines and to seek remuneration for the R&D on their hardware.

5.4.13 The Commissions Ruling - Providing an Alternative Scenario

The use of licences were deemed to act as a barrier to the market and distort competition because the licences operated not as a quality control measure per se, but to control the production of new games by independent game firms by controlling cartridge compatibility and their manufacture. This therefore fixed the third party firm's costs by forcing them to be manufactured by and purchased from the hardware firms. This latter point put the third party firms at a competitive disadvantage viz. Sega or Nintendo's own games with which they would compete. This state of affairs was felt to be against the public interest, as the issue of quality was deemed to be an autonomous business and design decision for third party software firms, and not one to be decided by either Sega or Nintendo on the consumers' behalf.

(HMSO, 1995, 2.84, p.25)

"If licences were available without present controls on games production, we think more publishers would enter the market, making their own decisions on the type of game to be produced and the scale on which they wished to produce ... overall we think there would be greater choice for the consumer and lower prices for software. Without licensing controls there may be more games of poorer quality, either technically or in concept, but we believe games producers and consumers together should be left with the responsibility of choice, as in the related area of computer games. In this context, we would expect the existing wide range of sources of information about playability and quality of games referred to in paragraph 2.13 ... [reviews, borrowing and word of mouth]... to continue. It would be in the publisher's own interest, as now, to see that the games were good ones which would work properly in order to protect and enhance the value of their own brands".

In this sense the conception of quality here is not so much something to be defended and regulated externally by Sega or Nintendo, but something that would be best encouraged via numerical diversity and publisher autonomy. Further, the view of 'the user' is one of a laissez-faire classical / liberal - economic 'consumer', able to make their own rational decisions based on various sources of information of games' quality. (Section 10.1.5 returns to the implications of the report's insights on these issues viz. the evidence from the case study games).

Other criticisms directed to the operation of the licence terms offered to third party firms was their use in recouping R&D costs which the hardware firms had incurred whilst developing their hardware units. Nintendo and Sega charged third party software firms a royalty element for this R&D, in calculating the costs of cartridges. The commission questioned whether it was valid for these publishers to pick up these

costs. Further the control over the manufacture of hardware compatible cartridges by Sega or Nintendo restricted the supply of the sources of cartridges. The commission employed a consultant to examine the possible prices of competitive cartridge production available from other independent sources and concluded that the mode of production that the licensed conditions created was one of a situation that publishers paid a price "*well above*" and "*often more than twice as high*" for their cartridges (HMSO 1995, 2.90, p.27). Based on Sega's figures submitted to the commission, a 2 Mega Byte cartridge for the Sega MegaDrive, (such as for the *Bloodshot* case study cartridge), would have a gross margin of around 7 pounds or 45 percent of costs incurred by third party firms, (ibid., 2.92, p.27). Nintendo's cartridges were roughly a pound or two higher due to the cost of their security chip (ibid., 2.93, p, 27). Evidence based on publisher Virgin Interactive Entertainment's hearing at the commission gave a higher estimate of cartridge charges, stating that they were on average about 20 pounds per cartridge and that represented 70 percent of the wholesale price (ibid., 9.62, p.172). While the initial developer and publisher of the research case study game *Bloodshot* - noted that Sega charged 16 pounds for manufacture of a cartridge, but it would cost only 6 pounds if available on an open market, (ibid., 9.23, p.166).

The implications of the high costs of the "*excessive prices*" (2.97, p.28) charged to third party publishers contributed to Sega and Nintendo's profitability as well as acting as a method for subsidising the console hardware / software price structure, inhibiting hardware competition. Therefore the price of cartridges was increased to these consumers and these increased charges were used as evidence that the two firms were exploiting a complex monopoly situation against the public interest.

Both the two firms' individual terms of licence agreements were seen as using "*similar frameworks of restrictions*" (HMSO 2.99, p.29), by the commission in point (c) and this related to criticisms over regulating specific aspects of the games' creative content and production restrictions. These included controlling the number of games a firm could make for the hardware systems, approving the games technical and aesthetic quality, (in Sega's case this included approval of the initial concept formation at the game's inception). Additionally all the game's supporting documentation, packaging and advertising were subjected to approval by Nintendo and Sega partly to ensure rules over trademark use were employed and that there was uniformity in presentation and no offensive material included.

The commission felt arguments based on the ability to control the quantity of games produced to maintain the quality of content, in order for Sega and Nintendo to 'protect' the value of their brands and consumers interests, was unfounded. The commission had taken evidence from firms that had licences denied and game's proposals rejected and felt there was scope for uncompetitive use of the powers to control production of games. For example Virgin Interactive Entertainment gave evidence to suggest that the concept approval stage Sega operated, helped Sega to control the timing of firms' game proposals and it had game proposals rejected, (HMSO 1995 9.62, 172). Further the firm noted that the market dominance of the Sega and Nintendo hardware systems meant that firms had "*virtually no choice but to produce video games in cartridge format for use...*". These machines and this situation of approval represented an unprecedented change to the freedom publishers had experienced previously and this served as a problem for "*many*" firms who could not obtain licences or meet the production criteria of the two hardware firms, (ibid., 9.61, p.172).

Additionally the commission felt that even if it were not a case of using the approval process uncompetitively, the power to control concept approval would influence the types of proposals firms would forward. This would pre-empt some designs from being conceived in the first place in their attempt to avoid rejection and risk having their timing influenced. Evidence offered by Intelligent Games Ltd., noted that Sega's and Nintendo's approval processes were biased against strategy-type games which they specialised in and this had the effect of restricting consumer choice. For instance the Sega and Nintendo machines had a ratio of 10 to 1 of arcade action based games to strategy games, whereas on computers such as the IBM PC, the ratio was more even, (ibid., 9.30, p.169).

The implications of the findings of the commission were to find Sega and Nintendo exploiting their complex monopoly situation and influencing competition by regulating publishers' output and inhibiting the diversity of games available to the user.

Regarding the regulation of trademarks in games' supporting literature and control over packaging and advertising, it was felt that firms should have autonomy over designing their own material and should not have to use trademarks mandatorily. Rather, trademarks should be an option, if a publisher wishes to identify their products with the Sega or Nintendo brand voluntarily, for purposes of giving an identity to the product. The net effect of the licences enforcing content regulation on game software and packaging was that the publishing firm was denied autonomy in marketing their own goods and creating and managing the identity of their own brands in the software they have created. This process was seen to distort competition.

The final aspect of contention covered here (d), the issue of intentional design of hardware with security devices and different territory specific hardware configurations, was felt to be an issue of deliberately seeking to inhibit and restrict competition. For instance the Sega machine used a 'Trade Mark Security System' (ibid., 8.72, p.156) that had the visual display processor examine a cartridge once it was plugged into the hardware unit and look for a specific code in the cartridge. Once found it would display - as in the case study game *Bloodshot* - "*produced under licence from Sega Enterprises Ltd*". Hence as the game would not work without the presence of the code. Any unlicensed use of the trademark to make it compatible was a trademark infringement and could be used as protection in countries where protection of the copyrighted computer programmes is unenforceable or not valid.

The commission did not regard such design choices as a clear-cut method for protection against counterfeiting but rather one that also inhibited reverse engineering and the production of compatible games without the risk of breaching IPRs. Further the design of hardware to only run territory specific games to stop grey importing, so as not to inhibit the co-ordination of official marketing campaigns, was also seen as unacceptable. However, the issue of there being different television display standards in different territories made it possible for justification to be made for having different versions of territory specific machines and software.

5.4.14 The Commission's Recommendations

The main recommendations considered by the commission to remedy the adverse findings of the report, which are relevant for this section were the areas of pricing and licensing. (Also covered was the removal of rental restrictions on games).

The issue of allocating price controls to counter the issue of discriminatory pricing with its affects on competition and on the amount game players paid, was felt to be too difficult to initiate. The problem of trying to calculate commission regulated price reductions or increases would be too difficult considering it would need to cater for products becoming 'old fashioned'. Additionally the key to the pricing structures lay in the licensing restrictions that were the proposed site of changes. It was, however, suggested that the Secretary of State could re-examine such price controls should the licensing remedies (below) not be appropriate.

The aim of changing the licensing restrictions for third party game manufacturers was in order to loosen the control over the supply of games and their costs. The first suggestion was to make available Sega and Nintendo licences to any firm wanting to make compatible games, with an agreement on a royalty payment which could, if need be, be settled by a copyright tribunal. Additionally the commission also recommended the removal of conditional licensing restrictions regulating the number of games and the approval of game concepts, final quality and packaging, and control over manufacturing of cartridges. The legal basis for mobilising such changes was examined and it was felt that Schedule 8 of the Fair Trading Act of 1973 empowered the state to enforce such changes. The legal issue at stake here was that such recommendations removed the hardware firms' ability to authorise reproduction of their IPR in programmes and know-how and patents etc. in order to make compatible games.

On a geographical level the implications of the UK state making such recommendations could be at odds with other states that did not or could not enforce such changes in the licence terms of third party games' publishers and could distort competition between countries. Further there were some reservations felt by games' publishers, (ibid., 2.152, p.39), that Sega or Nintendo might not be willing to enter modified licensed agreements that would yield on the issue of approval and control over the price of cartridges and so would refuse to grant licences, forcing some UK firms to relocate outside the UK so as to enter into agreements. Additionally there were some reservations as to whether the UK government could enforce laws against copyright and patent holders that were located in Japan - introducing another dimension to global and local operations of firms in the video game industry.

It was feared that Sega or Nintendo could withhold 'know-how' (contained in official development programming manuals) that made programming the hardware easier. Enforcing access to patent and copyright information was felt to be enough to make a game of sorts but access to know-how would overcome a handicap to making an optimised game. It was felt that although the Secretary of State might not have powers to enforce access to know-how, some legal scope potentially existed under the fair trade act to remedy problems here, (ibid., 2.152, p.40).

5.4.15 Summary and Conclusion

This chapter has met the aim of explaining the issues relating to the political choices in the design philosophy of *hardware* and noted its significance for the design of *software*. As in sections (3.4.1) and (3.4.2) regarding Winner (1985) and the SCOT approach, this chapter has attended to the issue of why the closed-ended hardware systems had come to be designed the way they were, noting the choices involved in creating this scenario, and the 'problems' that were associated with these technical choices. As sections (5.1), (5.3.8) and (5.4.12/13) noted, a major 'problem' associated

with the design of the Sega and Nintendo hardware, licence and approval system, was that software design and the industry itself could be adversely influenced by such arrangements.

This chapter demonstrated both the social construction of the technical artefact (the hardware unit), the 'problems' that its design addressed, but also the 'problems' that emerged as a consequence of its deployment. This was demonstrated by following the 'careers' of the hardware units. The elucidation of the globalised histories and 'careers' of the hardware revealed a trail across 'meso-social level' national territories that have accumulated, not just financial capital that funded the push into the next territory, but also the accumulation of legal and industry conflict with institutions that had come into contact with the hardware. The response to the hardware across societal, economic and cultural boundaries revealed uniqueness in each territory's interaction with the hardware units, where scope for resistance and irregularities existed. The success of the diffusion of the cartridge production model across the territories was contested and not a deterministic 'inevitability'. However, the role of power marshalled at economic and legal levels by the hardware firms' strategies had created an attempt at centralised control over technology management and the creation of intellectual property, in an industry that had no standardisation or control over either of these two elements. Yet, software developers did demonstrate an element of voluntarism in entering the network to access a target market with their games designs to a known audience, organised around either Sega or Nintendo technologies, in order to recoup development costs and make a profit in a 'fashion' market where uncertainty of demand was a factor.

The next chapters (6), (7), (8), examine UK firms creating initial game concepts and developing them for release for the Sega and Nintendo hardware systems - as well as one attempt to develop a game in parallel for an unregulated 'open' hardware system, the Amiga personal computer. These chapters seek to explore specific instances of how the designs of games were influenced by these institutional and technical arrangements noted in this chapter. Also examined are the impacts of other heterogeneous issues of individual agency, software developer and publisher organisational influences and the consideration of the users needs as these interact with the emerging game in design and development.

These reveal the implications of the impacts upon the games' contents in relation to issues that were examined here, regarding 'diversity' and 'quality' issues, as well as high production costs and autonomy over content selection. What is crucial in the next three chapters are the informal processes impacting upon the games' designs that are not revealed in this chapter. The discussion in chapter (9) contrasts the evolution of the game's designs and examines sources of power and influence upon their content choices which the original designers faced, and examines these in relation to the reservations and controversies outlined above.

6 Creating a Video Game – *CyberPunk* and *Bloodshot's* Inception

6.1 The Creation of a Video Game

6.1.1 Introduction

The case study of why a game, in this case *Bloodshot*, looks the way it does serves as an in-depth examination of how games are made, for whom and why. It illustrates the strategic nature of allocating creative resources and trying to design new entertainment products when demand is not known. Specifically it shows how: individuals make sense of their tools, work environment, entertainment markets, interpret 'what players want'; interpret 'what counts as quality games design', resist and incorporate design choices in the game from various power holders (intra and extra-organisational), from various sources of knowledge bases.

The underlying motives for the case study are to understand:

(i). The motivations of the designer's content choices and see how these were mediated by (ii), (iii) and (iv). This examines the nature of knowledge that designers hold and its origins. It is relevant to the discourses of video games design in the literature raised in (section 2.1). Also it is of relevance to debates over invention, design and creation which in liberal / Romantic theories regard design and innovation as the act of individual genius and inspiration.

ii). The influence of the development context in relation to technology, group and organisational impacts and

iii). The influence of the console manufacturer's licensing conditions and the software quality control and approval process. Secondly and conversely it also sheds light on how games design occurs in rationalised profit seeking organisations and how this selection environment impacts upon the design and meaning of the artefact. Relevant here is the issue of managing the design process within a heterogeneous web of vested interests and influences. These include technology such as the Sega hardware, as well as in-house management, interested colleges, quality control and extra-organisational technical and quality assessment bodies. In this case, these latter bodies included Sega and subsequent publishers and magazines that at various points interacted with the emerging game's design and contested its identity and symbolic meaning.

iv). Identify where the user or player entered into the development process and how their 'needs' were considered in design. Given that a video game is both intended to be a consumer good, which is intended for play and communication between the user, the machine and the designer's 'micro world' - how is it known what other people want and where do they enter the design process?

The game *Bloodshot* is a cartridge-based game designed by a development team within a publishing firm called 'Rocket Software' (this is a pseudonym). *Bloodshot* was produced under license for the dedicated games playing console the 'Sega MegaDrive'. The following details' breakdown of the key phases that the game passed through along its initial inception and eventual post-production release. Each of these phases represents the branch points and choices that created shifts in the design

attributes of the game, as different agents and actors came into contact with the game at subsequent stages. In each of these stages, the design team made intentional and unintentional choices. These were at times, against the will of the design team or were made in conjunction with factors over and above the control of any one agency. These 'choices' are what dictate to some degree who played the game, by deeming what players would be playing with and what they would not be playing with. How the game stabilised in its form and (play) function is revealed in this case study.

6.1.2 A Brief History of Rocket Software

The publisher itself had its origins in the UK personal computer games' business and the start up partnership between the two co-founders with backgrounds in marketing, had entered the market speculatively at the end of the first initial wave of interest in 1984. The basis of the business was publishing games created by third party games' developers with the addition of the use of marketing tactics, such as advertising prize money for completing a game, or using big name licensed properties to associate games with, (these included *James Bond A View to a Kill* in 1985 or *Friday the 13th* and *Star Wars*). This method of creating games around a licensed property was part of Rocket Software's initial strategy. (Haddon 1988a; (30) (number refers to interview subject given in the appendix A.4).

The site where design and development took place was at a department nicknamed the 'Kremlin' which had relocated to be in the same building as the publishers' marketing department and by 1993 had come into existence as an in-house games' development studio. Another shift in strategy for the firm was its support of the cartridge-based machines for which, by the late 1980s, Rocket Software had been licensed to create games, along with home computers. *Bloodshot* was one of three completed in-house developed cartridge games from its new development department.

6.2 Part 1: The game as CyberPunk

6.2.1 Beginnings

The initial idea for creating the game came from the development manager of Rocket Software agreeing to collaborate with a British Film company who had scripted a low budget science fiction film called *CyberPunk*. The game was intended to be a licensed tie-in with the film and was to reflect elements of the film. How the design team dealt with the issue of interpreting the film script and converting it into a computer game was a process that uncovered many design tensions over defining what counts as 'a good game', 'what do people want' and who should be responsible for delivering this. These issues were resolved concurrently rather than sequentially and had wider implications for informing the subsequent design of the game.

The initial design meeting, which took place to define the content of the game, was based upon the programmers' meeting with the filmmakers and gleaning ideas from their script to provide a preliminary game specification. The way the specification for a game was interpreted by the design team was political in three related dimensions:

- (1) It revealed a branch point in the interpretation of what counts as a 'good game';
- (2) Whose ideas counted in the team in codifying the game's specification.

(3) Delegating the division of labour - i.e. who should and should not be responsible for interpreting the game specification in its embodiment in computer software during development.

It was in this first initial phase that the game's identity was contested.

6.2.2 Translating a Film into a Game

The film's plot was set in an underground bunker where five of the characters are trapped. Due to a pathological condition one of the group was telepathically inducing others to kill each other while they searched for a way out. The choices in representing the film script as a game were between one group member who proposed the idea of the game having a "literal view" (30) matching the scenes of the film closely in the game, versus the programmer's view that the game should only roughly resemble the film.

"Well with M.H. it was particular to him very much, as I remember it, to have a game based on the events that were in the screen play. He wanted to take quite a literal view of it saying 'this character does this' and we'll have to have a scene where the character does this and all the rest of it and what I wanted to do was do a game that captured the flavour of the film...". (30).

One aspect of this choice was the way it is signified what is distinct between one entertainment form and another - 'a film' and 'a game' - and to what extent they are discrete entities. The programmer's interpretation of this issue was to polarise the meaning of 'a good film' and 'a good game' because the film had a small number of characters in it, one weapon and was based on suspense. The reason he felt this was a handicap to creating a 'good game' was partly related to the imagined needs of the player and the form consumption ought to take:

"... because what makes a good game and what makes a good film is almost completely different and the thing about the film was that it had a few weapons in it and as a shooting game it was a bit of a no-no. It was mainly based on suspense... It was mainly based on suspense and so on it's ... the story of the film was that there were 4 or 5 people and they were stuck in some underground bunker and one of them had gone mad and had gone round killing everybody and went round killing everybody or the other guys and that was it really.

Now there's nothing wrong with that really as a film story, but in terms of a game... with a game you've got to provide constant entertainment ...for hours on end...I mean because the guy who's going to spend 40 quid on buying a game, so he needs a long time of entertainment, so you need to come up with a formula or a system that's going to just provide constant fun for that duration and a story ..a film story ... with 'this happens and that happens in this scene and that happens in that scene', if you did a game that's based literally on that kind of progression of events and there's your game ... its going to be over too quickly and even so that's not necessarily going to be very much fun. So what people are going to want is where they're playing characters, they're running about shooting everyone and what have you. So that's what a whole lot of arguments were about and there were a lot of ... sort of power struggling in the group I think.", (30).

A literal interpretation of the film for the proposed game which used linear sequences from the films narrative, as a form to structure the game would, he felt, be of a limited

longevity. Therefore the need for repetition in play was seen as a key issue in the design choice: -

"The game is an [sic.(E.L.)] pacey arcade adventure which would take about sixty - ninety minuets to play straight through if completed successfully, although for the inexperienced player failure will be frequent until the game's skills are learned. It is the kind of game that the player frequently replays from the beginning (rather than using saved positions)....

Most of the main game play will revolve around the task of escaping from the bunker +. This will be much more involved than the film as a lengthy adventure for the user must be provided and the combat in the film does not easily convert to an involved game on its own..."

(CyberPunk Specification Discussion Document (1994) authored by interview number (30). N.B. the '+' represents the designer's symbol of where there is a direct reference from the script into the game specification.).

This debate within the group of how to represent a game of a film was related to the issue of whose ideas should impact upon the design. Here the programmer interpreted his role as being ultimately - in a pure form - responsible for operationalising the design specification into actions on the screen.

"Well ... everything that goes into the game in terms of what happens in a game: how the character moves, how the enemies come on screen, what happens when they do, what happens when they get hit, the speed of the game, the speed of the movement, the smoothness of they movement, the amount of things that can happen on the screen, the pace of which things happen, all these things, mainly the feel of the main character, the control system how it moves and so on, these are ... anything like that has to be put in by the programmer. He writes the code and they generally ... to actually write down on a piece of paper how these things work, would be quite complicated and you end up programming it anyway on a bit paper ... its like sort of ... I think of a program as a design, I think of it just as the end stage you put in more and more stuff about how the game works until you have a game. So these decisions have to be made by somebody, somebody has to decide how many pixels a frame have to be done, somebody's got to decide the path a bad guy takes on screen. Now who's that going to be? Is it going to be the designer? Or is that going to be the Programmer now - the programmer will end up putting it in, so if he's also in a position to design it as well it saves everybody time. Why would you know ...the other question you could ask is why would the programmer not be the best person to do it, you know - give me a reason why not? I mean he's just as qualified as someone who says 'I'm a designer let me do it', that's what I think...", (30).

The artist on the games project agreed with the programmer's assessment of his role.

"Primarily it's got to be the programmer's baby because the programmer gets things working. The programmer knows what the system can handle. As an artist I can throw untold ideas at him and he'll know whether they're do able or not so the programmer has to have the driving force in terms of what the games going to be like", (31).

Additionally the programmer felt that a hierarchical group structure was best for creating a design specification. The debate was related to the issue of creating a game specification that lent itself to precise interpretation for implementing onto a computer without the programmer needing to have to interpret the specification should it be too vague and hence run the risk of becoming a de facto designer.

"I was the one who was going to sit down and do it and write the thing and there were all these people who wanted to ... lead the way the game was going but there was nobody who was going to sit and say 'I am going to take responsibility for it and make sure it works' ... people wanted to have a bit of fun and make a few suggestions and then bugger off... I personally find that's not the way to design a game, not in committee. The way to design a game is to get one person who has a strong idea - usually one person or maybe two people but who've got a very strong idea for something which incorporates everything, takes the technology, the way the image, the idea you're trying to create, the kind of world you're trying to create and also has a good game concept in there and this guy is going to be the person who's going to sit down and design everything in a lot of detail because he doesn't disregard this kind of responsibility if it messes up and having 4 people around the table saying 'We should have this, we should have that' - it's a good starting point but I think someone's going to be in control someone's going to have to say, 'This is what we are doing and I decide because I am the boss' I don't mind actually if that's not me, as long as that person does a really tight design where nothing's ambiguous.",(30).

A specification that was finalised in a clear form was seen as an essential prerequisite by the programmer in order to perform his role of implementing the game and determining how it operated. Having infringements upon a clear specification with too many divergent game ideas from other team members would create ambiguities in the specification. This was felt to mean that by implementing the specification at the programming stage the programmer would become the designer by default and this could create resentment.

"...I've seen some specs written by non-programmers and they'll say things like, where they'll say things like...they'll be really, really non-specific about quite, nuts and bolts elements of the design . So ... they'll talk about barriers in a game and not explain exactly what a barrier is, how it affects your car. I have to decide what a barrier is say in a car game, I have to decide what actually happens if a car hits a barrier, I've got to decide what actually happens unless they actually say in the spec.

That's all the decisions that need to be in design, really. So what I'm trying to say is that my view of design comes from being let down really. ... being told to do, to develop a game with someone else's design but not being given enough so that I end up doing the design myself and then I end up getting attached to what you do and then you don't want to let go, saying 'It's my game, hands off'.", (30).

Thus, the first phase of the debate over what the game should be was influenced by ideas of 'a good game' and who was the legitimate designer i.e. in delegating which team member to have the power over ideas and the programmer's role to interpret and negotiate the ideas from the design specification into software. The programmer in this sense is regarded as a mediator between the machine and the specification. (The 'gatekeeping' power of the programmer is a theme reoccurring in the research and this interview, especially since, at the time there were organisational changes to the managerial structure which also made this point even more salient).

This aspect of debating who should ideas be created by, was significant in freezing out certain members from the decision making process over defining the game. Also the programmer was negotiating both his role as a designer with his interpretation of 'a good game' which affected what the game was not going to be. This was achieved by stressing the need for a codified design document with appeal to the authority of the programmer's 'gods eye' view of the machine's capabilities and the programmer's

role of mediating between the machine and the specification document. Ultimately then, the programmer's role was combined with that of 'designer'.

This issue of design management and the role of the programmer as a designer / implementer, interpreting specifications again arose when considering the resentment the programmer felt over the producer's influence upon the game. Specifically the point of resentment was the proactive design ideas that were offered at infrequent intervals and created ambiguity in both communication and implementation.

"... I was p..... off with the fact that D.... who was my producer was never in the building and he used to turn up once a week and I was doing all this work on the game and he'd come in and put his head around the corner and most of the time he'd say, 'This is great, this is fantastic, keep the good work up' but every now and then he'd take the game off on a completely different tangent and it was his game with a capital 'H' - and that was how it was perceived

I see this all the time I have to plan in my head - I have to write this game, I have to plan how its going to work and I have to do it right now because it affects everything I do so I need a detailed idea of what we're doing. So what would happen would be I would say to D... 'Look we've got to talk about this and this is what I want to do' and I'd give him this proposal and he'd generally say, 'Oh that's good - we could do this', and he'd take it down a stage, take it back to the great crazy what- ifs' sessions that you had in the beginning of a game not in the middle of them and I'd go away not feeling as if I was not sure if everything was OK or not. And he would also bring ideas, 'We could do this, we could do that' and bring in uncertainty and what I wanted was certainty so we could actually plan it and do it and then if it wasn't right we could look at it again and see if we can change it but you've got to do something. But the thing is that D.. would a have a lot of crazy and wild ideas - which were probably very good ideas but he'd say something like ... 'We should have some thing like this in it', I don't know. I can't think of something specific but ... say it was ... he'd want a jet pack in it and he'd say, 'J... I think it should have a jet pack in it' ... and I'd say, 'There are these problems with it' and I'd give him some reasons, blah, blah, blah, he'd say 'OK' and he'd go away and 3 weeks later he'd come back and say, 'Where's my Jet Pack'. That seemed to be the problem that I had. So what I need was certainty...", (30).

The situation was ultimately resolved when the 'official' producer was taken off the project.

".... I just thought this was a pretty raw deal here, I'm doing all this hard work here, I'm doing all this design work, I'm doing all this effort and he's basically never here and he's got the power to do what he wants and it seems to be his game and I thought ... I was not at all happy about that and that's when I formed my now notorious views about producers which is that I don't see the point, that the amount ..from an organisational point of view 'maybe' but from a creative point of view what you need is a game director who has the last say on the game apart from the firm that's buying the thing. And that's probably going to be the programmer, but whoever it is, he's got to see the game all the way through and check everything works fine and that everything's fine. There's no point having someone in charge who isn't involved in a very, very, detailed day-to-day role because it just creates huge resentment. Anyway so we went to . G...[head of development].. and I said, 'Look' -because G...s been the boss for about a week - and he said, 'Look, if you've got something to say just say it', I think G..., one of his catch phrases which he's well known for is, 'I don't believe in all

this corporate bullshit'. He doesn't believe in it. So I said, 'We don't need a producer. This guy's a waste of time'. And he said, 'OK he's sacked' ... well not sacked but he took him off the project and then I hid for the next few months because D.... wasn't very happy, he wasn't very happy at all. In fact he was pretty pissed off with me. So I was a producer and me ... [other team members] ... sat down and redesigned the game to how we thought it should be, based on the technology we had.", (30).

The implications of the organisational changes are that the new head of development elevated the programmer to producer status with the power and authority over managing and implementing the game. This in-house resolution of the issue of 'who is the designer' also created the conditions allowing the design of the game *CyberPunk* to change and enabling it to become 'a new game' in its own right. How the game changed its design trajectory or pathway and entered another, changing its identity is outlined in the next section :

6.2.3 The Flexible Game Design. A Conjunction of 'Problems'

The process of shaping the script of the film into a video game as mentioned earlier had been related to the perceived notions of what the player's consumption practices and pleasure 'needs' were. The issue over value for money and the price of the game was one concern raised as a design issue (and this relates to the same time period as the MMC concerns over price covered in section 5.4.12). Also of concern was the 'problem' of creating a game from the film script and keeping some degree of authentic relationship to the film as well as creating a game that was compatible with existing games' design conventions. These two factors continued to be in tension. The shift away from the game as *CyberPunk* partly involved the capabilities of the target hardware and its ability to create a 3D-environment.

6.2.4 The Meaning of the MegaDrive as a Design Issue. The Hardware's Situated Context

The destined target platform for delivering the game was the Sega MegaDrive, which in 1994 was a relatively mature game delivery technology. It was designed in 1989 as a strategic response by Sega to supersede its own Sega Master System and challenge Nintendo's Family Entertainment System that, then, enjoyed a global market lead. By virtue of its earlier arrival in the UK during 1990, the Sega MegaDrive was one the first '16-bit' machines available and had 18 months head-start to build market share over the subsequent release of Nintendo's own Super Entertainment System. In 1994, Sega had been identified as enjoying a 'scale monopolist' advantage in the market for hardware and software (38 percent) by the DTI, (HMSO 1995, p.3). Therefore, economically, the Sega MegaDrive had been the largest market for games' production at that time and the publisher / developer Rocket Software, had targeted its output mainly to the MegaDrive. Also the MegaDrive had penetrated foreign markets too, as Sega was a global operator in Europe, Japan and the U.S, so the markets for the game were expansive. Therefore the firm had in-house knowledge of the machine's working - the programmer had himself worked on converting games from other machines to the MegaDrive and had learned skills in the process. Therefore, the above issues were relevant preconditions for why the MegaDrive was chosen and felt by the designer to have "*decided itself*" (30).

There were, however, two disadvantages in the use of the MegaDrive, which were to be relevant later in the diffusion of the game and also during its design. One issue was

that the market for cartridge-based video games had suffered a 'crash' in Christmas 1993 and early 1994 and continued to diminish - (this is related to the 'mature nature' of the market for cartridge-based games, (See section 5.4.6)).

Also the Sega MegaDrive, despite enjoying the advantages of being a 'first mover' in hardware innovation, was by 1994, in competition with other more technically advanced machines. It was perceived by the programmer to be "*not a particularly powerful system at all*" (30), in terms of its technical specification. It was seen to have a design competence conducive to producing games that were fashionable at the time of its inception - hence the MegaDrive was seen to be optimised for moving large cartoon characters or 'sprites' around on screen and moving backgrounds quickly. Therefore the software that was released for the MegaDrive also helped define the symbolic identity of the hardware via the type of games it could run.

"... MegaDrive is not a particularly powerful system at all. It's good at shifting sprites about, it's got dedicated video hardware for shifting sprites of big size around the screen and doing scrolling backgrounds, which is why I can understand why they designed it like that because that's what characterised most games around that time that were fashionable". (30).

6.2.5 Impact of Other Game Designs. The Valuing of Design Precedence

While *CyberPunk* was being conceived, a game from an American software house, called *Doom*, had been released. This was designed for the IBM PC compatibles as a follow-up to an earlier game *Wolfenstein 3D*. The games were based around a 3-dimensional maze where the player was placed in position as if looking through the maze in it in the 'first person'. The wider industry interpretation of *Doom* was to revere it as a 'milestone' in game design and as a major innovation due to its graphical competencies. (E.g. '*Doom*' had won the European Computer Trade Show's 'Game Innovation' and 'Computer Game of the Year' award categories in Spring 1994, (Edge Magazine. 1994b, p.21).

Given the degradation of the perceived abilities of the MegaDrive as an advanced game playing technology, the implication of implementing software for it that resembled the 3D-display that *Doom* and *Wolfenstein* had, would be seen to be unfeasible or double-edged. This was because the machine was not optimised to display 3D-graphics of this nature and the effort taken for implementation could prove intractable. On the other hand to implement a simulation of the display from the more advanced PC, to the MegaDrive - and therefore strategically in product design "*being first on the MegaDrive*" (30.) - was part of the incentive for adopting the display.

How the display was appropriated for the uses of the game was again down to the programmer's design activities. This was due to his having the time and ability to go about producing a prototype of a wall moving, to show that it was possible to mimic the display technique and so, this was seen to be as a viable display format for the game. How the display was produced resembles the motivation of the virtuoso 'hacker' that Turkel (1984) or Levy (1984) identified in pushing the machine with unanticipated software techniques.

"Yeah, yeah it was Doom that we saw.... and this created a huge demand but the MegaDrive wasn't the right machine because.. so one of the things I was trying to do was trying to get the best out of it , be creative with hardware and get the absolute best you can by doing off the wall things and writing to it in ways that you won't

expect. That sort of thing I really like to do, is to really get in a machine and really get to grips with it and so you know it inside out and what we did, well what I did was thought about how we could do - not Doom, but it was based on a game that they did before that called Wolfenstein". (30)

The process of implementation involved the programmer breaking down or 'deconstructing' the way in which the wall was drawn into its constituent parts and seeking to reinterpret it onto another machine. This involved, therefore, a process of translation of *Wolfenstein's* 3D-technique and technology transfer of the technique to the MegaDrive in an approximated algorithm.

"It was based on a technique you had walls that always went from the ceiling to the floor, vertical walls and there's a lot of things and when you're designing a world like that it makes it a lot easier to process it because its basically as you go from left to right on the screen you can think of it as a vertical strip, so you can do...also if you do a wall you know that nothing's going to appear behind it so you can stop processing as soon as you reach the wall, you draw the wall and you forget about it. That's a limited technique which was used very successfully in 'Wolfenstein' and I was interested to see if you could do it on the MegaDrive and I..basically it's difficult. For one thing you haven't got enough memory because it's based on a character system with tokenised characters, their make up is...", (30)

The process of getting around the MegaDrive's "limited memory", (30) and simulating the maze drawing technique from the other game was to use a "little trick" (30) that split the screen into two halves, drawing one half of the maze and duplicating it to give a full screen display. Therefore half the data was needed to be stored and the use of colours in the art work hid the symmetry. Secondly to get the maze to move effectively meant that rather than calculate it in real time, the co-ordinates were pre-calculated before hand and stored and called up when needed. The inclusion of the technique was dependent upon the experiment being successful and once demonstrated there was no objections to its use.

"[How did people react when you said you wanted to implement this kind of Doom Style ?]

They were quite happy, the question was, could we do it with the technology? That was the thing so - in fact I didn't actually mention it to anybody originally, I just sat down and started to write something to see if I could get it to work. So I wasn't going to commit to doing it until I could get it work because we were so dependent on the technology, but when, that was the way the game progressed - we threw some ideas around and came up with this...and then I sat down for a week or 2 and I managed to get some walls moving around on screen and it looked quite impressive and then everyone was saying, 'Let's go down that route and let's go that way'. So it came from the technology really. So it just decided itself. If I hadn't been able to get it to work properly then it wouldn't have done that way", (30).

6.2.6 The Display's Significance

The significance of creating the technique meant that the game was going to be meaningful in two ways: one relating to *CyberPunk* as a film license but now with a 3D-display.

Why the 3D-display technique was thought to be of compatibility with 'the needs' of *CyberPunk* was that it could offer the "tension" of "what's around the corner" (30),

that could be related to the game's original imperative of searching the underground bunkers of the film. Why this 3D-display was devised and not a more orthodox 2D-display, was tied into the programmer's belief that licenses of film media that used 'side-on' platform displays with horizontal levels and characters represented running side-on, were inauthentic. (This was a wider criticism of licensed games designs mirrored in the trade and popular press see, section 9.2). Other display angles that were considered were isometric or plan views which the MegaDrive could competently articulate (as were considered in the CyberPunk specification document.), but was this was felt not to provide the same degree of atmosphere as that of a first person perspective game and it was not *"like seeing a film"*. (30)

"...because it was set underground, it was people sort of wondering around in bunkers, and that just seemed just ideally suited. I mean we were thinking about what viewpoint to give it to get it on the MegaDrive ... because you're limited in terms of what you can do and I came up with a few possibilities like ... where you have top down ... where you have plan view and then like an isometric view where you're looking at up, down again but I think things have got some height to them I think you can see the wall and those sorts of views that suit the MegaDrive but they don't have much atmosphere...that was it, the screen play sort of cried out for that particular style of viewpoint because they have the atmosphere and attention that you need the 1st person view, in fact anything else (tape paused due to a phone call).....I've seen loads of games done from films and where you have sort of side-on platforms, with characters running around or whatever, it looks crap generally...I've seen loads of ... 'Aliens' ..., I think there was a game ..it was in an arcade where you had characters running along the screen...there was no tension there, its not like seeing a film its like.. you've got to work so much harder just trying to get all the elements of the film in and first person brings in that kind of sense of 'what's around the corner' and so on...", (30).

What is of importance here is that the choice of the 3D-display and generation of the technique gleaned from an extra-organisational game's design, which had a revered 'aura' of being a 'milestone' design, that both legitimated its validity for inclusion in the game and also became part of the reason for the next design choice or 'branch point'. This involved the uncoupling of the design from the 'official' game of the film script. Why it became uncoupled is related to the earlier issue of the problems in designing a game around a film license. The initial game specification for *CyberPunk* had sought to provide its entertainment by being designed as *"some sort of puzzler"* (30) which meant that to escape the bunker *"problems"* (30), were set for the player in trying to escape by finding entry cards to enter various areas, finding computers to activate lights or to consult to find information. Additionally the five characters from the script could be chosen by the player to utilise their special attributes, such as speed or medical skills to solve problems at various locations.

There were problems in trying to fit the game to the script. These were seen as restrictions, and included the relatively low number of people in the film script; the fact that the story 'only' had one gun and also that some of the films concept's were not readily implementable on a computer as they were not of a strictly binary nature. One issue was that of the 'anti-characters':

"...and you had these other people ...this is where it gets fuzzy, this is where it stops working when it gets just too vague. Their idea was that they would 'help you' these other characters but they might be trying to kill you as well but frankly how you

would have a computer player 'helping you', I couldn't actually think how that would work....I mean it sounds great, it's like I...it's a certain sort of idea which you hear a lot when you have people talk about games...I think they call it 'a design idea' and it's an idea and it sounds great and if you...until the poor programmer has to come in on Monday morning and make the bloody thing work and I mean he's helping you, a computer character is going to be helping you - how does it help you, how is it going to communicate with you.", (30).

The game then could have been mainly based around explorations and puzzles (and if felt appropriate 'helping' behaviour). Why the game changed trajectory was also compounded by the fact that the production cycles of the film and the game were felt to be out of sync. The making of the game concurrently with the film would have meant that the game's release would have been delayed and the technology dated as the film's production cycle was slower than the game's which was originally due to be released at the end of 1994.

"We developed it for quite a long time like that, just doing the technology, wondering around, trying to find some weapons and stuff like that for several months and then we figured out that it was going to be only several months until completion and this film was years on ... and they were talking about the next generation consoles as well. So it looked like there was no chance that we were going to be able to release it, that if we didn't even release it, they hadn't even decided what the logo was going to be for the film, it was far too early to release it in conjunction. At the same time we were waiting around for it to be finished, we had all this technology that was going to be out of date by then, we were quite pleased with what we developed , so we then decided to just break off from the film". (30)

Given this, and the combination of the problems of the design restrictions from the film license, the change in producer roles, and another change in the head of development operations, the satisfaction over the viable 3D-display technology meant that the game could be allowed to change its design path to become a new game design around the technology.

"we had this meeting ... [development manager and artist] ... and we said 'Let's ditch this idea' - by that time I was getting a bit bolder and I didn't like the film. I thought it wasn't ever going to get made ... I don't think it is now - no I don't think it is, so in retrospect what we did was right and the other thing we were developing, and we were still working with these restrictions from the film ..You know, like we decided on one pistol or something and as I was making this game I wanted to do so many things that weren't in the film screen play and I wanted to do all loads of different fun sorts of weapons and bad guys..."

"We were either going to make a sever departure from what was on the screen play or we were going to be tied down...so it was quite good as well, so we could do our own game and forget about CyberPunk and we thought 'Oh good we can do this, we can do this', and that was a real buzz". (30).

6.2.7 A 'New' Game

The game now was to be based on shooting characters and collecting different varieties of weapons and it was felt that owners of the MegaDrive, given their perceived typical age, would prefer a less structured game but one which was more simple and could provide more "fun", (30).

“So, OK then we thought we could do what we like really, I mean you know, it was just me and J... really, and he said ‘Let’s do loads of guns, loads of different types, let’s make it a shoot’em up where the fun is in all the different types of ways to kill people. And the other thing is in CyberPunk there was going to be loads of explorations, - sod the explorations, and the way these levels are structured is such that you just start at the beginning in what is basically a snake like corridor –there’s no.. you can’t really get lost and you go through and people come at you and you shoot all sorts of interesting ways and that was it, kind of thing. Simple. Simple. Simple spec in you’re face - That was the other thing! We thought it would suit the MegaDrive the MegaDrive’s a kiddies’ console and all these guys there just going to want to have fun, they didn’t want to have a crummy structured game in any way. So it was verbal, we just came up with this idea verbally and we just thought to write it and see if it works”. (30)

The end of this first section highlights a process of how the design activity of games is responsive to structures outside the design team’s individuals control. These were derived from the extra-organisational determinations of producing a licensed game of a film, and the production and reception of other design innovations such as the design display, and the design limitations of the Sega MegaDrive. These structures’ impacts on the emerging design were not fixed and immutable at this point; for instance as the meaning of the film *CyberPunk*’s compatibility with the game was reinterpreted and rejected by the design team.

Therefore both the conditions of work and the direction of the project were negotiated. Also, on an interpersonal level, the delegation of roles and the issue of the programmer’s privileged knowledge regarding the mediation between the specification and the machine also represents a labour power / design issue.

However, despite choosing to make a shooting action game and use a display from another game, the implications of this choice and the symbolism revolving around the graphical display of a milestone game meant that, as the game design matured, various other agents became involved in the scrutiny of the game. This eventually had implications for the team’s design activity and the game’s subsequent design and reception.

[Parts 2 & 3 look at the game as it continued to develop an identity and how other social groups impacted upon the game’s identity and interpreted the game as it travelled the path of becoming a commodity form].

The relevant ‘problems’ constructed around the game involve :

- The game and its passage of assessment and preparation for diffusion.
- The game and other canonical and competing texts.
- The game and unstable market environments.
- Encoding the game’s design. How ‘should’ it operate?

6.3 Part 2: Bloodshot as a 3D-maze game

6.3.1 Introduction

This second section examines how the game’s passage, (later called *Bloodshoot*), as an emerging game design was interpreted by other actors within the development organisation and how this affected its design as it progressed to being a mass market

commodity. This section also considers other external bodies which affected its diffusion in addition to its design characteristics. These include not only in-house colleagues, play-testers and marketing people, but also other external organisations such as Sega's US and European branches and Rocket Software's US branch. Again, as with the first section the process of interaction with these agents was political, in the sense that it involved elements of power and authority in deciding what the game 'should be' and 'could be'. Again, this is a contested and negotiated process. The dialogue defining the way the game 'should be' is widened, as the programmer now interacted with global organisations as well as local bodies in designing the game. The meaning of *Bloodshot* became increasingly less in the hands of the design team, both in its symbolic and functional form.

6.3.2 The Game's Intended Content Choice

The game's design aim was to create a game as discussed in section (6.1), prioritising the programmer's feelings of what he liked in games himself. At this point, the user or player was equated with what the programmer himself liked when in the role of consuming action-orientated games. The designer, then, by taking part in the consumption process of both buying and playing games, felt that he was no different from his intended audience. What he intended to implement could feasibly be wanted by the player.

"[Who was Bloodshot written for? Who did you think was going to buy it?]

Good question. I didn't really have a consumer in my head. I had this idealistic viewpoint which I still have to some extent: that you should just do the games you like and that and then other people will like them too or may like them too. I think there's always going to be a market, because there's always people like you - unless you're a really strange person. You know, there's always going to be a market for games that you yourself want because there are other people out there like you and I used to play a lot of games when I was a kid - and so, I don't play as many games as I used to, but I can remember the sorts of games I used to be really into and the way they used to make me feel, and I just go on that really. So no I don't really...", (30).

The aim of the design was to include two things. Primarily the display technology was the focal point of attraction since this attracted players to video games *per se*. The *Bloodshot* 3D-display and character movement were thus legitimate elements to focus design effort on.

"[What fun would they get out of it?]

(laugh) Have you ever played that type of first person perspective game, where you're walking down corridors shooting things

[Yeah I played that game upstairs]

They're immensely popular, I guess that's as near, damn it, as you can get to walking down corridors killing people and it's immensely addictive.

[In what sense? where's the fun?]

Because in most games, or in other games, where there's a different perspective viewpoint, you're more aware that you're playing the game because you're like an observer playing your own character watching your own sprite. So you might be watching Sonic the Hedgehog. He's not you but you're watching you [i.e. Sonic is an iconic character representation of the user that the player looks at and controls].

Whereas these games [i.e. Bloodshot] you are watching what can be seen, so it's like as if it's through your own eyes.

[What did you set out to capture?]

Just that rush you get when you play that type of game. Kind of, what's around the corner?" (31).

Secondly, concepts of bodily pleasure elicited from the process of game-playing were sought to be replicated. Therefore the attraction of this type of game was to induce an "adrenaline rush"; provide an "exciting challenge", "to get through the levels", provide "suspense", "fantasy" and be "fun" (30). The player represented a space marine that had to immobilise a threatening space ship. The game's objective was to be a "fast sort of strategy kind of quest" (30), - i.e. the player had to get to the centre of each level of a space station and destroy the 'plasma node' which would cause a chain reaction and destroy the level. The player then had to escape back to the entrance before it blew up. Along the way a variety of robot aliens shoot at the player and engage in a duel. The player had to pick up types of weapons along the way. Each weapon having its own attributes and optimum application, e.g. the 'piercer' weapon's application is designed for penetrating walls and shooting the enemy behind it. The enemies served as obstacles en route to the objective and the feeling of "what's around the corner?", (31), aimed for. Also, other minor objectives for the player, were the search for keys to open doors and the avoidance of mines that would remove some of the player's oxygen on collision.

Beyond the specific attraction of the game's manifest content, part of the player motivation was also generally related to the wider appeal of the attraction of the category of all video games to which *Bloodshot* belonged.

"[Why would someone want to play this?]

"Well why do people like?...well it's a game and why do people like games? I mean that's what the question is. It's an exciting challenge to try and sort of get through these levels...it's a bit of...it's supposed to be like an adrenaline rush and a bit of sort of suspense basically but at the same time, it's a fantasy really isn't it? - You're supposed to be a space marine in a space station with aliens attacking you - it's nothing to do with real life, but mainly there's just something about video games' technology that people like. It's technology really, it's the glowing screens drags them in,.. and it's, there's always going to be...I don't think its actually necessary these days but in order to make money in video games, to be all that different. But there's a big appetite out there for games maybe not as big as it was 5 years ago or whatever, but a lot of people will want to play games and pretty much anything you release if it's good will sell and so you don't need, I don't sort of lay awake at night and think, 'Oh God, the next game has got to be different or nobody will buy it' - oh well I want to be original but there's...what I'm trying to say is I just think is that's the way I see video game's: just see how good you can make it and they will be willing to buy it". (30).

The 'simple' game objectives and functioning were facilitated by the view that the MegaDrive was owned by a younger audience and that the machine was perceived to have certain attributes that were conducive to a simple design.

"Each machine's got its own culture you know, it's got a type of game 'its best at' and you know if it's on a PC you could have made it a lot more complicated, a lot more options and things..." (30).

Also the style of the game itself and the genre it belonged to carried with it the expectations that people would have about its workings. The aim of the design then would be to facilitate play that was of a short term nature and require little time for the player to familiarise themselves with the game:

"Well it's probably, well it's a MegaDrive game so I think its main market is sort of on the living room carpet isn't it, underneath the telly. So it's a quite...it's not a ... it goes down to the type of game it is as well. I wanted to do a game people would dip into you know, that they could pick up, have a blast and get on with some thing else - not sort of a game that people would really learn.

[How do you think that was reflected in the design for them to 'dip into'?].

Well, everything sort of in your face, not too subtle, I suppose simple controls, you don't have to select the weapons if you don't want to, it'll pick the most powerful one for you. There's kind of a language of computer games that people sort of know and people will already be familiar with that kind of game, and so they'll know what to do and so on. We're not going to put too many challenges in, we're not going to put in too many things that make it hard to understand really, simple and in your face, so you don't need to be an expert to play it. You don't even need to use the manual to play it". (30).

In this sense, the design was intended to not be so esoteric as to prevent or inhibit user participation by having to learn a new set of rules. Indeed familiarity with other similar games was expected and the design implicitly assumed this. The interpretation of what 'simplicity' was for *Bloodshot* was both in the determining of the player objectives and in what the players should be doing to realise them and how the control interface worked - one function for each button only. These two initial aims were part of the negotiation process between various actors, to define how the game should function.

From a graphical and artistic perspective, the MegaDrive's allocation of 32 available colours for the pallet were halved because of the programmer's novel technique of mirroring the screen display. Therefore this influenced the style of art that could be used:

"A lot of the stuff when you draw on computers you've got serious limitations to work with, you do what you can with the limitations...so these designs, because ...[the programmer's] system to get the game to work on the MegaDrive he had to work out a system of getting the graphics to work. I don't know if he explained it to you, this is all symmetrical, it's all a trick. That meant that I had to half my pallet, because the MegaDrive can only handle a 32-colour palette, so my palette was halved, so I had 16 colours. Colour 0 gets used for invisible purposes or for programming purposes, so I had a palette of 7 or 6 distinct colours to work with which is shit, I mean it seriously is. So that was my biggest design limitation so what I wanted was a kind of bold futuristically kind of style with 8 colours...

Ultimately from my side the whole thing was ... awkward having to use such little colours and having such little memory to put stuff in. I mean as an artist I want to have loads of different stuff, loads of different bad guys, loads of different backgrounds. So that was a frustration right before the off. Again the MegaDrive had trouble with it at times and made it slow down. Which is not something we could do much about". (31)

Therefore the MegaDrive's 'limited' colours and technical capacity had some affect on the potential look and graphical styling of the application of the 3D-technique. This directed the artist's labour, so that colouring in for the walls and background, was mediated by both the technique and hardware.

6.3.3 Intra-Organisational Influence upon the Game's Design

The next section is focused on the development of *Bloodshot* in-house. The implications of using the 3D-display for the game had meant that, for others in the organisation, the game was seen to be a direct copy of the games that had inspired the designer's use of the display - *Doom* and *Wolfenstein*. The effect of this had meant that there were problems in communicating what the game actually was to others, and that unsolicited advice on design was forthcoming which was perceived to be "pressure" (30) to borrow elements from the game *Doom* and place them in *Bloodshot*. Here the influence of colleagues and play testers in the development firm, observing and sampling the game, had meant that comments were made which influenced the game's identity from being a pastiche of a display taken from *Wolfenstein* to being a game that was going to have strong look-a-like and play elements.

"..everybody in the company had looked at Bloodshot at one point ... At the time I was in the end of the corridor but because we've got these Perspex offices there was actually, it was possible to look at my screen from the corridor and so people would come and three or four would come and stand... you were just working just wanting to get on with what you were doing and you'd look around and 3 or 4 people and ... they would tell you what they think and they wanted to come and play it and so on, And so there was a lot of interest in the company particularly with the games' testers ... the games' testers at the time. They'd be quite interested in it, yeah - people like Doom and stuff and the word got around that I was doing Doom which I never was, but as soon as you make that comparison everybody wanted things from that game in it and there was a lot of pressure to put those things in. Well, I say 'pressure', you can feel the pressure. If like five people ask for the same thing you start to think, 'Oh well', you know, I should probably put it in even though I'm against it, this many people have asked for it - 'I'm not going to hear the end of this' ... and everyone's going to ask the same question ... that was it really, there are lots of things in there that ended up being quite similar". (30.)

One of the specific elements was the inclusion of the 'strafe mode' that existed in *Doom*. This was a mode of control that the player could use to fire at the enemy robots and also move left and right to side step the opponent's return of fire but still keeping the gun pointed in the original direction towards the opponent. This was instead of firing, moving out of the opponents way by facing left or right in a 90 degree turn and then move back and readjust 90 degrees again to return to the original line of fire. However, this element was in conflict with the designer's preconception of what he felt a game 'should' be and his preferences of how this game should function. The bias to simple controls and the speed of play he felt would have been inhibited by the need for a specific button to put the function into operation. Because the Sega MegaDrive's hand controller only had three (official) buttons which were being used already for opening doors, selecting weapons and firing, the fourth function meant that there needed to be a button with two shared functions. The juggling of input/output functions to make the inclusion then would have slowed

down or at least altered the way the user played or fought the enemies but conform play to the designer's intended or 'preferred' playing style.

"That's very important for Doom. I didn't think we needed it because it was really like a much quicker combat system. There's a guy - we fire at him, 'bang' he falls over and he's dead ... there's no messing around and I didn't think we needed to complicate the controls because I've only got 3 buttons: You've got to have open door on there, fire, select weapon and strafe as well - hang on that's 4. So I thought, 'Leave it off', but so many complained about it that I had to put it in...". (30).

Further amendments to the game were the simplification of the game's corridors to make them less maze like and straighter. This was because people playing the game in-house were getting lost in the game's play area. So the corridors were made simpler until they resembled elongated rooms divided with doors. This change, although motivated by influence from others playing the game, also was facilitated by the designer's preference for shooting as a primary play/design objective as opposed to exploring spaces - (which again reflected an aspect of the design shift from *CyberPunk*).

"..the levels in the game were really kind of ... you can't really tell but as I say it was like a snake, one corridor, open a door then there's another bit, there's no maze element its just a line of rooms and this is so you can go in the next room - boom - shoot - go into the next one. I mean I started off doing little bits off but people got lost and so I just made it simpler and simpler and simpler and so people didn't get lost and because we like the shooting bit because we didn't think that was fun...". (30)

The cumulative effect of the repeated suggestions for the design of the game had helped push the game's functional design towards *Doom* and reinforce its meaning as a look-a-like, rather than being more distinct. The 'surveillance' of the game through the Perspex office by interested parties had indeed created so much resentment in the artist and the programmer that for the next project, *Crime Wave*, they moved into the far corner office using the back desks and deliberately sought to develop the game in semi-secrecy to avoid 'interference' in design. Again this reflects the earlier questions of who is the legitimate designer? and who owns the game? - should it be open to influence from members outside the design team for suggestions?

6.3.4 Labour Process of Implementing the Design of the Game. Aspects of Authority, Influence and Autonomy

This section examines the continuing 'firming up' of the game. The mode of creating and developing the game that had finally stabilised in its conceptual design with the team's consent to ignore the film's influence is covered next.

Relevant here was the balance between two sources of influence: (i) the development teams attempts to seek autonomy to proceed with the games design with their own preferred content choices away from influences *outside the team*. (ii) *Internally*, influence from within the team, with their own self-management once the games thematic content had changed direction to be built around the 3D-graphics engine.

As was noted, the informal scrutiny of the programmer's work by other internal members of the development firm, had been a source of pressure influencing content choices which conflicted with the programmer's desire for autonomy in directing the content selection of the game. This too extended to the artists own labour activity in designing the physical appearance of the game:

"[So people look over you're shoulders and does that impact upon you too?]

*[31] Yeah, I *****g hate it.*

[30] Yeah, he gets more of it

[31] I hate it. I'm the most uptight artist here that's official. Being an illustrator or whatever, I can't stand people seeing my work when I'm working on it. Coming into this company is a real effort, as you work on a game and people start to see a form they want to get involved with it, which is great but it can be really dangerous. So everyone in the team impacts upon everyone because you have to try and keep everyone's really enthusiastic ideas at bay.

[What ones did you actually have?]

*[31] When we were doing Bloodshot, because it ... the game part of it looked similar to Doom which was 'big' at the time. So if anything that Doom had that we didn't have, it was 'Why don't you have this' and so those were the main things that we were trying to say that 'This isn't Doom, this isn't trying to pretend to be Doom' and, 'Can't this be this? can't this just be this on its own merit?'. Occasionally you'll get a suggestion, you'll know its a good one because they're thinking of the game in the same way you are. Most of the time their only way of understanding the game is relating it to something else they've seen. So the problem is, they'll see it and they'll think 'That looks a little bit like 'that' game that I like, are you going to have 'this' in it because I liked it in that game'. And then they'll go away and then maybe two months later they'll come back and that thing won't be in there because in our heads we weren't going for that game and they'll get...depending on the amount of power they hold, they'll either get p****d off or they'll keep hassling you for it".*

Beyond this the internal management of the content between the programmer (now also the 'producer') and artist was based upon the consent over the role of the programmer in development and influence upon design. The mode of work within the team's management structure meant that an "informal" (30), method of developing and implementing ideas was now in operation.

"[How do you tell people, 'You should do this now, 'You should do this now'?]

Well mainly, if it's just me writing it then I worry about what I'm doing and the artist with Crime Wave you know...we just sort of get a rough idea of it all again, fairly informal and fairly verbal and I just say, 'Can, oh can I have a space ship or whatever? Can I have a building?' Sometimes we write things down. I did at one point start to write things down. I'll see if I can find it a ...here I did this fairly shortly afterwards again, I did this for.... [one page document for other team members] ... and I said I want this a few frames, it doesn't say that much ... (tape ends) ...

I mean it is very informal, but I don't necessarily think it matters if you've got the discipline to carry it through really but there's a problem you can have in having it too specific really about these things, I mean ..I'm not saying that Fighting Fantasy has its problems but Fighting Fantasy is another project that's been going on here, have ... have two full time designers on it and they do this big document and quite often it gets chucked away because of technical problems. Something gets on screen and it doesn't look right and they just change their minds, they see another game and they want to incorporate something from that ...and that happens all the time so even if you do have a specific spec. if you like a very tight sort of spec. with it all written down, it often all goes all out the window anyway. So, if it's an experimental game

anyway and that's what *Bloodshot* was, experimental on the technology side of it. So I thought that there was no point in there really, writing a huge amount out because we might just change our minds. There's no reason why I don't think why you can't change your mind as you go along through a game. I know a lot of people, that worries them. If you're not a programmer, if you're writing it that probably would because you don't know what you're going to get .. but I always have had good results from just fiddling around, trying something. If I like something good, if I don't, take it out. You can only do that if you're the designer and the programmer of course". (30).

This subsequent mode of work contrasts 'the need' for a formal structure for specifying ideas and content that created the changes in personnel and the game's form in the first phase. The legitimacy of the 'informal' flexible mode of managing content in the main production of the 3D-based *Bloodshot* game then, rested on the programmer's dual roles of having a 'hands on' intricate knowledge of both creating, arbitrating and implementing ideas. Yet, the subsequent issue of the music's inclusion in the game represented a challenge to the team's authority structure in the degree of autonomy that the musician was allowed to have to determine what style his sounds could take. The choice over the cartridge music represented, in a similar way, an experiment in the musician's skills as much as the 3D-techniques of the programmer.

The musician had chosen to use "*experimental blipping noises*" (30), for the cartridge version to run concurrently with the playing game. This was a *leitmotif* from the influence of the design 'needs' of *CyberPunk* to give an 'eerie' atmosphere to accompany the searching/suspense aspect of that game. Similarly the CD music choice was an autonomous content choice undertaken by the musician.

A challenge to the authority of the producer's control of content selection – here specifically over what sound effects could be included - came with a conflict over the quality of sound effects:

"..... We did have a bit of a run in with him at one point, because he did some sound effects and he/we really liked some of them but the nature of the system that we were using was that he'd give us a package set of effects on one file and that was everything and I couldn't take them out or whatever, I had to take everything, so I had to play whatever was in there. So the first lot we got, we liked some of them but he took them back to do some changes and he messed up the ones we really liked. So we wanted to get him to do a third one and take bits from both and he got really stroppy about it.

[How was that resolved?]

He did it in the end. He just said 'All right, I'll bloody well do it', basically. I think.. he said he wasn't going to work on it, he's a bit temperamental frankly, he said he wasn't going to work on it or something and stormed out and then I think he probably sat in his back room for a couple of hours and then thought, 'Well I've probably got more to lose from this than they have because at that time it was quite an important project in the company and everything and ... I wouldn't have another go of sorting out my differences with him but after that would have gone to the boss and said, 'Look he isn't doing these changes and it's a problem' ... and I think ..[musician].. would have come out of it worse. But he's like that, he can be difficult to work with. Don't tell him I said that, but he can be difficult to work with, he does have strong ideas and he doesn't seem to be into getting into a project's theme. I mean we've worked on the project for years, literally for years ... and then the sound effects, need a bit longer but that could

be a day's work. So, it's not too much to ask to do it and to do it right, I don't think". (30)

The resolution of this issue over the selection of sounds could have meant that an appeal to the official authority of the development manager was needed to solve the issue.

From an overall resource-management perspective, the financial troubles that the firm was experiencing meant that scarce resources such as development kits (software and hardware used to interface with a PC to programme the Sega machine) were in short supply.

"[What other things were there?]

The biggest problem we had was when the games' industry as a whole slumped for a bit and this company along with every other company lost lots of money. Yeah this company didn't have enough money to fund four or five games in house and so a couple of them had to be scrapped and you get that kind of thing. You get equipment problems where, say, you've only got two MegaDrives on the premises and say there are four MegaDrive games being made then obviously you're going to have problems. We had problems because testing ... the testing department needed the equipment to test it on but we needed it to work on and so there was a constant battle between us and them, in terms of equipment". (30)

These labour aspects were affected by the economic concerns of the firm's trading status. And consequently as *Bloodshot* was one of the very few titles that the in-house development department was in the process of completing (along with *Total Football*), *Bloodshot's* economic importance to the firm was more salient, given the delays to the flow in product development.

6.3.5 The Impact of Competition

One element that was also to have a future impact upon the functional design of *Bloodshot* was the emergence of another game *Zero Tolerance* from a firm called Accolade. This game also had a 3D-display which resembled *Wolfenstein* but was smaller in size than *Bloodshot*, however it had a more colourful display. Again shooting the enemy aliens with a choice of weapons was part of the player's objective, but there was a choice of characters the player could 'be'. Each character having their own attributes and trade-offs - speed of movement, defensive skills or healing skills etc. (Ironically, this element was in the original *CyberPunk* design specification).

Knowledge of this new game on the development horizon for the MegaDrive had come from a journalist who interviewed the team about their game in preparation for a preview in a magazine (see 6.3.6), which aimed to discuss the game's merits and prepare users for the new game as well as provide a form of advertising for the development firm. The journalist by chance had visited the team that were making *Zero Tolerance* and had passed on information about this game to the *Bloodshot* design team.

From a strategic point of view this meant that *Bloodshot's* innovative merits and the relative advantage of being the first/only Sega MegaDrive game with a 3D-display that resembled *Doom/Wolfenstein* was going to be eroded. *Bloodshot* was going to have competition from a firm who also had sought to design a game incorporating similar elements from *Doom* and *Wolfenstein*. The implications of *Zero Tolerance*, then, as a competing product with similar design merits meant for the design team was

that *Bloodshot*'s design should be altered. Again the change was a strategically motivated attempt to differentiate the game from *Zero Tolerance*'s play objectives. This was because *Zero Tolerance* was seen to be more of a strategic game and so *Bloodshot*'s design was pushed away from having 'strategic' play elements to emphasise shooting with weight placed on *Bloodshot*'s fantasy story scenario written retrospectively, which formed the 'front end' display of the game once in operation.

"...my personal philosophy on this is that if you've got a close competitor you shouldn't be seen as such you should try and make yours as different as possible that will accentuate your game that is different from the other game. So I thought take it even more down ... Because we knew that Zero Tolerance was more of a strategy - Sort of you're a member of a SWAT team kind of thing and it was more strategy involved, it had more things to do. So we thought right, go in the other direction and move away from the competition, distance your self, rather than say take it head on.... I made it so there were no strategy and so there was just blasting and I probably took out too much....", (30).

Again this shift in design, although motivated by preconceived post-production concerns over product placement strategy, it was again in harmony with the designer's personal preference for games that were similar to arcade games with emphasis on constant action.

6.3.6 Magazine Influence

Another impact upon the design came from magazines, indirectly via the marketing department, which had liased with one magazine and had been told that the inclusion of a map would be worth five percent in a subsequent review for the game. Despite the game's now simplified corridors - which the designer had felt unnecessary and negated the need and pressure to include the *Doom* inspired map element - a map was included for the review.

The preview's role as mentioned earlier were to arouse awareness amongst consumers of *Bloodshot* and to construct demand for the game. Strategically it was felt from the design team that the timing of previews by the marketing department had drawbacks in that if it was published too far before the game was released then resources used to build demand were wasted. As *Bloodshot* (like many games) fell behind schedule, that meant the previews and reviews were too early to coincide with the actual release of the game. Why the delayed release occurred was partly due to bugs in the program which was caused by rushing its development not only due to the presence of *Zero Tolerance* on the horizon, but also to the assessment process that examined the program's technical code as well as the way the game functioned in play.

6.3.7 Extra-Organisational Influence upon Content Choice

The process of assessment or 'approval' represented a phase of *Bloodshot*'s design that again involved more external actors becoming enrolled into the process of scrutinising and adjudicating the game and seeking to influence the game's design in various ways. This now meant that the dialogue of information flows that revolved around *Bloodshot* was increased to an institutionalised legal-structural level that involved licensing agreements and patent law to legitimate a dialogue of product assessment between Sega and the development and publishing firm, (see section 5.4.12). Specifically Sega's mode of mobilising software support for the MegaDrive

via a licensing system which included the right to final approval of the game's design and technical software design is explored here via its affect on *Bloodshot*. Also the influence of publishers upon *Bloodshot*'s quality and design and their interpretation of what counted as adequate quality is covered.

The phase of assessment occurred concurrently with the in-house play tests at Rocket Software, Rocket Software USA and Time Warner (who were publishing it in the US), and Sega Europe and Sega US. Although formally the game concepts specification should have been approved by Sega before coding the game, this was not the case. The game was taken to a third party office of Sega UK in London, to be demonstrated in a recognisable form. Theoretically the game could have been rejected at this point and the development effort wasted. If product quality control had been an issue, it is fair to speculate that with *Zero Tolerance* on the horizon, the publishing of *Bloodshot* could have been prevented to prevent a build up of too many 'look-a-likes' or to encourage redesign of the game's concept to encourage a diversity of choice, (section 5.4.12 notes that this is part of the official aim of the concept approval process).

Indeed the US branch of Sega had at first refused permission for *Bloodshot* to be published in the US unless changes were made to include elements from *Doom*. A list of things to be included was drawn up and was rejected by the programmer. One sticking point was the inclusion of a gun. In the game *Doom* the player although not visible as a figure, does, when armed with a weapon, have their presence signified by a gun barrel protruding into the screen which recoils after each shot. This was held by Sega to be a significant enough feature that the game's publication rested on its inclusion. The inclusion of the gun was resisted by the programmer due to his reticence in taking too many features from *Doom* to make it appear like an outright copy. A compromise was made to include cross hairs for the US version of *Bloodshot*.

"..when we tried to do the MegaDrive version in the States, Bloodshot was actually rejected first time round and they said these things have got to be done if you want it to be published. I remember now, that's right yeah, and I wasn't really all that happy about that because the things they wanted to do were just put in everything that was in Doom, that I already hadn't been persuaded to put in. So we got it down to a list of things in the end, a list of what we've already said, it was like J... from the States office who ... rang them up... I said 'No, I'm not doing this, I'm not doing this, I'll do that, I'll do that'. They had a list of points and he rang up and eventually we got a compromise together and one of the things is. No, we haven't got it on this (looking at a review pic.), because this is the one where it doesn't have a gun ... because in Doom you've got a gun firing from the bottom of the screen - you're supposedly firing from and I didn't want to do that because its just one copy too many for a start and that was the first game to do it and I don't know I didn't think it was all that great and I didn't think it really needed a big gun at the bottom and this stuff came on and the States said they wouldn't approve it unless we put a gun in it - so.....

[Did it affect the European version, too]

No it doesn't that's the thing, so in the end there were actually two versions, the European and the US, but in the end I just actually kind of refused to put a gun at the bottom, I just said, 'I'm not doing it', because its just one copy too many, because, for one thing ... and as I say I never started out wanting to copy Doom. I actually felt quite guilty about doing some copying because ID Software who did Doom are a fantastic operation and it's a great game and out of respect for them I wouldn't want

to copy their stuff outright, so I said, 'I'm not putting a gun at the bottom - that was their idea - it's not my game - I'm not doing it'. But eventually what we compromised on was a gun sight - little cross hairs in the middle of the screen, like a gun sight". (30).

What is interesting here is the parallel with the issue of interpreting *CyberPunk*, i.e. the restrictions of using a licensed film and how 'close' to keep the design of the game to the film script, with *Bloodshot* there was pressure regarding the possibility of making a direct copy of a pre-existing game and how legitimate is it to do it. Also it highlights how a transnational firm can influence a game's content with their interpretation of what the game's content needs to be to give 'what the player wants'. In this way '*Bloodshot*' was redesigned for the US market by the US branch of Sega who interpreted what design elements count were 'necessary' for the player in the US territory. Sega of Europe however, were content to make corrections to the code rather than enforce and changes to the game's play-functioning. (The Sega MegaDrive's hardware was configured in three territorially different forms - a US, European and Japanese version. Each version only accepted cartridges that were designed and approved for their version.)

Another issue of extra-organisational territorial design influence upon *Bloodshot*'s content, that was contested by the designer and that had implications for the game's functioning, was that of the 'continue' option. This design device occurred in many other games once the player had lost their allotted lives. In effect, should the player chose to use the 'continue' option the game restarts where the player had last reached. This is in contrast to restarting the whole game and playing from scratch. The issue over whether to include this was felt to change the nature of how the player experienced the game and how difficult the game was to complete and -by implication- how long its consumption would last.

From the designers point of view the ideal or 'preferred' mode of play was to start at the beginning of the game each time the player died. The attraction in playing the game would be building up skills to complete the game to the point where it could be completed in one go. The reason why it was felt a 'continue' option would change the nature of playing the game was because the player would restart at the same level and in replaying in this fashion would give the player a 'head start', each go making the mode of play less repetitive. Each level of the space ship would only be played through once and it meant that on completion the game would not hold an incentive for further use of the cartridge. Therefore what was at stake here was again, as with *CyberPunk*, how the player should experience the game and what counts as value for money entertainment. The American branch of Rocket Software had applied strong pressure for a continue option to be included. Again (as in other games) the issue of game difficulty was an area of contention is determining what constituted a 'good game'. Here, the American source of pressure, and their conceptions of 'what games players need' in a game, was felt by the design team to be a source of weakening the game's experience and long term value for the player.

"The Americans are particularly bad at this. I mean the Americans just hate anything that isn't particularly easy, and there's a huge pressure to make it easy and that spoils it, you can spoil it. No matter how much effort you put into the display and everything, if you make it too easy them it stops being fun, it loses its challenge". (30)

Indeed the head of Rocket Software's USA branch wrote an article about their economic status, had addressed the relationship between Rocket Software UK and

USA at the time *Bloodshot* was made and pointed out the geographical differences between conceptions of product design:

(Roberts1995a, p.27. Interview with MD):

[Managing Director]

"...We've also been influenced by American attitudes and philosophies about the way games are created and sold. In Europe we have great technical talent but what we lack is the polish, the great music, the good manuals. US developers make it easy for players to restart at level two or three or whatever, over here we're constantly arguing with our programmers because they don't want to put in save game facilities. They want people to die and go back to the beginning. Why? Why are you torturing these people? Why do you hate them so much. Let's be nice to our consumers. Americans understand that much better, they've got better games testing..."

In this respect the concept of immediate accessibility of the game to the user is contrasted to the designers emphasis on longevity over time through difficulty. The excerpt above stresses that each play session should continue from the last, with the player's progress recorded and progressive play encouraged. The game is a '*consumer good*' with '*testing*' providing a source of design knowledge about the programmer's knowledge. The audience are termed as 'consumers' rather than 'players' or 'users'.

Others influences of foreign markets upon *Bloodshot*'s design included the translation of English text in the game into German, Spanish and French. These phrases were translated externally by a specialist firm and there was a degree of flexibility over the fantasy names which remained in English. One tactical use of the language selection function was that of its placement in the games title sequence. Once the obligatory 'Sega TM' logo had appeared on screen on the game's start and the publisher's logo had appeared, the title *BLOODSHOT* appeared with a face and in English a voice announced 'Welcome'. Due to copyright and censorship problems the name had to be changed. In the US, a comic book had used the same name and the publisher Voyager had been bought out by computer games publisher 'Acclaim' who intended to make a video game based on its characters.

An internal faxed memo was sent around Rocket Software trying to suggest an alternative name. These included names like *Killer Squad*, *Death Factory* and *Blood 'n Guts*. The name *Battle Frenzy* was chosen for the US version, changing part of the game's symbolic meaning in communicating what the game might be about. (Had the game gone into cartridge production then this would have caused problems if left unnoticed). Additionally, the name *Bloodshot* had to be changed for the German market as the word 'Blood' was prohibited in the title of games in that territory. Rather than produce a specific Germany version of *Bloodshot* as with *Battle Frenzy*, the language selector was placed straight after the title page and if the German language option chosen then the game was renamed as *Battle Frenzy* on the title page.

The following faxed communication, from the MD to development staff, gives some indication of the legal impacts upon the symbolic choices of the game's meaning.

"Office Memo Subject:....err....Bloodshot.....not

Hey lads. Its just as well we did a legal search. There is a comic book character called Bloodshot owned by Voyager Communications. And guess what Acclaim

bought Voyager recently and intends to make video games on all their characters: I rang....(Acclaim CEO), and he says it would be a problem.

So there you have it. We need a new name. I hate to think what might have happened if we'd gone into manufacture and found out about it then. Can everyone now ensure that faxes go out to anyone who may be reviewing the game to advise them of the name change. Also all artwork etc. needs to be pulled. If we move fast and get a new name and logo done, it shouldn't be a big problem."

Rocket Software (1994a).

In these examples given above *Bloodshot* was redesigned to meet the requirements of other territories.

6.4 Part 3: Production Hurdles

6.4.1 The Sega Test and Approval Process

The next section is crucial to the examination of the impact of the approval process and inter-organisational dialogue between hardware firms and the design process that section (2.2) and (5.4.12) had noted to be part of 'the problem' of the licence agreements.

6.4.2 Formal Procedure of Sega Approval of Third Party Games. Faxed Communication

The formal process of analysing the content of a prospective game, which is to be licensed and released for use with the Sega MegaDrive, is examined. According to the letter from the Sega Supervisor of the Third Party Analysis Group concerning "*evaluation and approval procedure for third party Sega CD, Genesis [MegaDrive] and Game Gear products*", the manifest aim of the review procedure is explained. The letter states that while the third party producer is responsible for their own testing the Sega Analysis group exerts a quality control function.

"The third party licensee is responsible for their own product testing. The Sega Third Party Analysis Group acts as last line of testing before a product is manufactured. We are dedicated to upholding the quality standards associated with the Sega Seal of Quality and ensuing that all products are supplied bug free." (Sega 1993a).

Involved in a scrutinising role, the Sega Analysis group process involved filling out a form (third party concept approval form) that categorised the game and broke down its contents into categories of relevance. These included how much memory the cartridge would need to store the game and which territory the game would be targeted to. It also included the categorisation of the game's style or genre using eleven possible categories including: 'Arcade action, Adventure, Shooter, Strategy, Edutainment, information, R[ole] P[laying] G[ames], sports, puzzle, simulation/vehicle, other.....'. Sega (1993b).

The usefulness here is that this categorisation of games reveals a formal codification or taxonomy in producer terminology. This reveals how officially, games are considered and segregated in part of the concept approval process. *Bloodshot* was categorised as a 'action/arcade' game, tying in with the designer's own stated aims for the game. This taxonomy was similar to UK designers' terminology and that of game magazines, although surprisingly it did not include a discrete category for 'platform

games' which was a very popular style, (see chapter 7), and the categorisation also was much less individuated than the Gallup/Chart Track break down.)

Other categories on the Sega classification scheme included the number of players that could take part in the game and the nature of their interaction in play 'competing', 'alternating' and 'cooperative'; also the estimated duration of play in hours or minutes. Further requested information was the proposed medium for advertising of the game, TV, magazine etc. and their frequency.

The form reveals what formal information is needed for an assessment of game products in order to scrutinise their viability before full development of the game's concept. It also shows how well games as artefacts are categorised and communicated meaningfully between a third party licensee and an authoring licensor of software production.

6.4.3 The Third party Test Procedure

This section outlines the routinised formal process that constituted the test procedure that was also part of the 'approval process' before official production of the games software could be encoded on the ROM cartridge. (This was noted in section (5.4.12), as an element of criticism by the MMC). The third party was expected to send a package which comprised of a set of EPROMs (chips) and floppy discs containing the game, together with a recommended video cassette of the game (to help assessment of the game by video standards' councils for the content's age certification), and a manual of the game.

The first part of the analysis of the code examined its content, the reason being to check the code's compatibility with the five different configurations of the MegaDrive's operating systems. The second phase of testing involved the search for 'Class A bugs' that would cause the software to malfunction critically such as causing the program to crash. This aspect was made a manifestly clear objective of the test procedure while noting that minor bugs would also be listed and categorised in order of "*three severity classifications*". The two others being 'class B bugs' which included '*graphic corruptions and glitches*' and class C bugs - '*minor little things*', (Sega 1993a; Rocket Software 1994d).

Once classification of the bugs had occurred the bug report is signed by three parties 'the lead analyst', 'account executive' and 'third party manager' and faxed back to the producer in Sega headquarters in Japan.

The significance of the existence of Class A bugs meant that the whole game needed to be resubmitted by courier to the Sega Third Party Accounts officer and the process started over. Should the game not contain any 'class A bugs' then the third party game producer could then have the game content scrutinised for 'approval'.

'Approval' consisted of downloading the game to Sega HQ in Japan's bulletin board and faxing back confirmation of the game's approval and stating that the game had acquired a content quality of a required rating, (a mark over 65). Finally the 'signature process' occurred with the fully approved and evaluated game confirmed by the official signatures of the Account Executive, Third Party Manager and Director, Marketing Manager, Executive Vice President and President.

The outlining of the formalised test and approval procedure reveals an intricate and bureaucratised process as well as a three way transnational communication between the prospective game producer, Sega of America and Sega Japan. (This procedure is

very similar to Nintendo's approval process, (Stevens and Thomas 1992). Also this gives an indication of the importance of eliminating class A bugs to achieve a fast as possible approval of the game to aid the game's completion and production.

6.4.4 Specific Aspects of Quality Control

Aspects of testing software quality control that affect content choice can be seen from the Sega "*software quality checklist*". These give specific examples of rules of design that the third party licensee must adhere to in the formal organisation of the game's content in its presentation and user operation features. These aspects serve as parameters that, in effect, standardise aspects of all games created for use on the Sega MegaDrive of which *Bloodshot* was one.

The overall standardised sequence for a game's appearance, once the MegaDrive had been turned on, was, opening sequence, opening titles, demonstration of the game, ending sequence and then restarting at the opening. The opening titles were required to conform to the licensing agreements outlining the blue Sega logo's appearance, then the licensee's name and name of the game with obligatory trade mark and copyright notices plus the mandatory words "*licensed by Sega Enterprises Ltd.*" below the licensee's name appear at the bottom of the title screen. (Section 5.4.12 discussed the legal / strategic importance of this).

From a game control aspect, checks were outlined to ensure that buttons worked as proposed in the game's documentation, that the controller when plugged into the machine's second port, only worked in two player games, that the arrangement of controls on both controllers was uniform, that the word 'pause' appeared once the function was activated with no accompanying sound effects or irregular graphic configurations appearing. Also the game was checked for compatibility with newer controllers that had come to market subsequently with innovative features such as 'turbo' (speed up), and 'slow motion'.

This iteration of the procedure helps to highlight aspects of the controlling presence of the Sega approval process on relatively clear-cut objective criteria. However, an aspect on the formal check list that represented an area of relatively ambiguity in its impact in content selection was that of content censorship that sought to exclude offensive material from the game in order for it to conform to the "*Sega of America Game Standards*". These included prohibition of content of a sexual, political, profane or narcotic nature. An example of the possibly open-ended nature of this is the statement:

"no usage of symbols or other content that is anathema to any racial, religious or ethnic groups". Sega (1993c)

These are restrictions that, in theory, design activity would have to anticipate.

The whole checklist method of 'Sega Approval' and testing content and software code configuration shows how long the formal process of testing was and what time frame was expected. For instance the game had to be tested on all five versions of the Sega hardware for a minimum of 30 minutes each going through all criteria on the checklists plus examining and reporting ad hoc software bugs in the playing of the whole game and all the associated paper work.

6.4.5 The Actual Evaluation of *Bloodshot* as a Game - Examining the Faxes

The faxes from the actual process of evaluation of *Bloodshot* reveal specifically what elements in the game's operation and content were had to be removed, revised, or what totally new inclusions had to be introduced. The sources of the faxed or documented bug reports were either from Sega, internally made from the original firm or from other subsequent third party publishers that had a role in publishing the game. This phase highlights aspects of malleability of the game's final design and reveals the flow of information between inter-organisational parties as they dispute the final form that the game should be allowed to take.

6.4.6 The Official Sega Test Report

The set of faxes that comprised the Sega test report was sent on October 5th 1994 to Rocket Software USA. This was split into two sections one outlining the categorisation of bugs and the other giving suggestions for design improvements. The first section of the report had identified as a 'Class A bug' the actual overall quality score of the game i.e. 54 rather than the 65 needed to pass. In addition it had stated as a caveat that:

"Sega of America reserves the right to withhold approval on bug related quality issues"

(Sega 1994b).

This suggested an aspect of subjective interpretation regarding the game's quality was possible by scrutinising content issues which were non-technical but aesthetic. This section of the fax also suggested that adherence to the second section's game design suggestions would be conducive to improving the game's score on resubmission for helping pass the approval phase:

"Please review the list of recommendations also included which would help to boost the overall score of this title".

(ibid.)

Other class A bugs, which were also identified and meant resubmission was obligatory, were that firstly, the game had not been assessed for suitability for play by a designated age group by a standards council such as the ESRB (entertainment software ratings board). Secondly, that the game appeared to 'slow down' at various points during its operation and this could cause a *'freeze for up to one second'*. More subjectively a 'class A bug' was awarded to the games level of difficulty for the user:

"This title is too difficult for the average player. It needs to be made slightly easier".

(ibid.).

This aspect of the game being judged too difficult and this being seen as a 'class A bug' is significant in that it is not at all related to technical issues that affects the ability of the software to run effectively, or without crashing. Rather it is a prejudging of what the user or *"average player"* is held to be capable of achieving in playing the game, which logically should be confined to the fax's second section but does however, conform to the caveat noted above. The actual *"test duration"* used by the American Sega tester was 25 minutes and the *"level achieved"* section had 'level 4' marked in.

The second part of the faxed test report included the recommendation report. Despite mentioning the explicit value of utilising the subjective suggestions to boost the game's quality score, a pre-printed section on the report plays down the significance of the sections suggestions:

"Sega of America has compiled the following analysis report in an effort to provide you with feedback concerning your final code which has scored beneath the rating cut off. The recommendations below represent the extensive industry experience of our Third Party Analysis Staff. These recommendations are not exhaustive, nor are they generally required. Rather we hope that these ideas provide you with helpful tips and a fresh perspective in the ongoing development of your title". (ibid.).

The nature of recommendations made in the report covered three general areas that related to issues of (1) presentation, (2) inclusion of content and changing game rules of play inside the space ship to help the player win the game and (3) overall changes to the mode of play the user adopts.

The wording of the recommendations vary in their degree of emphasis. Some suggestions being worded as casual observations, whilst others were firm commands e.g. *"must include.."*.

On the issue of presentation (1), a recommendation (that later caused a source of controversy see below), was for example:

"cross-hairs or a point of reference must be added to the game to give the player an aiming point. It can be something as simple as showing the top of a gun". (ibid.).

Another example of a presentation suggestion:

"Eval 3. Smoother scrolling would increase enjoyment of the game. When there are a number of enemies on the screen the movement can get jerky and inaccurate".

(ibid.).

From the aspect of (2), the recommendations made sought to redress the balance of power away from the computer winning the game to creating more equitable odds of survival for the player to win the game:

E.g. "5. Eval. Power ups like a bullet-proof vest or shield to reduce damage would aid the player in getting through the levels. Reducing the damage the player takes allows him to get through more of the level".

or

"Eval 13. There should be a way for the player to destroy mines so that he doesn't not (sic.) hit them when trying to return to the docking bay. This gives the player a way to clear his path for his return to the docking bay". (ibid.)

Another aspect of the recommendations sought to reinforce the in house suggestion of changing the use of space and creating easier movement for the player in negotiating the levels:

"12 Eval There are too many columns in the level. These columns tend to hinder player movement. Usually, they are placed so that the player cannot squeeze in between them and the wall. The player also tends to back into them when retreating backwards and firing at the same time". (ibid.)

Other content aspects reflected the freedom of choice for the players in game manipulation of weapons. These again reflect a design recommendation seeking to

define what players' 'needs' are, and construct the user as someone demanding "a choice" in their playing behaviour and the tactics they are free to adopt in their style of play.

E.g. *"6 Eval. Players should be able to choose the reserve gun to save ammo in the special weapons for the bosses and/or min[or] bosses. It seems a waste of special ammo to use the regular enemies. Many players would prefer to save the special ammo for the tougher enemies and bosses"* (ibid.).

The final aspect of the recommendations which related to the classification of Class A Bugs that prevented the game from being produced was that of the game's overall difficulty. The implications of these recommendations listed as 1 and 2 on the overall list again tried to give the player choice in their use of the game. Here suggestions were made that a difficulty select option would help temper the game's challenge to match the player's ability. Secondly a recommendation was made that had implications for the temporal use and mode of intensity of play activity that could influence the nature of the player-software / machine interaction:

"2. Eval. Passwords, level saves and continues would give the player an opportunity to continue the game at a later time. Instead of trying to solve the whole game in one sitting, this would allow the player to take a break and come back later. Also it gives the player several chances to complete a level without having to start over each time". (ibid.)

6.4.7 Conclusion of the Sega Faxed Communication

Therefore due to including an issue of difficulty as both a Class A Bug in the first section and making difficulty an issue in the suggestions the report blurs the role of the significance of the 'suggestions' and indicates that they are a source of significant influence on the game beyond being not 'generally required' as had been stated. The actual role of Sega's 'industry experience' that was cited as the basis for recommendations, therefore was created by the tester actually exercising this authority and was a non-neutral application. The response of the development firm indeed also interpreted the report in this way.

6.4.8 Implications of the Sega Test Report for the Development Firm and the Design of the Game

The development firm's reaction to the whole test report was given on a covering fax from the US office to its UK branch and it revealed both the strategic importance of the game to the firm in terms of its ability to supply products to the market and which had been made an issue prompting management changes. Also it highlighted that priority was to be given to finish the game for the US market first as the market was larger there for the CD versions of the MegaDrive. Finally the fax reveals an aspect of cynicism over the Sega test's low score and notes that it maybe due to the forthcoming production of an official licensed *Doom* game for the other Sega peripheral the 'Sega 32X' which was appearing on the development horizon and gaining publicity.

" Attached is a bug test from S[ega] O[f] A[merica]. As you can see, it has scored quite low with their testers. I don't know whether this is because they have a hidden agenda with their own Doom on the 32X, but in any case rather than getting us mad, it could be helpful in getting the CD version approved quickly.

I received ...(programmer's) notes on the Mega CD version and I completely agree. Getting a version out here as it's the biggest market should be the priority. It should also address Sega's biggest concern that the game needs to be quicker. This would help out on difficulty, as the faster response would make it easier to control. If we can implement some or all of the changes they requested then so much the better.

If we all keep in close touch on this we can get it out for Christmas we need something".

Rocket Software (1994c).

Consequently the adoption of design suggestions was seen to be a useful method of gaining acceptance and passing the testing phase in order to manufacture the game and publish it.

Beyond the Sega US test report other sources of official testing undertaken by publishing bodies for instance, from Sega Europe, Rocket Software USA and UK and Acclaim were taken into account. These had also made similar suggestions and highlighted similar problems.

The Sega UK branch list of suggestions also had matched the US branch's observations over the aspects of difficulty and suggestions although with less sharp wording. For example:

Page 1. "3. Would it be possible to introduce a difficulty setting option?

We feel the present difficulty level is set too high". (Sega 1994a).

or related suggestion 7.

"with the present difficulty setting more lives / continues / passwords would seem appropriate".

Again the similar design suggestion was made from a point of reference for the player:

"How about displaying a gun nozzle to help the player aim?" (ibid.).

One fax from Rocket Software USA which compiled a test report, had also centred upon the issue of the 'problem' of the game's difficulty. This again was seen to be a possible 'Class A Bug':

"(Page 3.) A 20. Game too hard. Can barely get to the fourth level. (i.e. players need to be able to use special weapons only when they want, not have to, more 'credits'/continues added etc.)". (Rocket Software 1994b).

Beyond the classification of bugs and errors which reflected errors in sound, graphic and playing operations, the 'problem' of the game's difficulty was reiterated and classified as a 'class A bug'. Other than this, the proactive design considerations offered from Sega's recommendation list was absent from this fax. Yet, given this, the tester had felt impelled to offer forward the following point as a class C bug, i.e. a minor issue for consideration.

"19. C. Please add my name on game and / or manual for the hours of dedicated game test / design contributed to make this the most enjoyable game possible". (ibid.)

In this respect the advice offered from the tester was felt to impinging upon the design process and recognition was felt to be needed.

The internal Rocket Software UK bug report had only listed minor B and C bugs but did make a subjective proactive design suggestion to address the industry wide criticism of the use of CD ROM's in games by drawing attention to delay caused in waiting for the computer to access the CD before loading up new levels e.g. (Edge Magazine 1993, p.49):

"7. If in the final version of this game the CD access is going to be this slow then I believe there should be a big map and text of the level you are about to start". Class B". (Rocket Software 1994d).

Their reassessment of the game after 'Bloodshot' had been acquired by Acclaim had meant that more suggestions were made again after the Sega approval process. The quality assurance report (10th Jan. 1995) gave a set of changes to the games content that were requested. One example being the door movements which provides an example of the game's designer seeking to resist a prescribed design amendment:

"4.After defeating the Mother Android, you must exit the doors. Since you are operating on a limited amount of time, please have the doors open quicker (it currently takes a full three seconds)". (Acclaim 1995a).

In response to this the programmer had faxed back in lieu of corrections and solutions to other recommendations the response:

"4. I'm not sure I agree but I'll think about it today". (Rocket Software 1995).

The response to this was faxed back at 18.25 the same day with a scribbled response next to the original: *"Change - no do now". (Acclaim 1995b).*

The subsequent final approval was acquired from Acclaim and the amended cartridge version of *Bloodshot* was notified to Rocket Software by faxed official 'signatures' from Sega of Japan on February 10th 1995, four months after the initially proposed finishing date. The Mega CD version was finally approved by Sega of Japan on May 19th 1995. Therefore despite the plea on the fax for urgency of production (*'we need something'*), the delay was a significant five months after Christmas of 1994.

The dialogue between Sega and the developer in the faxes represents what revisions were to be enforced and what advice on game quality was offered. These list specifically 'how else the game design could have been' if the advice had been adopted. As was noted earlier, the suggestions about the game's play merits were negotiated or ignored and this shows the degrees of freedom that the designer had in designing the game at this stage of the game's development cycle. Phrases from the faxes like *'control is loose'* or *'appropriate music would really enhance the atmosphere of the game'* needed interpretation. These were either ignored as in the case of the music or accepted and reinterpreted, with changes to the game. The ambiguous phrase *'control is loose'* was felt to mean that the player moved too fast around the corridors as the designer had prior knowledge of how to control the game and so the players control and movement was slowed down to compensate.

"... you know they said the control is 'loose' whatever they mean by that. I think that I looked at that and I thought 'well someone must have difficulty controlling it' so I went back and made it a bit slower so that ... I'd been really into it ..., I'd been zooming around no problem you know, but I think that was an American one, they can't do anything..." (30).

6.5 Developments in the Longer Term

6.5.1 Economic Influence on the Development Organisation's Publishing Strategy

Rocket Software USA, which had been established in 1993, with the advantage of scanning developments in the US market, had set up publishing and distribution deals with Time Warner for cartridge games and Spectrum Holobyte for its computer games while the game was being developed. The planned release schedule for 1994 was to have produced 15 cartridge titles (developed in the UK) ready for distribution to the US. Due to delays in finishing games there existed a bottleneck in production which meant that the Sega deadlines to manufacture the cartridges (and the retail and distribution logistics) were missed, (Roberts 1995a). (*Bloodshot* was targeted for an Autumn/Winter release in 1994). This situation contributed to a financial problem at Rocket Software and the blame for the delays in product development was attributed to senior management which resulted in a clear out as well as one of the original start up partners selling a large share holding and leaving. To raise money Rocket Software had sold its cartridges (including *Total Football* and *Bloodshot*) to the game publisher, Acclaim, to publish and distribute. Strategically Rocket Software had made a shift in its development and publishing strategy, moving away from designing games for cartridge based machines to focusing on PC machines as it carried a higher potential profit margin and fewer logistical problems, (Roberts 1995e).

6.5.2 Rocket Software's Strategy

This section demonstrates some of the motives underlying the changes to the firm's production strategy that in turn influenced *Bloodshot*'s path of production and diffusion.

(Roberts 1995a, p.27) Interview with Rocket Software's MD:

"And the great thing is it's all high margin stuff [i.e. profits on PC software, E.L.]. When we sold 500,000 copies of F1 worldwide [for the Sega MegaDrive, E.L.] in Christmas '93, we made about \$2.50 per cartridge, and that was a \$49.99 cartridge. The new platforms are bringing us back to something like the old days we can make as many or as few units as we want in the knowledge that we can turn the machines on at the weekend to solve any problems. We don't have millions of pounds sitting in Japan all the time".

This reveals the meaning of cartridge games as an economic good in terms of the relatively low profitability, in relation to their overall per unit retail value, despite very high sales. Furthermore, another aspect influencing technology change in the original publisher's production strategy was the prospect of flexibility in production in terms of quantity of production and timing as well as geographic financial commitments. This was an advantage that the strategy of being committed to the cartridge-based games such as *Bloodshot* denied, but production for the open-ended machines such as the PC allowed. Further more, the selling off the stock of cartridge games that Rocket Software had, was also a prerequisite to streamlining the firm before a prospective take over by another firm, 'Eidos'.

In this sense, cartridge-based media were seen to be too much of a risk for the firm. Also the demand for cartridge-based games for dedicated consoles had diminished since Christmas 1993. Software sell through units in 1994 for the 16-bit console market were 4,500,000 and this had fallen to 3,000,000 and 1,900,000 for 1995 and

1996 respectively, (Parker 1996, p.24). In Europe the fall was even more severe, falling from 18 million in 1994, to 12 and a half million in 1995. The value of the cartridge market therefore dropped from 255 million pounds in 1994 to 124 million in 1995 in the UK - (Roberts 1995c, p.16). The industry at this point was going through a period of technical change with the adoption of CD ROM delivery technology as well as the advent of PC as a games' platform, where computer sales were increasing.

6.5.3 Acclaim's Acquisition of *Bloodshot*

The basis of the viability of *Bloodshot*'s transfer from one firm to another via acquisition by Acclaim lay in the publishing strategy of the second firm. This viability supposedly remained despite their being a fall in demand for cartridge-based games and there being a growth of new 'next generation' game machines on the horizon and firms such as Rocket Software moving away from producing cartridge-based games for the Sega MegaDrive or Super Nintendo Entertainment System. Acclaim still sought in 1995 to build and maintain a catalogue of cartridge games for publication. The basis for maintaining a variety of games in its publishing scheme was to aim to buffer the risk of a particular title not selling as expected by recouping revenue from those games which performed better than expected. This was contrasted to the alternative strategy of putting resources into just one or two games. In addition by not adopting the CD ROM based technologies, a degree of certainty about demand was perceived to be available, by continuing to supply software to a known, installed user base, which despite its decline was bigger than the emerging market for the newer machines.

(Roberts 1995b, p.33) The interview with Acclaim's director of the UK branch:

"Operating in a volatile business is all about calculated risk. You want the spoils of war. So let's analyse the risk. The fact is that at the beginning of the year and at the end of the year there are more cart. based systems in the global market than there are CD machines. Equally, even in the wildest guesses of the new entrants, the volume of sales of CD systems is not significant this Christmas. So our view is that there is still a substantial market out there to take the largest slice of it simply by going where others fear to tread is a worthwhile strategy".

The competing strategies of Rocket Software and Acclaim with regard to the issue of risk of producing catalogue games then meant that *Bloodshot* became a viable commodity for the new publisher but now existed along side other games in Acclaim's stock and other acquired games in its catalogue.

6.5.4 *Bloodshot* as Part of Publisher Strategy

Bloodshot as a cartridge-based game, represented a commodity that was going to reach a declining market even if the development went smoothly. Development was further delayed by the search for and fixing of bugs in the software caused by rushing the game's programming due to *Zero Tolerance*'s arrival. The delay was compounded by the fact that surrogate publisher Acclaim now chose to reapprove *Bloodshot*. Acclaim requested changes to the games working and technical changes to the code, which in turn meant that it had to be reapproved by Sega. This in turn delayed the game's release further, and, as a consequence of all this, Rocket Software and *Bloodshot* lost its strategic advantage and novelty value of being 'first on the MegaDrive' with its 3-dimensional viewpoint. Also the previews and review timing was disrupted as these came out in late 1994 and the game was actually released in the

summer of 1995 by Acclaim. Any built up 'desire for the new' was diminished and *Bloodshot's* technical merits appeared less innovative. All this was compounded by the fact that there were no adverts for *Bloodshot* in the popular games' playing press and the distribution of the game was not wide and so overall demand was diminished.

In this phase of Rocket Software's product supply problems the US branch M.D. had persuaded the designer to convert *Bloodshot* into CD format for the Sega Mega CD add on for the MegaDrive.

6.5.5 The Mega CD. Delivery Media and the Promise of Product Innovation

The aspect of technology change over the delivery medium from disc and cartridge to experimenting with CD ROM discs had meant that by the early 1990s firms were planning and introducing CD add-ons or stand alone units, such as Philips and Commodore. Sega's response to this trend was the introduction of the Mega CD add-on unit for the MegaDrive. This add-on was introduced as part of Sega's competition with Nintendo for the market share by becoming a 'first mover' in the global release of CD based innovation in hardware delivery units. The proposed benefits of using CD ROM for games was to change the nature of the player's experience of games.

For example, the computer games' press response over the introduction of the Sega Mega CD had addressed the possibilities of there being bigger and better games due to the economic and technical practices involved in using and making CD games. This included the prospect of more memory storage, scope for using 'real music' and audio and film and video footage. Specific to the Mega CD was the inclusion of new custom chips to rotate graphics and cheaper games, (Computer and Video Games 1993a, p.16-17).

By 1993 when Sega introduced the Mega CD to the UK, Commodore and the 3DO Alliance of licensee Japanese consumer electronic firms were in the process of introducing their own machines of 'next generation' game playing hardware. It was into this environment of technology change and rhetoric of 'promise' of the new gaming experiences, that CD ROM based machines were introduced and represented the initial basis of material and symbolic resources that the *Bloodshot* CD ROM version could potentially exploit.

Yet the subsequent market and press reception of the Mega CD was to regard it as being technically weak, incapable of using CD technology effectively, with very little and poor quality software and by 1995 Sega had only managed to sell 150,000 units in the UK, despite an expensive innovative TV advertising campaign. (Edge Magazine 1995c, p.111, 129; Edge Magazine 1993, p.52). The unit had been poorly received in Europe but the US market had a relatively more successfully installed user base, (30).

6.5.6 The Game on CD. Delivery Medium and Design

The implications of transferring the design meant that the game needed rewriting totally as the add-on changed the architecture of the machine.

"[What about the Mega CD version? How did that come about?]

Again that was because of the Americans. I think we'd done a title in the States that did a lot of business, but over here it didn't sell very many and was seen as being as a bit of a turkey of a format, but in the States it was a popular format. Because, well, a lot of developers are in Europe so the Europeans weren't developing for it and this

contributed to that, and also in Japan, it wasn't particularly big in Japan, just America, so they didn't have enough software produced in their domestic market for it. So it was starved of software so D...[M.D].. in the States said he wanted to see a Mega CD version of it, and asked could I do it? and I didn't want to do it actually because I wanted to do another game, and I also knew the Mega CD changes the architecture of the machine quite a lot". (30)

The programmer showed reluctance to start the project because of the work needed to re-engineer the software techniques to transfer the design to CD and because he wanted to start work on a different game design.

Generating the technique to draw the maze therefore needed considerable rewriting. From a design point of view the diminished amount of memory available to the programmer for use with the Mega CD (750 K at any one time) compared to 2 Mega Bytes for the ROM cartridge, meant that only three aliens appeared on each level at any one time. What counted as 'new' for the CD version was 4 extra levels due to their relatively easy nature to design and two extra characters that were not included in the cartridge version as the storage space on the CD was much larger than the cartridge. Another inclusion, by virtue of the press feedback from the prior cartridge version, was the inclusion of an extra 10 seconds for the player to escape the level before it detonated on completion.

One radical departure from the cartridge version of *Bloodshot* was the inclusion of CD quality 'rave' style music composed by the in-house musician who also made underground rave music and dance music at clubs. The decision over music choice was made autonomously by the musician, however, and it allowed an outlet for his skills in composing music with professional equipment that allowed him to side step using the MegaDrive's own internal sound chip which was felt to be 'inferior', (24).

The cartridge version of *Bloodshot* had used 'atmospheric' sounds in the game rather than composed music as the musician felt the sound chip was not capable of producing music that would fit with the needs of the game. Rave music was chosen also as it was also being used in other games at the time that also used CD.

The affect upon the game by the inclusion of the music for the CD version again was felt to have changed the nature of playing the game:

"...for the Mega CD version it really changed the game...I mean when you're playing the Mega CD version it's got this thumping, techno sound track and it's quite a different experience playing it like that. Would you agree with that J..?, that its different playing the Mega CD one?,(30).

[31] Yes

[How would the experience be different from the game's players point of view with the CD version ?]

*[30] It's like you're playing with this rocking sound track basically rather than this atmospheric thing. So it's like that then like, 'Oh god what's around the corner', it's like you know, 'Let me at the F***ers', basically because the music really pumps you up. It's great music. I mean apparently some of them when they were testing the game they used to, even when they finished testing the game, they used to stick the music on rather than play the game, just listen to it."*

An additional unintended consequence of the change to the game from cartridge to CD was that the fewer aliens that were encountered to fight was felt to give the game

a strengthened sense of being on a “*remote alien world*” (30), and did not do any detrimental damage to the game.

Other planned embellishments for the content of the CD version of *Bloodshot* such as to include detailed texture mapped ceilings and floors (which were present in *Doom* but not *Wolfenstein*) were dropped as the deadline for the game was brought forward. Also planned speech and realistic sound effects were excluded because they were not felt possible by the musician.

Bloodshot consequently as a game existed in three physical forms - a European and US cartridge version and now a CD version with some new embellishments and redesign. The fragmentation of the original design had meant that the game had two names *Bloodshot* and *Battle Frenzy*. It has two different cartridge variations with slightly different content in the US version to make it more similar to *Doom*. The CD ROM version was designed as a strategic after thought to increase Rocket Software's US inventory of games rather than as a designer-inspired decision to optimise the game to take advantage of the Mega CD add on. Indeed the CD rewrite of *Bloodshot* was seen as a chore as it took the artist and programmer off work on other projects.

6.5.7 Getting the Game to Market

The post-production reception of the game by magazine reviewers which was held to be very important in the industry to developers and publishers is part of the focus of this next passage, (and also seen in chapters 7 and 8). Press feedback acts as a benchmark measuring the quality and success of a game and is used as an information source by both retailers and distributors, as well as consumers in making purchasing decisions.

It is at this point that *Bloodshot*'s symbolic meaning as 'a new game' became circulated and mediated in the public sphere. This process brought new agents into contesting what *Bloodshot* should look and function like. Although some influence was made with the inclusion of the map and the journalist providing information about *Zero Tolerance*, at this point *Bloodshot*'s definition was not open to producer revisions of its structure. The magazine review process entered the artefact definition process by reinterpreting *Bloodshot*'s merits in the 'order of things', i.e. the rationale of reviewing *Bloodshot* involved decoding its structure for meanings in relation to conventions and norms relative to other games. In operating in this way, the evaluation process that magazines strategically occupy as a medium diffusing the meaning of games to consumers, also serves to organise the experience of players. Additionally in this case, it served as feedback to the design team and was interpreted as highlighting the flaws in the game design and its implementation.

The dialogue between developers and publishers and games' magazines in the standard use of previews and reviews had been touched on above for *Bloodshot*. An advert had appeared in a trade magazine as early as September, (Computer Trade Weekly 1994b, p.21), advertising *Bloodshot*'s presence at the European Computer Trade show in the Rocket Software conference room, where retailers could observe proposed offerings for that Winter (two other games). The advert had highlighted *Bloodshot*'s 'unique selling points' - or what counted as 'novel'. These focused upon two elements: the graphical display and the two-player option. These functions were presented as relative technical improvements over other games primarily and these technical merits were conducive to enhancements in the player's experience. For example, the graphical display was first to be mentioned and its claim to being 'faster

and smoother' was placed in relation to other state of the art 3D games which used a 'DSP' chip (digital signal processing chip) added to the cartridge to aid their calculation of the display. Secondly, the two-player function was highlighted as not needing two connected MegaDrives via a cable (unlike *Zero Tolerance* or even networked PCs that allow simultaneous, multi-player *Doom* games).

The above 'producerly' account of *Bloodshot*'s innovative merits was a mediated description of *Bloodshot* from the marketing department. This represented attempts to give a preferred image of the merits that would allow *Bloodshot* to be recognised as a 'new' game.

6.5.8 Magazine Reviews: Defining the Artefact

The magazine reviewers' interpretations of the game were to bracket *Bloodshot* as a copy of *Doom* quite explicitly and make comparisons with *Zero Tolerance*. Indeed, one best selling magazine, (Sega Power 1995), had reviewed the game by breaking down the game into constitutive categories such as 'atmosphere', 'levels', 'graphics', 'weapons'. This was done in a three way comparison - directly between *Bloodshot* and *Zero Tolerance* and then these two games were contrasted against the degree of accuracy with which they represented *Doom* in an age of software reproduction for different hardware architectures. In all of the reviews, *Doom* was used as a yardstick for judging the game's design and play functioning. Deviations from *Doom*'s original design or exclusions were not rewarded. For example the inclusion of rave music for the Mega CD version was regarded as being detrimental to providing the 'atmosphere' that *Doom*, 'the original', had, as well as noting the problematic issue software producers had in demonstrating 'added value' to CD games - e.g. (Games Master 1995a, p.51):

"The music is a let down as well. This is a Doom game for God's sake. Let's have some atmosphere not rave. You've got a whole CD to fill up, sure there's space for music that could make you feel like you're on a space station".

The exclusion of the physically displayed gun was also noted as a 'detriment' and the absence of any sprayed blood, (an attraction of *Doom*), from the shot enemies (despite mainly being robots), was missed. *Zero Tolerance* scored better, or was regarded as a better game, as it had more elements from *Doom*, and had more variety in the design of its levels and had more of them.

The reviews then restructured the meaning of *Bloodshot* as a new artefact, as something that existed in an order of relative quality to other canonical game texts. *Bloodshot*'s existence represented a challenge to this order where *Doom*'s aura of innovation - its 'atmosphere' and graphical competence were regarded as the design standards with which to judge *Bloodshot*'s design and technical merits. No attempt was made in the reviews to treat *Bloodshot* as a discrete entity. As with the software developer and publisher organisations interpretation of the evolving design of 'Bloodshot', the same *Doom*-like comparisons were made, and these were, in some cases, exactly replicated in the reviews, or totally new criticisms made. For instance, the limited variety of objectives for the player to achieve in the game was held to be important. The strategic redesign of *Bloodshot* by the designer to differentiate it from *Zero Tolerance* had not affected its reception from the reviewers in its intended 'preferred' way. *Bloodshot* was felt to be lacking variety for the potential audience. Also the 'unique selling points' that were stated in the trade advert (and the back of the

game's box) were not considered with the same priority or weighting as the producer firm intended.

It should be noted that the magazines serve a production function in terms of producing meanings around a game, for structuring the nature of demand of prospective users, closing off certain avenues of possible product perception and presenting the 'needs' of players. The designer's bias toward designing the game for the player to engage in shooting at the expense of any strategic diversion or complexity in terms of searching and exploring the levels of the spaceships, was not rewarded in the reviews but seen as a relative design deficiency. With the absence of any public advertising by Rocket Software or Acclaim, the magazines' reviews were even more important for constructing the meaning of *Bloodshot* in the public domain. For instance two reviews explicitly used the boxes cover art, spread over two pages in colour, as part of the background. (Computer and Video Games 1995; Sega Power 1995).

No feedback ever reached the design team from real consumers so the reviews were the main post-production feedback of the game's quality. The reviews were interpreted by the design team as either being ill-informed in the technical areas or conceding that the game's play structure was possibly flawed, in terms of there not being enough variety.

A key issue at stake in the design team's interpretation of the reviews and the role of magazines was their validity as being legitimate arbiters of what counted as quality and 'a good game design'. Magazine review journalists, it was felt, did not have privileged industry access to the technical limitations of the MegaDrive which limited their 'understanding' and interpretation of the game from a preferred producer understanding of the design constraints:

[31] "Yes I thought they were overly hard on the music and I thought they were overly dismissive of the fact that we got it running full screen on the MegaDrive, no one seemed to pick up on that...other than that...the criticism didn't seem to be based on that we had so many limitations. The criticism was correct but I feel that it could be done with an explanation of why the levels were a bit samey..."

[30] There's something about magazines wasn't there, I mean the industry people generally knew about the MegaDrive and that its so shit.

[31] The magazines seem to think that you're capable of doing anything and if you don't do it it's because you're either not talented enough or not pulling your weight.

[30] ...I even had one of... these pseudo-technical points, these journalists think they know these technical things, but they don't at all, they always get it wrong. Things like, I think there's a comment in one review - one reviewer said, 'It almost looks as if the sprites have been drawn in 16 colours', this is appalling. Now this is someone who writes in a magazine for the Sega MegaDrive. Now if they actually knew anything about the Sega MegaDrive they would know that all sprites are always in 16 colours because you can never get any more. Not only does it look like they are in 16 colour they are in 16 colours and as is every Sega MegaDrive game ever published before or since ... so that gets me angry on occasion".

What was accepted from the review feedback was the criticism of the game was that it was too simple with not enough variety in the level design and colouring. What 'should' have been done was the inclusion of more obstacles or more strategy in the design. In this way the reviews acted as design feedback to the team and in this way

were accepted with more weighting than that of the advice given in Sega's and the publisher's assessment and approval process.

6.5.9 Summary and Conclusion

Outlining the process of making the video game *Bloodshot* illustrates how product innovation - making 'a new' game - represents a very complex interplay between individuals, machines, other media 'texts' or games, organisations and markets. The implication of this is to call into question the view that the producers of cultural products act in a uniformly intentioned and rational way when constructing new goods. Rather, the production of new goods is a political and negotiated process that continually defines and redefines the identity of a new product throughout its life cycle or career. Consequently the raw materials provided for players, are the result of choices made by the various actors' involvement with the game as it emerges in a 'product space' from being a set of imagined ideas to becoming embodied in a computer program that is fully coded and ready to play.

Bloodshot's biography or 'technological career' from an embryonic idea of a licensed game to becoming labelled 'a *Doom* clone', highlights many salient issues and problems in trying to invent new artefacts in an industry that paradoxically seeks 'the new' but also rewards repetition and continuity. The struggle over the meaning of *Bloodshot* with its 3D-display and what it should include shows up the issue of power that designers can hold in rationalised organisations but also the limits of this power. Also elements of irrationality and unpredictability were uncovered: the fall in demand for cartridge games, the lack of perfect information producer firms have of competitors' actions; the unpredictable demands of overseas firms and the influence of overseas territories and markets upon design.

The game *Bloodshot* as an artefact was therefore constructed meaningfully in four related dimensions: a game design - produced within a wider discourse of 'what is a good game'; a labour process - an attempt to develop a project in a work environment; a strategic investment for the developer/publisher involving issues of organisational product strategy and risk; a consumer good that was to be diffused into a wider social and cultural context ready for play and interpretation by users.

The next two chapters examine another firm's approach to designing games which have to work within similar institutional and creative constraints to maintain a balance between producing novelty and similarity in content choice.

7 The Making of an Original Game - *Putty*.

7.1 Introduction

7.1.1 Aims of the Chapter

The aims of this case study are similar to those given in section (6.1.1). Briefly restated these were motivated to help focus the examination of the creation of a game from initial idea to finished and released product in order to understand the impacts from the following upon the game's emerging design. These included the impacts on the game's content from:

(i) The motivations of the designer's content choices and see how these were mediated by (ii), (iii) and (iv).

(ii) The influence of the development context in relation to technology, group and organisational impacts and

(iii) The influence of the console manufacturer's licensing conditions and the software quality control and approval process.

(iv) Identify where the user or player entered into the development process and how their 'needs' were considered in design.

These aims are met by outlining the process of making (*Silly Putty*) in this chapter and continued in the exposition of its sequel, *Putty Squad* (in chapter 8). This illustrates again the complexities involved in product innovation within a dynamic, globalised, mass-entertainment market structure. The design of this game differs from *Bloodshot* in many respects. It was a product targeted to a different genre, made by a different design team, with its own set of creative individuals and organisational history, market competencies and network of personal and intra-firm contacts and alliances. Yet, at the same time, because the firm operated in the same overall market sector of video games production, with the same issues of 'finding the consumer' and courting Japanese hardware manufacturers to create cartridge console games, there are certain similarities in their circumstances relating to product design. (The discussion in chapter 9, deals with the comparative analysis of the production and diffusion of all these games)

The initial phase of the selection environment, where the matching up of individuals with the idea of a game to target hardware and development organisations with resources to produce the first game occurs, is covered in the next section.

7.1.2 A Brief Market Background

These actors come into contact at the beginning of the decade, (1990s). This represents an era in the computer and video games' market where the full economic weight of the Japanese console manufacturers had yet to dominate the UK production market. At this point, the main output of games was being targeted at the Commodore Amiga computer, the A500. For the domestic computer games industry this hardware had been targeted as a home computer, which could play, what was for then, relatively advanced games. These games were stored on floppy disc rather than on chips in a cartridge. Before this, the main economic base for the supply of games in the UK market had relied on producing games for the Commodore 64, Sinclair Spectrum and Amstrad home computers. By the early 1990s, the Amiga had gained a market share larger than its main rival the Atari ST and was the major choice for which UK developers created games. Sega and Nintendo had introduced their less powerful 8-bit based machines in 1987, which then, were still less powerful than the 16-bit Amiga in technical

specification and had yet to build up a market share to displace it as a viable target for UK games manufactures in the UK market. However, both Sega and Nintendo were in the process of either introducing a 16-bit based console (e.g. the Sega MegaDrive) or developing one (the Super Nintendo Entertainment System) – but these had yet to be released formally in Europe but were initially being diffused in Japanese and US markets.

7.1.3 Game Concept Origins. The Career of a Game Concept

The idea for the game had originally come from an artist who had worked at and left a software development house. After leaving, he had developed a core concept idea for a game and had begun taking it around and demonstrating it to various publishers to accept and develop a full game. Like many accounts of origins of product ideas (Roy and Wield 1986; Du Gay and Hall et al. 1996, Kaye 1978) the game concept was seen as an 'inspiration' rather than a deliberate intentional direct copy of an existing idea:

[So where did the ideas for Silly Putty come from?]

“Very hard to say it was the sort of thing where you're sitting on the toilet one day and you sort of think 'an amorphous blob where it can do anything' its not a running jumping character it can do anything and I just went away and did some graphics. I'm not a programmer. I just did the animation of this blob stretching and inflating and melting and turning into these other things and then I did a tour of all these software houses. I'd just left Palace Software and started going around...” (28).

The tour of software houses to try and obtain backing for a game based around the initial concept was at first unsuccessful. The process of organisational rationalisation in the industry, by the introduction of a management structure to scrutinise ideas and oversee selection of games, was seen to bring personnel into the industry who were not conversant with the industry's game conventions or history of products or who did not understand what counted as 'a valid idea'. Consequently, the problem of gaining acceptance of the idea was seen to be a communication issue:

“I found all the other software houses that I was going to that a similar situation was building up and we had these outsiders coming in purely with financial background who had been brought in to tidy these companies up, and they did not really understand anything about the games industry or what was a new product and original, and what was an old product and unoriginal. They were going on the basis that Super Mario was a big hit and therefore any game should have Super Mario type characters and that's why we got this big glut of rip-offs. Nobody really understood the Putty concept at all. When I was showing this blob moving around I just got this blank expression, so, especially at places like Mirrorsoft. I went back to Mirrorsoft and showed them, and to quite a few people and I got this glazed look in the board rooms, where in the old days you never went into the boardrooms, you went straight into the other guy's house and showed him the game, and he slipped you some money, and he'd find you a programmer - and that's how it used to happen. Once the corporate thing came in it was almost impossible to get this thing across. You never got to actually meet the people you met in the old days. In the old days you met another artist or another programmer, but you were stopped at this executive level, if you were an outsider you saw the exec. in command and I couldn't get the idea across to anyone. I was getting quite despondent toward the end...” (28).

The explanation here of why the initial game concept was rejected is useful in that it highlights how developers and designers categorise those with 'legitimate' knowledge of what should be produced. Also it gives insight into effects of the organisational change and what

economic models are perceived to operate in the industry in the selection and generation of new product ideas. It must be also considered that the non-acceptance of the idea could mean that any of the firms could already have had such an idea in development, or seen the idea before (e.g. Levy and Weingartner 1990). (This would be a possible explanation for the creation of look-a-like games subsequently developed which resembled this one - see 7.3.3). However, also useful here is the fact that Nintendo's Mario was, by now, an established character and a popular and legitimate design template for game design from an economic point of view.

The actual firm that accepted the idea, 'Funny Software' was chosen by the designer to demonstrate the idea only as a last resort because of its relatively small size and it being rumoured that it was not financially secure. A personal acquaintance from the designer's previous work place, who he had met at a trade show suggested a meeting with the Managing Director. This illustrates the use of a network of friends and acquaintances and word of mouth communication, that came up frequently in the developer interviews, as highlighting the elements of 'community' through the high rotation of workers from firms and the building up of resources in the way of knowledge of possible employment openings and other unofficial resources such as technical advice and creative material. Also it gives an insight into the passage of game ideas created outside an organisation and their subsequent acceptance by a development and publishing house.

7.1.4 Accepting the Initial Concept and the Development Firm's Organisational Background.

The demonstration or 'demo' of the animated game idea was presented to the MD of the development firm and accepted on the same day. The graphical demo had the animated character performing its movement functions of "*bouncing, stretching, moving between platforms and turning into another character*", (28). It was the visual basis of the demo that helped in this case to communicate the idea because it could be scrutinised more accurately than a written document and also the artist's style of graphics resonated with the MD's taste preference. The style of the graphics then was felt to be the key:

[What did he like about it?]

"Because my graphics, at the time I was doing very simplistic base colour, like Putty with a blue blob with a highlight. I had all the backgrounds very simple stripy backgrounds or big polka dots and there was this big colourful no detail, therefore there was no sort of dibbling or stipple or break up of the imaging it was smooth and flat with shadows. He loved that and for some reason ...[the MD]... likes that sort of thing and it was until that point it hadn't really. Sonic the Hedgehog was the nearest thing that came to that sort of style. So he saw the potential of it, you know the sort of look of it..."(28).

It is prudent to note that the acceptance of the idea reveals both micro and macro elements relating to product conceptualisation. On the micro-interpersonal level, the MD of Funny Software had a background in games' programming and because the firm was small (around 5 individuals), there were no other personnel to veto the idea and the MD was in a position of financial power to give the go ahead to finance the game. (This later became a deliberate organisational policy of having a potential idea seen by a designer or artist and had been carried over once the firm grew). Also a knowledge of existing game designs - e.g. the style of *Sonic the Hedgehog's* graphics (Sega's flagship game) and the potential similarity of the game outline, and the absence of such a product for the Amiga computer, in its trajectory as a games playing computer, provided a recognised niche for a potential product that borrowed or could offer similar design elements as these console game designs. Also, from an

organisational point of view, 'Funny Software', as an English-based development firm, had established a competence in producing games for the Commodore 64 as well as the Commodore Amiga. The period of the mid to late 1980s saw the firm link up with a US based publisher and create a number of games that sold over 1 to 2 million individual game designs which enjoyed success in the UK as well as the US, (Roberts 1997c).

The context of the development firm's status in the 90s was that its relations with its publisher 'Activision' had entered financial trouble. (This was based on a knock-on effect of Activision losing a legal battle over copyright with Magnavox over data-transfer in compatible cartridges, and in 1990 it was ordered to pay back royalties of \$6 million, as well as losing \$10 million in failed expansion efforts in 1989). The implications for the firm were that that royalties paid to it from the publisher were delayed and this resulted eventually in the development firm suing for \$2 million for late payments and in return were themselves counter-sued for libel. The impact on the development firm was to turn its focus toward publishing as well as development and to lay off staff in the face of legal fees. The firm's numbers dwindled from 40 to around 5 employees.

The firm's knowledge of the Amiga software profile, the availability of technical resources, together with the availability of the designer's labour and the firm's heightened need to continue to create products for its survival, provided an environment conducive to the acceptance of the game. Also, contributing to this was the game concept's perceived viability to be the central focus character for a game in a popular 'platform style', and its particular graphical expression provided a conjunction of factors making possible the start of the development of a new game in this particular style.

7.1.5 Forging the Game's Identity. Implications of Genre

The particular style of game or 'genre' - the 'platform game' style - had been a staple design format for video and computer games since the 80s. Indeed, its frequency of use had led to criticisms of oversupply and a symptomatic example of an industry lacking creativity in its designs, (e.g. Takouchi 1986). *Sonic the Hedgehog* and the *Mario Brothers* series of games, by the early 90s were Sega's and Nintendo's flagship games and they were designed in this format. The choice of this format for the game then was therefore relatively less risky than choosing another format as it was a recognised and market proven style. The characters in these games usually were bipeds and 'ran' to their objectives, avoiding obstacles. Here, if there was any economic risk in choosing something new to invest a game's design, it could have been the choice of a relatively unique character that moved and operated in a multi-functioning way.

An example of what counts as 'risk' in game design at this concept level was given from Funny Software's back catalogue - *Bangkok Knights* released in 1988. This had used a familiar and by then, standardised 'beat 'em up' format which involved a two-dimensional side-on view of two characters facing off for combat. The new aspect of the design was the inclusion of large character designs for the fighters and also giving each of them a variety of unique fighting moves that had not been used before in similar games. However, these had proven difficult to make move smoothly in a fluid movement for a game, and it was felt that the programmer had found it too difficult to implement the design effectively. Therefore the difference between creating a new idea in a crude demo form and its actual implementation in a final computer programme could not be totally predicted before hand. So, despite being able to visualise a moving character in a popular design template, there were potential areas where problems could have arisen and affected the game's implementation.

7.2 Implementation

7.2.1 Implementing the Game - Design Aims and Evolution. The Labour Process and Design

The process of turning the 'demo' of the game concept into a finished commodity for consumption is covered in the next phase. In this section it is shown how actors beyond the designer's initial control influence the game.

The state of the company in 1990 was that there were fewer members in-house which meant that the initial design effort was limited to the artist and the programmer who was found to implement the game. The main basis for starting work on the project other than the graphical 'demo' was a brief written document describing the character in the game's actions. The actual working out of the milestones for the development of the game was fairly informal and it was stressed that like all other new games that are developed, this was because the creating of games at the initial stage is based on a very inaccurate and arbitrary estimate. The labour costing of the project was about £3,000 per-month, which was described as being relatively cheap due to the inexperience of the workers - as the programmer had only completed one game before and the designer/artist had yet to work on a completed project. In this instance then, the financial outlay was lower for labour costs but possibly a risk could have been incurred if technical or design problems occurred in realising a tractable design as the experience of fixing bugs or interpersonal skills in communication might have been lacking. This could mean that if the project had encountered difficulties it could have been greatly delayed or shelved.

The main basis for changes to the initial design brief was through a dialogue between the programmer and the artist who had made changes regularly on an ad hoc basis as to what the game should include. This 'artist-programmer relationship' for the game was described as having 'gelled' and not to create interpersonal friction. However, the design of the game was revised by the programmer and this had meant that the character 'Putty' had its number of moves halved:

[What revisions did you have to make to your design?]

"It was 100% revised I think (laughs). However we left in the inflating, the melting, the bouncing, the stretching of the actual main character but when it came to... he used to... in the original main design for instance he could form a bridge and characters run over him, you were rescuing these little robots as you know and he could form a rope and people could climb up him - that was shelved, the programmer shelved that", (28).

The reasons for the cut were seen to be twofold: Firstly it was argued that too many moves for the player's character would have made the game too complicated and confusing for the user to control. This reveals a tension between a design needing to offer something new to the player i.e. its movement, attack and defence functions and it offering too many of these new functions despite creating a more varied choice for the potential user / character-game playing activities. Secondly, there was the role of the programmer in the labour process of implementing game ideas in design. Each new function required the creation of a program routine that had to be programmed in assembly language which took time:

"One of the big things that programmers object to is having to programme one-off special effects in a game. They really hate doing that. They don't mind doing something complex that is going to be used repeatedly but as many of ... (28) ... ideas were, they were on-off unique occurrences and many programmers detest that because it's a lot of work for what they think is of little long term reward". (8)

"It's been the bane of my life, the programmers and that aspect of things. Sometimes you want to stand your ground and sometimes you win and they do it and sometimes they say no to 9 out of 10 ideas because as ...(8)... says because they think it's too much work for what you're getting back and at the end of the day you get product, you do get a product. But a lot of companies I think if the programmer has too much say you get a lot of mediocre unimaginative stuff and a lot of programmers like to rip-off other programmers work as well so if you get a successful game's formula they all go and examine the routines and come up with an almost identical game with different graphics. This has been a disease in our industry for donkeys years with people just emulating everybody else's stuff and it just tends to cause a stagnancy and after a while the public just tend to get fed up, you know. We had this platform game scenario a couple of years ago where there were millions and millions of platform games and the computer press were getting so fed up with it they were just giving low marks to all of them just because it was a platform game no matter how good it was, and that was a stagnancy just caused because programmers felt more comfortable doing the same thing over and over again, and occasionally you get this team come out of nowhere and they produce the most amazing game - completely original. Doom for example - it crept up on the whole industry without any warning. One day we're sitting in our office, got it, loaded it and we were just 'Oh my God'." (28)

This dialogue illustrated the magnitude of the influence seen in the role of the programmer by non-programmers in producing entertainment software, since, the degree of innovation in game design is ultimately operationalised by programming. Here it is suggested that the labour routine of programming could affect the game's content and game's quality significantly. This represents the degree of power a programmer could have over their own labour and the things which could be allowed to be included in a game. Although earlier an economic explanation was offered for the viability of choosing a platform design model in the first place, this account does show how the role of individual agency is also seen to be essential in the implementation of a standard design genre. The end result of the artist-programmer negotiation is that what the final user experiences is a simplified main character which has implications for the type of involvement and demands placed upon the player's interaction with the game's rules and the game's availability in terms of the hardware it runs on.

The actual first design was meant to be targeted for the Amiga computer as well as the Commodore 64 home microcomputer. The game was to be developed in parallel for each machine, but the programmer for the Commodore 64 project had given up because the advances made on the Amiga version could not be implemented at the same pace on the Commodore 64, as it was a less advanced machine and would require much effort in copying the same types of techniques. (The cutting out of the Commodore 64 version added to the decline of software support for the machine. This machine had faced increasing competition from the Sega Master System and the Nintendo Entertainment System prompting Commodore to release a 'console version' of the 64 by redesigning it without a keyboard and emphasising its cartridge port, to promote the development of games on cartridges for it rather than on cassette tapes. This only gained minor support from software houses but was an option Funny Software explored with a previous release of a game - *The Last Ninja*, (Green 1995)). At that moment in time, only a very few western development firms had a licence to develop for either Sega or Nintendo machines and this was why the firm - other than being UK-based - had chosen the Amiga to target the game for. This determined what audience would receive the game - in this case Amiga owners who played games.

The aim of the game's design as mentioned above was to place a 'new' character in an established design format 'a platform' style. The particular arrangement of the contents was

developed on an ad hoc base. During development - roughly one year - the game had pictures and story line briefs sent to the press to create awareness of the game and its idea. These were for 'news' sections of magazines which were seen as an opportunity by the development firm to feed information to magazines which needed to report the new up and coming games of the future and create user-anticipation in line with the magazines' media logic in the games' industry to create demand for new games. The material sent however, was constructed for the previews specifically, rather than being authentic on-going game development screen shots. In this way the game could be made to look in a more advanced state of development than it really was, or to look as if it possessed a better quality than the actual final game - e.g. using stills which have larger characters than the actual animated final game or using more colours or number of characters on screen at one time beyond the actual computer's ability to calculate. The role of the press beyond providing an institutionalised routine of preview / news' creation / providing free product advertising, - was also used also to provide a de facto design feed back.

"...at the time we thought to let the media see it at a very early stage, we thought this was a great idea because it meant that if there were any negative feed back we could counter it in the development stage. So as we had journalists coming in to see games that were finished we also gave them a glimpse of the Putty game and we got this great feedback at that point, they were very keen. I don't think we got any negative feedback and so we thought we're getting closer and closer to a winner here. But the mistake we did make was, yeah, they were laughing at the jokes in the game and the humour because they were English journalists and so we started to lay it back very heavy into the games design document and we ended up with a very English game at the end of the day but using journalists I think that it was a good idea", (28).

The positive feedback from the journalists with regard to aspects of the game, which would be rewarded in subsequent reviews, provided a source of reinforcement to the developers to use humour in the game's design.

[What kind of feed back?]

"What things they liked about it really and what they didn't like about it. We noticed about the sound effects they were very, very important we used very cartoony effects and we got guys falling about laughing while playing the game and one journalist - from Future I think it was - said he was playing the game in the office to review it and he looked round and the entire office was behind it looking at his shoulder because the noise coming out of the monitor - crazy sound effects - he wrote that in the review he said that, you know, that it attracted people" (28).

The impact of the feedback from journalists meant that the game was being targeted to provide a new character to play with but also in an entertainment format similar to a cartoon with characters with their particular attributes.

[Why did you think Super Putty was fun to play?]

"Because it wasn't a running jumping character, there's something new for people to play with really. It was a completely different concept, plus it was completely mad. The whole game was a cacophony of sound and visuals, it was swarming with things. Each one had its unique particular talent it was doing in the game you know it was different. Plus you had the remoulding which people really liked turning into other things, you know. I think we hit at that time when things were getting a bit jaded with the other platform games. We found a niche and the public picked up on it", (28).

The emerging design of the game turned in its design direction toward providing 'entertainment' in terms of spectacle, when the sampled sound effects were put in:

"... the press had picked up on that as well in their review in that it was an entertaining game. It wasn't just running, jumping about for the sake of it, there was an entertainment value there".

[Was that always intended?]

"No it was an accident".

[Right, how did that come about?]

"It didn't really happen until we put the sound effects in and until that point it was just a normal game. When we put the sound in it transformed it into this strange thing.

Imagine your looking over the shoulder of someone playing a game and you're rooted to the spot because you're watching them playing – it's entertaining. You're not playing. It's not actually having anything to do with your reflexes or your mind your just watching somebody else but you're watching what they're doing and that's what the first Putty Game did. People were just there staring because they were wondering what all the noise was and you know all the different things", (28).

The implications then, of taking a sharp turn to character development and giving them unique sounds and humorous names was to give an emphasis to the visual and sound aspects of the game. The designer's own personal background interest in cartoons had provided a resource that could be used within the game - although this was not preplanned - and these were recycled and linked up to characters. For example, in the game, the player's character *Putty*, would have to move beyond a point in the screen which was under crossfire from a green faced character (*Baccy-Chewing Goblin*) who was seen to physically chew on a piece of tobacco, clear his throat - with the appropriate sound effects - and spit it at *Putty*. Also the *Snot Goblin* animation showed a character picking its nose and dropping mucus down in a dripping line that caused the *Putty* character to lose energy. These visual audio elements in the game were elements that were counted as 'entertainment' in the video game because they provided a non-physical element to the play process that the player could engage with. In other words, in parallel to the moving of the character *Putty* to collect and avoid objects the player could also be a voyeur to gaze at the actions of these characters for the pleasure of seeing their own intrinsic actions in their own thematic settings. For example on level 5, *Toytown*, the character *Putty* must rescue robots and deliver them to the top of the screen to the safety of a space ship, (as is the same for all levels in the game). This is the repetitive game objective the player seeks to undertake in a 'new' environment - here *Toy Town* - characters try to obstruct *Putty* / the player by colliding with *Putty* or throwing projectiles at him.

The characters that *Putty* interacted with inside the game borrow from popular culture by making references to the specific video games as well as other icons of non-video game popular culture. For example: the *Train Spotter*, *Clockwork Orange*, *exploding Baked Bean* are examples of the latter. While the *Spaced Invaders* and rolling barrels are elements that are recognisable elements from two seminal video games *Space Invaders* and *Donkey Kong* from the first boom in video games. Each character had its own behavioural attributes in movement and attack and own respective sound effect and method of being dispatched. Further elements of design that borrowed from other popular entertainment forms were in the presentation format. The presentation music was a rewritten version of the *Joe 90* children's TV theme tune. (This was obtained from a previous work colleague who had composed the music 3 years earlier for a project that was eventually shelved and by use of personal contacts the

designer was given permission to reuse the music for the game. Again reflecting another aspect of the use of interpersonal-networks in the games' industry). Once the game was ended - if the player had lost all his attempts or 'lives' - a picture of a cat appeared, surrounded by concentric circles, and announcing 'too bad' in the style of the 'Warner Bros.' 'That's all folks' cartoon ending credits.

From a legal perspective, these types of pastiche could have caused potential problems in terms of copyright and necessitated more extreme redesign or recomposition to differentiate them from the original material or else invoke the payment of royalties - for example for the use of the *Joe 90*-style music. It was felt that any possible risk of copyright infringement and being challenged on it with subsequent royalty payments was worth taking because the prime market was the UK rather than the US, since the Amiga had found its application mainly as a game machine in the UK, whilst in the US the Amiga was mainly used as a productivity tool for art work or business, (Storer 1992).

The final additions to the game involved play testing - looking for bugs - which was done by the team itself rather than by an official 'tester' employed to do only that task because of the firm's limited size at that time.

7.2.2 Diffusing the Game into the Public Domain

The release of the game is covered in the next section. This examines how the final finished version of the game was interpreted by the press and became available to the public. This done by additionally considering the target hardware platform, the Amiga home computer, within the context of the domestic computer and video games industry, in section (7.2.3). The consideration of the Amiga's status is necessary because the availability, operation and meaning of the game is not neutral from the hardware. This is pertinent because the FTC and MMC had drawn attention to impact on competition of the design of the Nintendo and Sega consoles on 'open' hardware systems such as the Amiga, (as mentioned in sections 5.3.8, 5.4.12 and 5.4.13). Therefore, the relationships between the Amiga and the emerging console hardware systems are examined.

7.2.3 The Commodore Amiga as a 'Games' Machine'. An Alternative Development Pathway to Consoles

As mentioned earlier the course of this game's development from 1991 to 1992 had occurred at a time when the industry had experienced a period of technology change. Specifically the 16-bit based home computers such as the Atari ST and Amiga were maturing in their life cycle relative to the 8-bit based computers such as the Commodore 64 which they had superseded since its introduction in the mid 1980s. In the parallel games market for dedicated games playing cartridge machines (consoles) such as the 8-bit Sega Master System and the Nintendo Entertainment System together with its replacements for the UK in the 1990s, the Super Nintendo Entertainment System (SNES) and the MegaDrive, had gained a dominant market share in Japan and the US and this trend was growing in the UK and European markets. In response to this personal computer firms like Commodore and Amstrad had sought to experiment by releasing new machines or to adapt their technologies to use cartridge based games consoles such as the Amstrad GX 4000 and the Commodore GS. A secondary strategy for Commodore had been including software with its computers which had meant that 3 or 4 games were included with the machine when it was sold. This tactic of 'bundling' was reflected on both the Sega and Nintendo marketing strategies, whereby high quality 'flagship' games such as the *Sonic* or *Mario* games were included with the machine to give both a supplement to the brand identity of the technology and also to act as a catalyst to

encourage future user cartridge purchases. By virtue of the legal-economic arrangements both Sega and Nintendo enjoyed a technical advantage over other software houses which worked with their machines. This being in terms of their detailed first hand technical knowledge of its working and also the economic revenue gained from royalties from licensing its patented technology and know-how and having less time pressure due to obtaining privileged access to cartridge development resources. This meant that by virtue of their market position, Commodore, as a personal computer hardware firm which supplied an open ended hardware architecture earned no revenue through software royalty payments from third party software developments to cross-subsidise the cost of its personal computer hardware and compete on price with the Sega and Nintendo consoles. Additionally, by not having its own vertically integrated games software development division for the Amiga, Commodore had a strategic disadvantage in delivering a home computing technology that eventually competed with other games playing technologies in the market.

To overcome this disadvantage, Commodore's marketing strategy was to pick software titles that would demonstrate the Amiga's capabilities in a positive light and this was done by recruiting the latest and potentially most successful third party titles. This also gave some flexibility in terms of adopting software characters or trends that might have risen or fallen in popularity, (Pleasance 1994). For instance the 1989 *Batman pack* used a licensed game from Ocean software to create a theme around the sale of the Amiga with a copy of the video of the movie in a colourful package that coincided with the successful impact of the box office hit of the 1989 version of the film.

The game 'Putty' was chosen for the then, latest bundle for the new Amiga 600 *The Weird, The Wild and The Wicked* pack for release in October 1992. This featured the latest redesigned version of the Amiga home computer together with Funny Software's game along with a racing car game and a puzzle game, each from different manufacturers. In this bundled package the game was given a licensed trade marked title *Silly Putty* to tie-in with the original plastic toy that was used to mould, bounce and stretch into different shapes. This similarity to the game's characteristics made the tie-in with the toy's brand name a logical link as the toy had been available for sale since the late 1940s and the firm had sought every opportunity to maximise its popularity by obtaining media coverage for it and enforcing the term *Silly Putty* as a trade mark. This served to protect the brand name and product identity of the toy and prevent its name and identity entering popular language use as a generic term for similar plastic play things, (Kaye 1978, p.71-78). As the original toy had a very popular appeal for both adults initially and then children (when re-released after a government ban on the use of silicon based material during the Korean war), the firm had only specialised in the production of this one intellectual property and the toy's products identity was easily recognisable. This could aid the recognisability of the computer game's initial game concept that the designer had sought to propagate.

The peculiarity of '*The Weird, the Wild and The Wicked*' bundle that Putty was diffused with reveals another aspect of the video games' environment and the relationships between hardware design trajectories and software design. Since its 1982 inception, the Amiga had been redesigned and configured in various guises that reflected the computer industry's relationship with the demand for games and its perceived strategic importance as a form of software used to generate demand for hardware.

During the early 1980s, the Atari VCS cartridge machine had enjoyed a monopoly over the games industry and one of the designers of that piece of hardware had formed a partnership to develop a competing advanced games' console built around the then, relatively new, Motorola 68000 processor and using custom built chips to focus solely on advanced sound and

graphics' capabilities. By 1984 the R&D funds were exhausted, and both Atari and Commodore showed interest in using the hardware for personal computer use, as, by then, the games console market had crashed. The A1000 was released by Commodore in 1985 as a 'next generation' computer for use as a music, arts and business machine and had used pop star Debbie Harrie and artist Andy Warhole to demonstrate its potential for 'useful' productive applications rather than games use, (Amiga Format 1993a, p.16)

The use of the Amiga as a games playing technology was discouraged by Commodore seeking to gain a reputation for the use of the Amiga as a 'serious' technology, and software development kits were not sent out to games development houses as a consequence, (Roberts (1997b). Yet poor sales had meant that the Amiga was redesigned and the A500 released as a more affordable home computer to rival the Atari ST, and it gradually became popular as a games' playing technology as programmers developed games that used its custom built architecture for its initially intended purpose. Later models such as the A500+ were introduced in 1991, with extra memory but suffered some backward compatibility problems which meant that some games would not run because the software used routines in the code which were no longer valid on the newer model's operating system. (This was a consequence of being an open architecture where third party software code is not scrutinised by a formal process unlike with either of the Sega or Nintendo machines). Also the introduction of this machine caused confusion to retailers as well as developers because Commodore had not announced its move beforehand. Within a year, the A600 was introduced in 1992 to supersede the A500+. This machine was intended to be the A300 – Commodore's attempt to redesign the Amiga to compete with the console machines directly and had the designated project model number 'A300' still stamped on the internal A600 circuit board, (Holborn 1992, p.142). The actual physical appearance of the machine too had been adapted to make it look more like a console machine by making it more compact - not much bigger than a piece of A4 paper. The alpha numeric pad had been taken out, the two joystick ports were relocated from the back to be more accessible at the side of the chassis and some of the peripheral ports were missing (making some existing peripherals obsolete, (Amiga Format 1993c, p.75). Also the redesigned Amiga used surface mount chips which were more reliable than before and the overall cost of producing the Amiga 600 meant that there could be cut in price - (from £329 to eventually £199) to compete with the consoles on price.

Consequently, Commodore's design strategy in adopting the Amiga prototype technology had turned back from the design of the A1000, to accept that playing games was a legitimate and long term use of computer technology and that a change in strategy was needed to compete now not with Atari (which itself had restarted creating games hardware in the late 80s) but with the Japanese firms Sega and Nintendo. This it did by the release of games' bundles and, more radically, the design of the A600 and the planned projects, the A1200 and CD32, a CD ROM games' machine targeted for 1993.

As the Amiga had been seen to be the main games playing machine for developers and users predominantly in the UK, with titles increasingly becoming only exclusively developed for the Amiga in the late 1980s and early 1990s, (Noonan 1993b), and had been available in its cheaper A500 style design since 1987, having a relatively large installed user base of around one million plus users by 1992, (Dinsey 1992). It appeared that that these were mainly used for game playing, e.g. readership surveys of Amiga Format magazine had suggested that 95 percent of its readership used their Amiga for games. By year ending 1994, Gallup estimated suggested that had risen to 2,215,000 in comparison with rival console ownership of 1.5 million Nintendo SNES owners and 2.5 million Sega MegaDrive owners, (Edge Magazine 1995a, p.17).

This, then, was the potential hardware market that *Silly Putty* was diffused into in the UK and therefore reveals the stage that the Amiga had reached in 1992 in its trajectory both in hardware design and symbolic meaning. The more Amiga machines available to form a larger installed user base of active game players, the higher the chance of the game being bought.

7.3 Other Factors

7.3.1 Competing Games Designs. Constructing the Artefact's Relative Merits as a Commodity

From a software design perspective the game *Silly Putty*, itself would be competing with other games within the Amiga games market sector that were released in 1992. One influence of console designed games upon computer game designs had meant that *Sonic The Hedgehog* had also influenced another rival software house to release *Zool* which featured a Ninja Ant which ran over thematic platform areas, or 'worlds', based on designs including sweets and toys. In one historical review of Amiga games (Noonan 1993b), the year 1992 had signalled a landmark in games' design for the Amiga, as now Japanese 'cutsey' colourful-style console games graphics' had now influenced Amiga games on a wider scale and *Silly Putty* and *Zool* were given as examples of two of the five best Amiga games of that year, which were both influenced by this type of style. The implications were that Amiga games' designs were now borrowing from action-based console designs or IBM PC strategy style games - such as *Monkey Island 2* and *Civilisation*. As a consequence the Amiga itself was not seen as the originator of landmark games designs any more, as it had once been - for example with industry-acclaimed games such as 'Populous' and 'Lemmings' both of which were originated on the Amiga.

From a strategy point of view the design of *Zool* provided Commodore with an exemplary design that meant the Amiga could feasibly run similarly styled designs as console machines as it had received very high scores in reviews. For example Amiga Format awarded it a 'Gold' award and it gained a 95 percent 'over all' quality review score and the MD of Commodore UK cited *Zool* as an example of the type of game that should be designed for the Amiga, (Sumner 1992). *Zool* had been released at the same time as *Silly Putty* in October 1992 and both were held to be premium examples of software designs obtaining 95 percent 'over all' review scores. Both games were discussed in relation to each other as to which was the best game ever on the Amiga, (Amiga Format 1992). Both games were rewarded for their colourful well-drawn graphics but a distinction made on the speed of the games operation during play. *Zool* was described as faster to play while *Putty* was seen to be a slower more mentally challenging game, which required some thought as to the movement of the player's character in reaching its objectives. Also it was felt that some time would be needed to play through the game to begin to learn to play it to enjoy it. The review paradoxically categorised the game as both having a recognisable traditional design and yet also having enough to count as a 'new' so as to be an example of being a 'good' game:

"even though it's basically a platform game its incredibly original and playing it is both fun and challenging".

(Amiga Format 1992, p.135).

By Christmas of 1992 *Zool* was number one in the Amiga Virgin compiled software chart and *Putty* number two (Games Master 1993a, p.15). The game sold on the standalone version had included extracts of the positive press reviews on its box.

For example:

“Amiga Power 90% “One of the Amiga’s most original and finest moments yet”

From a technical point of view the print of the box assured compatibility across all the variants of the Amiga: the A500, A500 plus, A600, A2000, A2500 and A3000 - to allay the fears over backward compatibility that the press had picked up on with the introduction of the A500 plus. The actual standalone version released by the development firm had undergone a name change to just ‘Putty’ dropping the ‘Silly’ prefix. This was because the development and publishing firm felt that payment of a 1.50 pound per unit royalty was too much for the use of the trademarked name.

The game was also prepacked with warranty feedback cards that the player sent back stating their age what they thought of the game - rated on a 1 to 10 scale - and their address to provide information for other products. The designer recalled that the feedback gave high marks of 9 and 10s and responses from people aged 20 to 30. This came as a surprise as the designer had expected the audience to be in the 14 to 18 year old age group. Additionally the firm had been sent spontaneous feedback in the form of children’s drawings and designs for a possible sequel to this game. Other qualitative feedback came from a helpline designed to give hints to solve the game:

[.... What did they think though?]

“The game players? Well we had ... from one woman I spoke to who rang up, we had a help line going where people rang up, she was a housewife and her kid had bought the game and now she was addicted to playing it all day and she said 'I'm not getting any housework done, please help me with this level' and she said it made her laugh it was purely that she wanted to see what was around the corner particularly. Just making her laugh and I think that's what a lot of people had..”, (28).

Like the journalist’s feedback, humour had been seen as a positive design aspect of the game providing an additional element to conforming to the game’s rules and objectives.

7.3.2 Reproducing the Game

Given the success of the game, the design was chosen to be implemented on both the Sega MegaDrive and Super Nintendo Entertainment System (SNES). This was in order to diffuse Putty to other territories where Sega and Nintendo had become popular because the Amiga’s largest consumption base was mainly the UK. The attempt to gain concept approval from Sega to produce the game for its machine had met resistance. Again a similar account was given for organisational structure and publishers reticence to accept a new product idea and successfully communicating it:

“...We actually took it ... we were trying to sell the first game to Sega and we had great difficulty with their operation there because its all executives really and we couldn't sort of get concepts across. So in the end...[MD]... and I took a cardboard box full of these warranty cards and poured it out onto this desk at Sega headquarters and said 'this is what the general public thought of that version why don't you put it on your machine' and we still couldn't get it ... you know so...” (28)

(8) *“It was because there were no game players in the management at Sega”.*

Christmas 1992 was the peak boom year for video games’ sales for that generation of Sega and Nintendo machines and from an economic point of view, with the global success of Sega and Nintendo, the firms’ move to produce games for the cartridge based machines was strategically well-motivated.

The actual game was intended to be directly transplanted from the Amiga to the Super Nintendo with amendments to the sounds. This was because the Amiga version had used many digitally sampled sound effects for the characters' sounds which took up memory which meant that, for the Amiga, the game could be spread over extra discs (in this case 3). For the SNES version the use of sampled sound effects was diminished with only a few key select sound effects left in - such as the 'too bad' sound effect that one character announced at the player's demise. This was because, for a technical reason, the sound chip, (designed by Sony), could only access a limited 64 K of memory given over to sound and sampled sounds require a larger amount of memory to store the composed synthesiser music, (Edge Magazine 1994e, p.58). The SNES was more limited than the Amiga in this respect of hardware design choice. As a replacement, the SNES version had new music composed for each of the levels, which represented a difference to the Amiga version, which was relatively silent during play, other than the use of the sampled sound effects. The music for this version was created by the same freelance musician who created the Amiga *Joe 90* style composition, in situ with the designer playing the game through, and describing the type of music he thought he needed.

For the programming of the conversion of *Putty* to the new platform, a new programmer was used who had experience of programming the SNES. This reflected the fact that from a technical point of view, the hardware design of a new platform meant that for a publisher specialising in a different hardware configuration (i.e. the Amiga), the technical change of adapting pre-existing software to the Japanese cartridge based machines could, in theory, be easily enough accommodated without major new creative design labour activity. The reproduction of the design to a new machine was not, however, a totally straight forward 'Fordist' mechanised process of replicating labour. Some inconvenience was caused due to some difference in the processor's instruction sets and a more pronounced difference in the custom-built graphic and sound chips that the Amiga and SNES had, meaning that some routines had to be translated and reimplemented by the programmer who ultimately has responsibility for co-ordinating the movement of the characters in play, once the program runs. From a game design perspective, the intellectual properties - the copyrighted characters and the game's layout were the same and therefore it was cheaper for the development organisation to try to replicate the design than create a new game and therefore maximise the audience of the original *Silly Putty* design.

The prospected release of the SNES version of *Putty* was re-titled *Super Putty*. It is worth noting that the inclusion of the 1.50 per unit royalty of using the licensed name *Silly Putty* would have diminished the profits made within the business model of cartridge production for the development firm. This was aimed to be released around April 1993 for a prospective price of 45 pounds (compared to 26 pounds on the Amiga) and had been given a preview in the 'Games Master' magazine tie-in with the Channel 4 screened TV show of the same name, (Games Master 1993b, p.35).

The economic-legal agreement between Nintendo and its third party licensees as mentioned in (5.4.12), had meant that, once created, designs had to be scrutinised for both technical and creative content. The latter point involved mandatory layout of screens and a form of censorship that aimed to exclude forms of violence and profanity from games and the specific forms this took were represented in the Nintendo style guide. The implications of this for the implementation of the *Putty* design on the SNES was that some revisions to content were enforced. On a presentation side the obligatory Nintendo copyright screen had to be inserted to highlight the Nintendo brand. On the player high score section, the lay out was redesigned so that only three letter character names excluding vowels were allowed, so as to prevent any swear words being typed in.

From the game's design aspect, some character names changed and Nintendo enforced their graphical/behavioural attributes upon scrutinising the design. The effect of which had a profound influence on the development firm's attempt to assess what counted as an acceptable design style when creating products for foreign markets (as will be shown below).

"Yeah, in the original version on the Amiga, we had this guy who pulled a large piece of snot out and dropped it on top of Putty. We had this other guy who stuck out his head and chewed a bit of tobacco and spat it at him. We had a guy, a fat sort of Arabic character, who farted all the time. The Japs took exception to all of this and we had to, sort of like, make last minute character changes. The spitting man - we had to stop him spitting and give him a gun to fire a bullet out. The guy who picked his nose just had a jar that he took a glob out and dropped it, and all that. They resented the toilet humour but they didn't mind all the violence and people being blow up and shot - that was all perfectly okay.", (28)

(The design of the sequel game led to a rationalisation of this inconsistency in design restrictions and sought to accommodate Japanese users needs - and this is covered in section (8.1.3) and (8.1.4) and (9.2.7).

7.3.3 The Costs of Game Redesign

The implications of making character changes to the game operated on both a symbolic and an economic level: The game's design had put emphasis on humorous entertainment derived from its character designs in the game. Because it was these characters that helped to differentiate this game from the array of other platform games that both reviewers and developers constantly draw attention to, attempts to redesign or exclude certain unique selling points of the product interfered with aspects of the game's overall intended message that the developer eventually had created and wanted to transfer across to the new platform. The changes made to the original *Baccy chewing goblin* of the Amiga version specifically meant that the character was now given a large gun to shoot projectiles at the players character and its name changed to 'old man spittoon' (which in the instruction book suggests that he was still intended to be spitting - possibly representing a lag between the printing of the supporting instructions and the completion of the corrections to the games final approval).

Also, despite the graphical and name changes, the throat clearing and phlegm gathering sound sample effect was still left in the SNES version and not amended to accompany the gun shooting animation. Again the *Snot Goblin* of the Amiga version was changed to a character taking projectiles out of a pot and dropping it downwards. Its name was changed to just *Green Goblin* with 'missiles' that the player must 'avoid' and here the instruction book just has a question mark because the character had probably not been redrawn before printing. Another element of the game that was changed was the special move that *Putty* could undertake - 'make coffee' where by the player could make *Putty* turn into a cup of coffee and immobilise an enemy robot for 30 seconds. This whole move was left out of the SNES version.

The implications of these character changes meant from a labour/organisational view that the characters had to be eliminated from the program or redrawn, reanimated and reprogrammed and the whole program resubmitted to Nintendo for approval. This process caused delay of the product and the final release of the game slipped its intended date. Instead of being released in April 1993, as the preview had stated, the final finished game was reviewed in October 1993 and ready for release. From an economic perspective this meant that the game *Super Putty* - a potentially simple and uncreative 'port' or 'shovelware', (as industry actors had termed the widespread translation of games from one platform to another), to increase its market penetration into other territories - was delayed in its release and had undergone symbolic content changes to its design. The delay in time meant that the SNES version of the

game, (as well as the Amiga version), now had other games to compete with, not just other games for consumer purchases, but with other games that had also used a similar 'morphing' character concept as its central attraction. For example - *Jelly Boy* and *Blob* games were both seen to be copies of the Putty movement concept by the designer and providing a possible example of the diffusion of game ideas from firm to firm via personal contacts and helping to reinforce the industry-wide concern of the copying or 'stealing' of ideas :

[What were the reactions of other software houses?]

[28] They all copied it. I mean we had ... how many blob games came out afterwards?

[8] Quite a few.

[28] Globdule by Grandslam, Jelly Boy, Claymates.

[8] I reckon 6 or 7 products came out on the back of what ...[28]... had shown people.

[28] Which was post-Putty. Everybody was doing an amorphous blob game you know.

[How does it make you feel when you see spin-offs from the Putty concepts?]

[28] Ah, I used to get mad but I think I gave up in the end, you know. Its silly, you know. Interplay was the only one that really upset me because the guy at Interplay was actually our agent in America before he was at Interplay and all of a sudden a Putty game came out at Interplay and that was too much really because he'd been in at the beginning of Putty 1. That annoyed me a bit, happening so close to home.

This account of the diffusion of the game concept into rival game products was recounted in a subsequent magazine interview with the firm:

[Putty Squads designer (E.L)] "We did create a new genre with Putty. We were the very first developer to play about with that idea. I think Interplay were the first to copy us with Jelly Boy and Blob as well."

(Ireland 1997, p32)

The timing delay of the SNES release of *Putty* decreased the comparative advantage the firm had to exploit its own design and intellectual property of the *Putty* game as a development firm. Other companies were able to create their own spin-off games for the SNES - which as yet, did not have a rival concept of that nature to compete with. A smoother transition in transferring the game from one machine to another would have meant there being a period of less direct competition with other firms. For instance, games such as *Morph* and *Claymates* were received with a degree of comparison to *Putty* in order to attribute their sense of relative difference as a 'new game' and in what specific aspects they were an improvement. For example, *Claymates* was described in a magazine review as being similar yet with original enough content to offer a design improvement :

"Starting off as the blue blob of malleable clay you must quickly get yourself into the form of one to 5 animals ... Claymates is a bit like Putty only better - it isn't as restricted and you can go where you like".

(Price 1993, p.86).

"Morph is great. In many respects its a bit like Putty (the amusingly malleable main character, the attractive blend of strategy and arcade / platform skills, a six letter title. Sorry)" (Sic. E.L.).

(Lowe 1993a, p.48).

The actual review of the subsequently completed SNES version of *Super Putty*, which was released and reviewed later than the above similar titles (in the November edition of one magazine; Games Master 1993c). The review did not pick up on the content omissions and the review did not seek to comment on the differences between the Amiga version and the new implementation on the Nintendo machine.

Ironically in terms of chronology, the review did suggest that the games character *Putty* was similar to another title *Morph*, which had been released in the summer, in terms of its 'unique' aspect of its movement. This was despite the original 'donor' Amiga version being released earlier. Yet, on the whole, the game was evaluated as a 'good game' and a recommended purchase, due to its strange character designs and peculiar scenarios of the level themes. Despite *Super Putty* being described as a direct translation of a pre-released and 'old' Amiga game, these aspects of the game's design were still felt to be original enough for its release on the SNES and its relative status compared to other game titles available for the machine:

"It may be an Amiga conversion but in the blasted bloody well staid and occasionally rather samey world of video games, something with such a genuinely amusing philosophy and well - attitude is a welcome breath of a kettle of, erm ... fish".

(Lowe 1993b, p.55).

In this way, the review represents a marker to the temporal pace of innovation particular to the industry, by demarcating between what can be accepted as 'new' and 'old' in the output of the industry's products. Also it yields a cryptic critique of there being a relative lack of innovation in the game's industry and acknowledging that *Super Putty* was part of the industry-wide trend of games producers trying to increase the product life cycle of their games' designs by trying to find a wider audience for it, by effectively re-releasing the original design again, as if it were 'new' in terms of the overall 'order of things' in the output of all games designs.

Finally, it is also worth noting, from a strategic point of view, what could have feasibly happened if a different design choice had occurred earlier in the original construction of the Amiga version of *Putty*. In the terms of the reception of the console conversion, what if the original Amiga *Putty* had its design skewed more directly to compete with the Sega MegaDrive game *Sonic the Hedgehog*, as *Zool* had? Once *Zool* had been translated from the Amiga to run on the MegaDrive, it was compared now directly, in terms of content, with Sega's flagship game, as they were now both available on the same machine. Therefore the symbolic value of being 'a console game look-a-like' that gave *Zool* symbolic value as an Amiga personal computer game, (e.g. Amiga Format 1993b, p.95), had less currency when it was translated to the MegaDrive. This was due to the fact that there were already a high number of games in that style for the console machines and adding another one that was not significantly better or different from competing games was strategically questionable, e.g. review of *Zool* for the MegaDrive, (Groves 1993, p.79). Therefore the recycling of the *Putty* design was advantageously placed, in this respect, to avoid such comparison with a console flagship game, despite the subsequent designs that mimicked the *Putty* characters unique points - which the firm could not feasibly have foreseen.

7.3.4 The Silly Putty Game Design as a Consumer Good

From the perspective of the user, the two commodity forms of *Silly Putty* and *Super Putty* represented a games' design product marketed in two forms. One, on an open technical hardware standard and the other, a closed standard, which had undergone quality assurance testing by the hardware proprietor, Nintendo. The implications in economic terms for the user

is that the Amiga player already has initially had to make a relatively more costly purchase for the Amiga home computer in either the hardware/software bundle or standalone. The *Silly Putty* game cost 25.99 pounds brand new in 1992-3, (or 16 for the budget version released subsequently in 1994), implemented on 3 floppy discs. The Nintendo version cost 45 pounds for the cartridge in 1993. The developers themselves had felt that the Amiga version was a superior product (mainly because of the enforced revisions and sound effect differences).

From a content and play activity perspective, the Amiga version, because of it being spread over 3 discs, required the user to swap discs at points in the game to add new levels once other parts had been completed. This broke up the flow of the game because it required the user to manually insert one of the disks and take another out. The cartridge version did not require this because the programme was all held on a ROM chip in the circuit board of the cartridge.

From a perspective of consumer choice, within the relative time frames of relevant releases of the game for each respective machine, in the latter half of 1992, Amiga games' players were seeing a product being released for their machine that had been influenced by the aesthetics of other cartridge console game designs plus its own intrinsic innovative interpretation of 'entertainment' and 'humour' to differentiate it from other titles available for the Amiga. Therefore, these players of this game with this machine were experiencing a product that was relatively more innovative than the reciprocal case with SNES users experiencing the game in late 1993. The time lag had meant that the advantage of the innovative points of *Super Putty* had been eroded by competitors and from the overall choice of 'platform' style games, there was, for example, already Nintendo's flagship design of *Super Mario World* which SNES users could buy. Although, because of the wider spread of diffusion of the Nintendo machine across foreign territories compared to the UK-centred Amiga games' market, the opportunity of consuming *Putty* had been widened. Yet the staggered time frames of the Amiga full price and budget releases and SNES releases makes the issue of consumer choice complicated to compare, as the games were not open for comparative purchase at exactly the same times. However, this scenario of a possible choice over the same game became less frequent as developers started to adopt console platforms as their target for their initial designs due to the increased global market opportunities, (and the issue below).

From an 'unorthodox' consumption point of view, the supply of *Super Putty* on cartridge format also rendered it much less vulnerable to consumer copying. The Amiga's use of floppy discs to deliver games had meant that consumer copying or 'pirating' of games had gained media awareness in magazines and developers and publishers had constructed it as 'a problem' associated with developing games for the Amiga. One reason given by publishers for declining to continue to create or publish games for the Amiga was directly related to this point. For instance, in an industry survey of 20 major games publishers conducted by Future Publishing (Channel 4 Teletext, 1994, p.471), had quoted one respondents reason for declining to release games for the Amiga :

"it's all due to piracy 1 sale = 25 copies"

This aspect too was cited as an advantage of developing for cartridge based consoles. Yet also it was the chance for potentially larger sales and profits of a higher priced commodity which cannot be discounted as a reason for guiding technology change of a delivery medium and target hardware choice on a wider aggregate basis, (e.g. Amiga Format 1993d, p.87) This aspect then helped legitimate the publisher adoption of console technology for games' releases and explains the publishers' media logic of why the Amiga as a sole choice for a game's release was declining in frequency. (This aspect of the meaning of the Amiga to

industry actors is continued in the next chapter regarding the issue of the viability of trying to release the sequel game, 'Putty Squad').

The market release of the Nintendo version of *Super Putty* was felt to be unsuccessful in terms of content or sales. The content changes required by Nintendo were described as having 'killed' the game and the sales of the game were felt to be disappointing. (Later in 1994 Telstar had bundled *Super Putty* in a 2 cartridge game 'Value pack' at a cheap price, suggesting over production of the game, (Computer and Video Games, issue 157, p.40, December 1994). Indeed at the interview I mentioned that I had bought the game and the response was one of humour at having actually been sold a copy and of my suspect consumer judgement!).

The interpretation of the feedback of the poor reception of *Super Putty* for the development firm was to see it as a flaw in the initial design of the game carried over from the Amiga version.

"Initially when we did the first game, Silly Putty, that was aimed at the UK market specially and it was a big success in the UK. I mean the press loved it specifically because of its toilet humour. It didn't work anywhere else in the world er ... we sold a few copies in Europe but for some reason they didn't seem to get it.

I learned a good lesson by it I think. You know first... I mean the UK the time I did the first one I was really only aiming at the UK market and ... because you get a laugh from somebody in the UK press in the computer press you think 'done it - that's going to be successful' and it was in the UK but not absolutely nowhere else you know, because of the way we designed it".
(28)

The meaning of the poor sales then, was felt to be misjudging who the target audience really should have been. In this case, UK journalist feedback which had been used as a cue to reward and expand upon elements of character humour for the Amiga version was felt to have skewed attraction of the game to a UK market and hence, from a strategic point of view, developing the SNES version to enter foreign territories was felt to be flawed.

Elements of the game that could be described as being 'UK-centric' and possibly justify this interpretation are the inclusion of characters such as the *train spotters*, *Biggles* (the wasp) and the *Clockwork Orange* which are easier to recognise as elements from UK popular culture and provide humour and meaning for the audience. Yet other characters, however, in the game were derived from more globalised icons of popular culture: *Terminator* carrot (associated with the Schwarzenegger film character - a character wearing sun glasses and carrying a gun and announcing a sampled sound effect 'achtung!' on firing on the player's character) ; *Space(d) invaders*, *teddy bear*, *Frankenstein's Monster* are other characters which were included and that had a more transnational recognisability. Also the use of music based on *Sesame Street* and *Telstar* also gave a possible aspect of recognisability to the game in this respect.

Other possible explanations of why the project was not as successful as the Amiga version were not voiced such as increased product releases in the Nintendo console market sector; time delay in product release, fall in demand, and competition from other similar games. Without feedback, other than sales' numbers or reviews, as to how the game was interpreted by purchasers, it is not possible to exclude these other explanations for the game's lower relative sales than the Amiga version. Yet for the design firm, the role of the particular use of humour in product design and problems in its symbolic communication was held to be meaningful in influencing sales and this had an affect on the design rationale for the follow-up game, *Putty Squad*.

The next chapter explores the construction of the sequel game design. This reveals problems involved in trying to learn from this design precedence and apply the knowledge advantageously.

7.3.5 Summary

This chapter examined the 'career' of the game *Silly Putty* as it developed from basic idea into home computer and console versions. In this passage of developing the idea into commodity, various social groups and 'problems' were defined and engaged with. These included impacts from heterogeneous groups and diverse issues such as, questions of originality, the role of humour, the role of the programmer, difficulties in predicting user needs in global markets. Of concern for the thesis, regarding the relationship of the console hardware and software design, has been the attempt to create the game for both an open architecture machine – the Amiga home computer – and the dedicated console games machine, that chapter (5) had seen to be accompanied with strict licencing and approval requirements. This has allowed an examination of the impacts on game design in each of these two cases and is relevant to the issues raised in (5.3.8) and (5.4.12) and (5.4.13) about competition, creativity and autonomous design decisions, which the discussion in chapter (9) returns to.

8 *Putty Squad* - A Game as a Sequel

8.1 Introduction

8.1.1 Aims of the Chapter

This chapter again examines the design of a video game from initial idea to finished artefact and has the same standardised aims outlined in (6.1.1) and (7.1.1). These are to understand:

(i) The motivations of the designer's content choices and see how these were mediated by (ii), (iii) and (iv).

(ii) The influence of the development context in relation to technology, group and organisational impacts and

(iii) The influence of the console manufacturer's licensing conditions and the software quality control and approval process.

(iv) Identify where the user or player entered into the development process and how their 'needs' were considered in design.

The additional, specific aims of this chapter are to (i) outline the factors influencing the selection of a sequel game as a project to start design and development on; (ii) illustrate what considerations were taken into account in influencing content choice for the sequel and (iii) illustrate the problems that occurred in bringing this game into the public domain. In relation to this last point, the sequel game was also designed for both game console and home computer hardware and this allows, again, a comparative examination of the influence of hardware licensing and approval procedure upon software design that (5.3.8) and (5.4.12/13) drew attention to.

The discussion in chapter (9) deals with an aggregate analysis of factors that influenced all the games in this and the preceding chapters.

8.1.2 Choosing a Game to Develop

The creation of the game *Putty Squad* represented both an economic rationale for the design firm to continue to create games for revenue for firm survival, and, from a content point of view, it represented how the development firm adapted and learned from the process of creating the first game trying to give 'people what they want' and anticipating what the audiences requirements are. How the former objective was carried out and the problems arising from it in the complex web of variables operating in the computer and video games' industry is seen to affect further the latter issue of the game's content and subsequent release.

The organisational context of the development firm, that surrounded the production of the sequel in 1993, was that the legal battle with a large American publisher, mentioned in the section (7.1.4), was drawing to an out of court settlement. The legal dispute had

drained the resources of the firm and this had affected the flow of product development and it was felt that during this period that the firm could fold:

((Roberts 1997c, p.28) Interview with Funny Software's M.D)).

"I appreciate that Activision played a huge part in helping us achieve what we did in the 1980s. They made us but they very nearly broke us as well. It looked like we might go under a couple of times but I never thought about giving up because I always trusted our ability to come up with good games."

In this context, the success of the firm's original *Putty* game for the Amiga was crucial to the firm's survival and logistically creating a sequel to an already successful intellectual property in this entertainment market (as with others) represented a relatively low risk investment of resources: specifically, in terms of time saved having to invent from scratch new characters and designing new scenarios for a brand new game and secondly having a possible receptive pre-existing market niche to target the game to.

[Did you feel this was a Funny Software game or your project?]

It was mine yeah, initially. [M.D.] said to me 'I want a Putty game - now'. He thought we could do it in 2 months and get the exactly the same audience we had for the first game (laughs). And I went along with that thinking yeah - we can ... (28.)

The viability of the sequel was seen in the following terms:

Okay, we knew we had a UK audience - a big one - and we wanted to ... we, we ... If everybody who bought the first game bought the second we'd make a lot of money - we knew that. So that initially kicked it off, (28).

From an economic point of view, the second *Putty* game was initially funded by the profit from the first game. The firm had not, at that point, a definite idea of other products it wanted to create. These factors - the available intellectual property from the previous product release, the profits from the first game, financial and MD pressure and no existing substitute project, meant that internally any possible barriers to the selection of the project were diminished.

8.1.3 The Influence of Potential Markets

From a more detailed content point of view for this sequel game, the selection process of what 'should' be included and excluded was based on the experiences of reproducing the first *Putty* game for the Super Nintendo machine and the interpretation of the poor foreign sales of the game.

"... they resented the toilet humour but they didn't mind all the violence and people being blow up and shot - that was all perfectly Okay.

So when we did Putty Squad we said we'll just go all violent, you know we'll just set it in Vietnam and its just like lots of sort of GI Pups based on American troops - sort of Apocalypse Now story line.(28).

[8] Is it? (Laughs).

[28] We thought to hell with it, we didn't get any trouble did we this time ...?.

[8] No - it went straight through.

[28] The Japs didn't query any of it - you know, so..

[Why do you think that was?]

They...probably because the Nintendo seal of quality, for instance, says its okay to have massive violence and anarchy but not for someone to pick their nose or spit or fart basically.

[How many markets would Super Putty and Putty Squads be aimed at?]

Initially when we did the first game, Silly Putty, that was aimed at the UK market specifically and it was a big success in the UK. I mean the press loved it specifically because of its toilet humour. It didn't work anywhere else in the world er ... we sold a few copies in Europe, but for some reason they didn't seem to get it... So I think the reason is Putty Squad is more of a generic platform game in that its shooting and fighting and stuff like that, whereas the first one was more of a humorous game limited to our humour in this country.

...We decided we were going to hit the world audience with this and we pinpointed Japan as a major target for it... (28).

The sequel game had its emphasis placed mainly on Japan as its target market and the Super Nintendo Entertainment System was intended to be the main or 'lead' machine, upon which development of the game would take place first and versions for other machines would copy. Because Nintendo machines, including here, the SNES had a very much larger penetration in Japan, the choice of machine for the game, and reconsidered emphasis of what the game should include to appeal to foreign markets, was seen to be an attempt to pre-empt any barriers to market entry and increase the success of the game's reception.

[Was that a conscious effort when you say that Putty Squad was more generic?]

Yes it was, it was when we designed Putty Squad we looked at all the Japanese games and we decided yeah, that they are very generic in what they do and what they pick. There's very little in the way of sort of cultural stuff in it, they're not that Japanese - maybe the graphics are -but the ideas behind it are tried and tested all over really, everybody's packed in from every country in the world basically so. We decided to go along that route to make it a more popular world-wide thing than aim it straight at the British audience again, because that's what we did in the first place. (28)

In this case then, the design was made with an analysis of what other Japanese product designs included and excluded and this was interpreted as to how this present game could be designed to appeal across global markets. This included the game involving a tactical emphasis on shooting and less so on idiosyncratic humour. In this respect then, by using "tried and tested" ideas, innovative content risks in the game's design were not chosen as a possibility. How the need for 'tried and tested' ideas impacts upon the selection of ideas for content and their implementation are outlined below.

8.1.4 Specific Details of Implementation. Negotiating the Continuity for a 'Sequel'

The original design idea for the sequel, however, had its emphasis on 'violence' tempered by choosing animal creatures in a Vietnam War scenario. So the game had two aspects of appeal - some 'violence' which was in effect shooting projectiles and also the inclusion of cartoon like characters drawn in a 'cute' childlike style that other games such as Mario had been noted for:

“The original game’s design was very Vietnam and Apocalypse Now - extraordinarily so. It had helicopters dropping Napalm it was violently extreme - you know, so... We decided to sort of have a compromise between a cute type of game and an original Vietnam concept. So the GIs in the game became the GI Pups, these little dogs, so sort of trying to be organised but they’re not - they’ve got lots of military hardware but no tactics. They sort of shoot at everything that moves.” (28).

This initial ‘new’ scenario was designed to include aspects of continuity from *Silly Putty*’s design and also from other games which affected the shaping of *Putty Squad*’s design. The player’s character *Putty* was carried over to the second game with its special moves plus the character *Dweezle* which appeared in the first game as an antagonistic character mocking the progress of the player if they failed to perform a certain action or had failed in completing the game.

The character selection, partly due to being a sequel, logically involved the character ‘Putty’ but the second character choice was influenced by user feedback, in the form of drawings and paintings, concerning the popularity of *Dweezle* and possibly could have been ignored otherwise. The aspect of this two character selection was interpreted by the designer to lend itself to provide the raw material for making a “buddy game” aspect to the design. Games that used this type of approach had the two main characters which the player could use, interacting with each other to co-operate at times so as to help the players character achieve the game’s goals and objectives. This aspect had been used, for example, in Sega’s successful flagship sequel game *Sonic 2* where *Sonic the Hedgehog* had another character *Tails* a fox that could fly using his tail like a helicopter to help him. (Other games that included this aspect were Nintendo’s *Donkey Kong Country* and Sega’s *Comix Zone*). The “tried and tested” concepts of reusing the two characters from the previous game and placing them within a co-operative ‘buddy’ play structure within the overall platform genre game design represented the logic of the development choices in planning a product design to cope with the risk of being misunderstood or misinterpreted:

“Initially we had the Putty character in the first game. He collected robots and took them to the flying saucer so he could leave the sky scraper. In the second game we thought okay we got the character - there was a very popular character in the first game called Dweezle the Cat who used to stick his head out and harass you during the game - everybody loved that cat, we got fan mail for that cat. So we thought we’ve got to give him a key position so we made it a buddy game whereas Putty and Dweezle are both on the screen at the same time, Dweezle’s computer-operated and Putty’s player-operated but Dweezle has things that you need - and you can use him you can knock him over and use his belly as a trampoline - so you have this sort of buddy action and so we had those two characters initially”. (28).

Therefore, although the two characters were familiar, their ‘buddy’ interaction was ‘new’ as it was not in the previous game but as a wider industry design concept the ‘buddy’ action was ‘familiar’.

Another aspect of continuity in design choice was the ordering of the scenario:

“Then we thought right we’ve got to put them into some sort of environment, we didn’t want to do rescue the robots again because everybody else was doing the same sort of scenario at that time and rescuing things and puzzle element - and so we took the Mario games really as a sort of example and we thought right we’re going to go into a world, a complete world this time. We decided to make it a war zone I mean its based on sort of

Platoon and Apocalypse Now and we've got a Marlin Brando type of character in the game -who's the Wizard Scatter Flash- who sort of hold up a fortress and we've got this continental war going on with these characters called the GI pups and the locals and Putty and Dweezle are just characters caught up in this war zone who are trying to reach this Marlin Brando character on this mission to destroy him and that was the scenario really.

Yeah so it was a sort of twisted children's version of the Vietnam - so instead of a machine you've got a piece of Putty. (28).

Other less central characters also did spill over from the first game and were placed in the overall scenarios - *Uncle Ted* with a new record mixing desk that plays music and arrested the movements of the players opponents for a short period of time, and the *T2000 Carrot* - an advancement of the original games *Terminator Carrot*.

The implications of using influences from the successful Nintendo Mario games, then, was the creation of a thematic space or 'world' where all the levels would be less discrete than in the original game and more logically linked. Here the game involved rescuing *Missing in Action Putties* in a Vietnam war zone occupied by characters drawn in a 'cute' aesthetic artwork style, with repetitive use of the *GI Pups* as adversarial characters with a progressively changing array of weapons across the game's levels.

In this set of decisions the 'new' game again borrows design ideas from other aspects of popular culture by parodying a film and other game designs and assembles them in a familiar pattern but using new symbolic characters, scenarios and other resources such as background art work and music etc. A more routinised, procedural account about the process of content selection in the creation of the game was expressed by a manager/designer in the firm:

"The stages in Putty Squad were quite simple actually. Stage one: come up with a really wacky environment. Did that. It was easy. Two: come up with a cast of wackier characters to with this environment. That was pretty simple as well. Samurai Chickens those things spring to mind, or they spring to our minds. Three: come up with themes for each of the levels and how they would be linked together. That wasn't too difficult. We managed that quite simply and then the killer - stage four: come up with the original elements - that's when everybody went quiet. It is after all a platform game, you run around an area or different levels, collecting objects, avoiding hazards and destroying the odd opponents. So what we thought was we need to take the mundane, because all those things are mundane and totally unoriginal and disguise the fact they are totally unoriginal....", (8).

In this way then the economic and market feedback's of the creation of the original game had created financial resources and a perceived viability to directing creative resources for a second potentially successful game; as well as providing some guidance for what the game should and should not include. The underlying arrangement of the content served to create some differentiation between an 'old' original and a 'new' sequel.

8.2 Development

8.2.1 The Labour Process. From Ideas to Software

The labour process involved in producing the game had begun in 1993 during a period of organisational change. Funny Software changed its production status from being a

publisher and developer to purely focusing on development. This transition was influenced by the increasing costs involved in game development economics across the industry:

"That was also the time when big money was being invested in development for the first time both in terms of individual projects and the purchase prices of teams."

(Roberts 1997c, p.28. (Interview with MD))

The implications of this shift in market position of the firm in its production status influenced the resources available to make the game and eventually how the game would be published and distributed.

When the sequel game was initiated by the MD, it was intended to be produced in a very short time scale - 2 months - to seek to gain benefit from the impact of the success of the Amiga release of *Silly Putty*. The actual design of *Putty Squad* and its development however, were not able to fit in with these financial constraints or time requirements.

"... but when it came down to it we wrote the whole thing and it quadrupled in size - there were only 2 artists on it, it took ages basically. We missed out on that window we had.", (28).

As the company expanded with its change in circumstances and production status, more people became involved in the creation of *Putty Squad* and other ideas were taken onboard in its design. The actual scale of the game's design play area relative to *Silly Putty* had ultimately grown to be 4 times bigger and subsequently had more than double the production costs. (Consequently, the initial funding money for this project that had been taken from the profits from the original game were used up).

The implications for the sequel's release schedule of a design choice to create a new scenario that would be acceptable to global markets and also to make the game bigger, was that a two month target became unrealisable. If the choice had been taken not to redesign the game substantially to anticipate foreign market reception to the game but to create a game which followed the previous Amiga / 'UK centric' design, then the time taken in designing it could have been shortened as could have been the case for the choice of merely adding extra levels to the first game by using the same design tools as had been used in the first game. This approach to creating video game sequels had been used in games of that period such as *Cannon Fodder 2*, (Edge Magazine 1994d, p.30). In this example the successful game did not have any radical redesign to its structure but just included extra playing areas or 'levels' for the player to continue to explore using the same playing skills and procedures learned from the first game. In terms of the potential timing of the product release, the development firm could feasibly have chosen this option legitimately to speed up the release of a product for economic revenue, *if* the aspect of differential market tastes and previous product failures attributed to the role of humour in the initial game were not meaningfully interpreted as a possible barrier. A 'quick and dirty' approach to creating add-on levels to the first *Silly Putty* design would at the very least not have been 'misunderstood' in the UK.

The fact that the global markets were constructed as 'a problem' meant that the sequel would have to take a more radical shift in its design, i.e. the approach mentioned above. This design problematic had economic and temporal imperatives for both the organisation as well as for the new product, as it meant a release into a later time slot in a changed market milieu.

8.2.2 Programming. The Boundaries between Development and Design

The initial technical restraints upon what could be included in the game were outlined in a technical story board which meant that the programmer examined the initial story board ideas for the new games scenario and discussed how big the game could be and how many levels it could include. This was used as the initial basis for creating tentative milestones to calculate costs. The limitations of what the game could include rested initially on this programmer-artist / designer negotiation. An indication of what this implies for the game's design, is that for example, the character's parameters in terms of maximum height, width and amount of frames of animation are agreed upon and used as limits for artists to work within. These graphics 'slot' into the programmer's coded routines, which ultimately articulate and manoeuvre the characters on screen. The means of carrying out the creation of the game was via a modem link between the artist/design and the programmer because the programmer lived in the north of England. The process of development and codifying the game involved a sending of graphics to and fro by modem, meant that the programmer could veto graphic designs that do not fit in with his routines' requirements:

"... we modem all the graphics to him and when he's put them in he modems the demo back to us and we play it to check it works.

[What's the drawbacks with modem mode of communication?]

Yeah, if he was here we could change stuff before we send them to him. A problem is when artists produce graphics they are usually wrong for the programmer. The programmer will usually change things and say 'you've got things wrong - you've got the wrong colour here, this doesn't fit in'.

[What difference is it to the programmer, why don't they just absorb the graphics]

Some programmers do, some will physically change the graphics to fit in. Some programmers will refuse to do that. G... [programmer] likes everything on a grid so he'll have a character and he'll like that character to fit [draws a grid and a square] and not come out of that square - 64 pixels X 64 pixels. If the character we send him is bigger than that he'll send it back.

[Is that sort of codification agreed here...]

Yes it is it agreed on the technical storyboard. We say, yeah all characters have a maximum height and a maximum width and a maximum amount of frames for the animation that's all agreed there. OK we go out of that he'll send it back and we did go out of that all the time, by accident., (28).

In this initial set up, the original programmer for the SNES version of *Super Putty* was employed again to program the SNES version of *Putty Squad*. This machine was chosen to be the 'lead' version of the project and would be used as the main program that other versions would be modelled upon for other target machines such as the Sega MegaDrive, Amiga 1200 and PC. The basis of the code to drive the routines required for the sequel had its origins in the first game and the programmer had initially transferred the same routines to the second game. Therefore from a technical point of view the recreation of the games symbolic scenario to fit in with perceptions of the markets 'needs' would have had less influence on the programming labour activity, because of the time save reusing program routines.

"...he liked reusing all his old routines you see and I didn't like the idea of us rehashing all the routines from the first game just because he wanted to. And a lot of routines were from the first game in fact 99% of them....

[Could you tell him not to reuse his old codes?]

Well we tried but as he was the only programmer on the project, programmers won't listen to an artist - we're not technically qualified therefore we don't know what they're doing really. He just says 'I've got the routines'. So I think they must be good - not knowing they were the old ones.

The situation of reusing the code changed with a shift in personnel brought in to create the Amiga conversion of the sequel.

This...as soon as another programmer was brought in he takes one look at his routines and says 'these are all shit' and this is what happened. He said 'they're all crap'. ...[New programmer]... went back to him to rewrite the routines in the way he did them then the situation reversed and he became the lead programmer and he became the support programmer OK...", (28).

This aspect again highlights how the respective skills of development personnel can create a hierarchy of authority in terms of structuring aspects of the game as well as regulating their own labour activity. The ability of the Amiga programmer to scrutinise the code structure of the SNES programmer and suggest improvements with knowledge-based legitimate authority, had therefore had the effect of changing the nature of the game's content in terms of how the program moved the characters and their operation and additionally changed the labour routine. The support programmer of the Amiga conversion now became the lead programmer and therefore rather than implement and convert another programmer's code, he could actively create new programming routines to pass on for others to implement and hence also change his labour role and status in influencing the project's working. Again this highlights the importance of the legitimacy of programmer knowledge upon implementing a game's technical code and affecting manipulation of the games content.

"Someone can come 6 months into the project like K... did - ...[Amiga programmer].. - on the Amiga version and he suddenly has a whole bunch of new concepts for game play that improved the original concepts because he was the programmer there was no problem - he could do them. Where as if L...[manager / games designer]... had come 6 months into it with a whole load of concepts the programmer would have told him to get lost but because it was the programmer himself who did, you know, we could have changed the game.. and then we forced the other programmer to change the game and he did moan a lot C...[SNES programmer]",(28).

In this way an aspect of quality control and scrutiny of the game was imposed by self-regulation by the development team. Why the change came about was explained in terms of programmer work style and the mode of interpersonal programmer / artist communication. Here the first programmer was felt to be good in implementing programmes but weak at offering design ideas in contrast to the other Amiga programmer. Also the ability of the artist to communicate to the latter programmer and to successfully negotiated aspects of compromise in the design was described as being a "hammer and tongs" style, (28). A further aspect contributing to the flow of design ideas between artist/designer and programmer here, also was facilitated by the Amiga programmer being in situ at the development firm.

Further changes to the allocation of labour to the game occurred when a novice artist was used to bear the burden of the artwork due to a labour shortage and became co-artist.

"It was a gamble. T... the boss didn't want to do it he wanted to get in an industry veteran in but at that time all the other artists were tied up with other companies and we couldn't find anybody and I was just doing it all on my own back and I hate animation and I like doing the backgrounds and stuff and Putty himself and Dweezle. I'll design the characters as a static but I hate animating. I'm a useless animator and it drains the life out of me". (28).

In this way the less creatively demanding roles or other tasks were delegated to other members of the development team.

Further work to the artwork was added by the new artist who joined the firm to do their first week's work on the game. Each of the target machines technical attributes such as individual differences in colour palette and graphical capabilities had meant that the characters had to be recoloured because the number of colours on the Amiga and MegaDrive differed from the Nintendo and PC machines. Also technical issues affected the Amiga's visible screen size which had to be shrunk in size relative to the other machines.

The work on *Putty Squad* fell behind schedule further due to the transfer of personnel to help in the creation of a licensed game to the film 'Water World' which had fallen behind schedule but had a higher priority due to the threat of financial penalties from the publisher. Other sources of labour needed to complete the creation of *Putty Squad* on Sega and PC formats were obtained by contracting external development teams to transfer and translate the original source code and graphics to the new target machine. This practice of conversions was held to be uncreative (or used in a pejorative sense to describe the ability and status of a development team) because it was felt that there was no new creative input or ability needed in the game's design:

"they don't have to think they just have to convert", (28).

However despite this, the PC version of the conversion of *Putty Squad* was felt to be the best as it was the last version of the game to be finished and had benefited in the conversion process by having very fine points of movement and detail included and was described as being "more fluid to play". Again, the conversion process had created some individual differences in the final expression of the original design.

8.2.3 Including Music for the Game

Other external labour was also needed for the inclusion of sound effects and music because the development firm did not employ a musician in-house at the time of the SNES project's creation. The same musician from the first project *Silly Putty* was again contracted to create the music for the Super Nintendo version. The final music created for the game was, however, felt to be below standard and unsuitable for the game.

It was a sort of hard-core rave music. It was very irritating to listen to and play a game with, it made the game just too noisy.

[8] Where the music on Putty 1 complimented the game on Putty Squad it contrasted to it.

[Couldn't you offer any directions in the first place?]

[28] We did to D...[musician] but he farmed it out to this other character who we had never even met. D... was just a middleman. When the music came through we said 'this is no good' and D... became very upset and it turned out, he admitted that he had nothing to do with it.

[Well how does that make you feel - isn't he under contract?]

Yeah well we fell out and us and 2 other companies - Mirage and Renegade I think.

[Why does it involve them?]

No because they used D.... as well and he wasn't supplying anything to anybody. He'd taken on so many contracts - he did Rise of the Robots, he messed up all their sound effects (laugh).

As a consequence, a legal dispute ensued which revolved around the contention that the development firm felt that the quality of the music was not acceptable and not created by the person contracted to do it - whose specific inclusion as composer was felt to be a potential asset to product quality.

He charged us his usual rate -which was very high - you know because he's a professional and he always gets a high review in the press for sound. So we paid his high rate but it wasn't him doing it, it was this kid in a bedroom who we could have paid a fraction and used direct. And we didn't like that, it's just not on,....(28).

The music was eventually included in the SNES version of the game because despite efforts to approach another musician to rewrite, deadline pressure from the publisher necessitated its inclusion.

In this respect the contracting out of the creation of music had meant that its production was not scrutinisable by the development organisation until its final submission and therefore represented a risk in product design despite efforts to manage the quality of the music by paying for a professional computer musician with a 'track record'. This aspect of the game's content was included despite the designers' dislike of it due to economic and deadline pressures.

For the PC version of *Putty Squad* the music was rewritten by a different musician who was in-house, on a part-time basis, and had a background as a professional, non-computer game musician. The PC version of *Putty Squads* music was his first production for computer games. The impact on the game's new music was that it was rewritten in a style that was less upbeat than the previous rave-style music because of his personal taste preferences.

The implications for the quality of the new music was felt to be possibly, again, not totally suitable for the game's needs as a result of the musician's tastes:

[When you ask someone to revise music what do they do?]

[28] It's very difficult because, like you say, it's hard because the example is the PC version we've just had done by our in-house musician - he's very laid back Jazz sort of character and he's never done a game before and so some of the tunes for the game we've got out of him are laid back for a game they are the complete opposite from all the rave stuff that we had on the SNES one.

[8] But they lack the excitement that you need. Rave helps.

[28] And on some of them he's gone a bit too complex as well - a lot of the time you just want a basic beat (DRUM, DRUM, DRUM)) you know and he's gone really mad - saxophones all around, well that's because what he does.

.... That's his attitude he wants every instrument known to man because that's what he wants, but that may not be what we want. Okay that's the first product he's done for us, our feel is after he's got a couple of years experience with games, like D... 's got, before he produces exactly what we want. But it's a difficult area, its always been a difficult area, you always get to the end of a project and everything goes wrong with the music.

[8] Yeah.

In this sense, having a production history / 'track record' in creating games music was felt to be more desirable as it could act as a resource to creating sounds in the game within the expectations of the form which were felt to be more compatible with games than adopting more orthodox types of musical forms. In addition communicating the game's needs would be easier. The labour background of the musician meant that the newer approach to music in the game influenced what the PC version of *Putty Squad* contained and reflects an aspect of the influence of individual autonomy over creative choices in the games at the development stage.

The financial importance attributed to music's inclusion in games as a skilled labour activity, in relation to art work, design and programming was felt not to be important enough to warrant royalty payments because of the relative duration of labour time a musician has with the project in comparison with the other disciplines. This could amount to just a few weeks' work in contrast to months for other forms of work on the game. (The limited amount of time needed for a musician on a project explains why he was employed part time and also helps explain why much music creation for games is contracted out to specialists).

8.2.4 Testing the Game

The final aspect of labour affecting the game designs working appearance and implementation was the aspect of testing. The testing phase was carried out just before the final code was finished and at this stage improvements were sought in the operation of the game. The game's tester differentiated between phases of testing by making a distinction between (i) 'play testing' and (ii) 'game testing'.

Here in this phase of the development process the game's operation was shaped in terms of: (i) how the games characters moved, refining the map of the playing area or 'levels' and their layout; where characters and obstacles appeared and their frequency and pacing. This has implications for the intensity of the player/game interaction. (ii) Basic error checking, which involved mundane searching for bugs which crash the program or graphical errors.

The influence of the play testing upon the game's operation also acts a de facto design influence because it is here where the actual rules of the game are implemented. For instance, what counts as a 'fair' collision between a projectile and the player is determined at this phase or how fast the opposing characters should be allowed to move in their pursuit of 'Putty' and therefore the difficulty of the game was influenced as well as the demands placed on the player.

The following text illustrates aspects of influence upon the game in the play testing phase.

[29]

It was slow ... it was a bit sluggish, you know everything was going in slow motion and everything and the characters were like going the same speed and it was like really boring - So like after 5 minutes I felt like I would die of boredom, err... So you've got to make it more fun, you've got to add in the bits that you know, improve it.

.... you can make game play suggestions, so you know you might not like the way something kills you like if you get hit by it straight away you die you know, so the person looking at your test report, it might sort of say, 'I don't like the fact that you died every time you hit the thing and I lost about 3 lives in 1 minute whereas I spent ages staying alive for this sort of time'

[Your 3rd section 'play errors' [I am reading out from test report] WHEN PUTTY IS IN THE POD HE SHOULD NOT BE HURT UNLESS HE IS HIT BY A PROJECTILE OF SOME KIND E.G. A BOMB OR A GUN SHOT' - So what was happening when you were playing there, was he in some sort of pod?]

Oh yeah, it involves, when Putty gets into a pod and he gets damaged by things on the screen. So say if you pass through a creature, he'll lower your energy, when you're not in the pod, but say you're in the pod, pod passes over the sprite - you start losing energy even though you're supposed to be safe in the pod you see but also projectiles should, hurt him but nothing else should, so bombs and bullets should hurt him but nothing else should.

Also, other aspects such as level design were influenced:

... sometimes you get holes that are too big and Putty can't jump over them and you can't get over them at all and you'll just get stuck and you'll die, so you have to move the blocks in bit and also they'll be places that you get stuck in and you can't get out of and also you'll fall through the map. (29).

These aspects of making judgements - i.e. how to manipulate the movement of characters and manipulate the rules of the game, were driven by a tacit understanding of experience of games played previously and served as a guide to regulate the game. The conventions of game design practice from other games serving as a rule or 'common sense' yardstick of regulating aspects of the game.

[How do you know what to do?]

How do I know? I think its a knack. I don't know- I think it's a knack anyway I don't know. I've just played games all my life and since I was a little kid and I've had things like every different system and you know, what from Atari 2600, Intellivision, ColecoVision right the way though. So I guess... I don't know and you know what works and what doesn't, OK, because like ... I don't know its common sense really. The faster a sort of robot will go the harder he is and the more bullets he shots and the harder he is etc. and so you have to work it out from points and in sort of like difficulty etc. So you have to make it more and more difficult every level as well to see if ... there has to be a good range in it otherwise it has to, becomes too difficult too fast or too hard and fast. (29).

This aspect of knowledge used to adjust the design was also complimented by more explicit knowledge based on the storyboard and the game's rules and of the operation of other games. For instance Nintendo's *Mario* was seen to be of use in influencing aspects of *Putty Squad*.

“Well you get most of the idea from the story board - what you've got to do but then when you've done that it goes on from that to other games to how well they play and how well your video games should play. I mean it depends on what kind of game it is — it's a sort of a mix between arcade and Mario or something and it was worth taking bits of that and mixing the two together. (29).

The implementation of the 'game play' suggestions were mediated by discussion with the programmer as well as being influenced *a priori* by the version of *Putty Squad* that was being worked on for the particular hardware platform. On the first issue there was some discussion over how valid it was to borrow an aspect of character movement from the Nintendo *Mario* character and apply it to *Putty's* movement.

“...there was going to be originally a run so where Putty started off he was going to start off slowly and sort of run a bit Mario-ish sort of thing but we decided to just keep it at one speed because it was too much ... too confusing and especially when you like wanted to judge things and then you'd sort of go slow, then fast, you know, it wouldn't work out, so we had a discussion about that one OK”, (29).

The method of making changes occurred together with written comments (as above) and also being in situ with the programmers making on the spot changes concerning subtle movement changes:

“Oh no I'd sit down with the programmer and I'd play it and I'd say 'Oh no I don't like that can you speed it up a little bit' you know, because its a bit slow and he'd say 'I can only speed it up by half a step' etc. or something like that and I'd say 'OK speed it up half a step, put it up another half a step or something you know' and it'll go on like that and he'll say 'Yeah that's right - keep it at that because it works really well' and then you get the right, and then there'd be other things like ermm ...when you're underwater and stuff you've got gravity and things like that, sort of part of it, how fast you fall, the way he punches and also like the way he plays on the control pad as well - you have to rearrange the keys so he plays quite nicely”. (29).

Another aspect of mediation of content related to technical aspects of the platform's hardware restrictions that affected the movements of the characters:

“... speed-wise and game-wise characters tend to ... you can do very ... a lot more different speeds in the Amiga one where as the SNES one they kept it very strict and they're stuck to using like half steps and they'll either go double or not.

[Why was that?]

Just the way the SNES was designed - So you could only build it up in large amounts so you could tell the difference in speed in large amounts you know”.(29).

Other technical aspects that affected the way *Putty Squad* would be played on its final target machine were to do with the interface or 'I/O' restrictions. This affected the method of control the player used to move the *Putty* character on screen and implement the repertoire of special functions that were part of the uniqueness of the game's design. The SNES came with a unique proprietary controller that had six buttons accompanying a cross to control movement. In contrast, the Amiga computer, being an open system, came with no bundled I/O peripheral (other than the mouse) to control game playing. Control on the Amiga was via a single button joystick was the standard design choice made by developers as it used the Atari's standard design 9-pin interface, which was widely used across home computers.

The design requirements for the Nintendo machine emphasised that all the buttons should ideally be used on its controller and therefore each button performed one of *Putty's* unique functions. In contrast the one button joystick for the Amiga version had to use combinations of joystick movements and button pressing to elicit the required function. This design requirement was felt to influence the quality of play required for the game because for the SNES version the array of buttons affected the nature of player/machine interaction by requiring the player to think about which button to press. The one button Amiga was felt to be a more effective control system:

...on the SNES one, when you were going to inflate you'd press the button and you just inflate, when on the Amiga you'd push up on the joy stick and you pump it up - on the joystick - to inflate so you'll sort of inflate up. On the SNES you just push the button instead of just pushing up so it, just you know, take a direction use a button like, if you press your finger on the fire button, you move left and right you can stretch left and right - if you take the fire button on the SNES he'll just punch. (29).

Another aspect of the machine choice affecting the respective SNES and Amiga design of *Putty Squad* was that of the issue of how difficult to make the game. The game tester's own self-reference was used to try to judge the difficulty of the completion of the whole game for a prospective player by using himself as an example of a really "good player" and if it was seen to be challenging to complete then it would be acceptable. If the game was seen to be too easy, for example completable in one day, then this would be unacceptable as the game would become boring for the player and cease to be played. The point was that the design should be skewed to encouraging repeated and prolonged play and this was a valuable criterion in influencing the difficulty of the game. This preference affected the Amiga version but the SNES version had its difficulty tempered down as that was seen to be a requirement by Nintendo for producing for that platform. This requirement was seen to be another aspect of why the SNES version of *Putty Squad* was not as good as the Amiga version.

..you see the SNES one was easier because Nintendo are very fussy about how hard games are and that's another reason why I thought the 1200 one was better because I was wasn't able to make the SNES one difficult as it could have been because Nintendo don't like games to be difficult, but for me I'd liked it a lot harder than it was because I found it quite easy, you know I mean the ... whereas on the 1200 version we were able to make it a lot harder, we made the creatures a lot tougher, you lose energy a lot faster - its much more of a challenge so its better that way but it depends on who you sort of like...Amiga are more kids that are good at games where as the SNES tend to be just players really". (29).

With regard to difficulty - which affects the rate consumption of the game - a freedom / control aspect was reflected in the way the two products were differently influenced in accordance with the platforms' open and closed architectures.

What is at stake with the game testing phase is ultimately how the player interacts with the game through the I/O system; and manipulates and negotiates character movements to meet the objectives in the game which were created by the designer. For instance, the speed of the enemy characters, if they were all uniform, would suggest that the player's sensory-motor activity be uniform to meet them. The fine manipulation of the game's characters' physical movement, within the game's rules, represents an aspect of labour that affects the implementation of the game's design and represents a large part of the game's overall content that is scrutinised under the rubric of 'playability' or 'game-play' in the press reviews or producer discussions of a game's characteristics in operation.

The specific value of testing the control and play aspect of the game in its direct impact on the quality of *Putty Squad* as a game, was seen as it related to issues of 'interactivity' and its influence on the game's 'playability'.

8.2.5 The Input/Output Device: Playing and Controlling the Game

The role of interactivity relates to how the I/O controllers interface between the player and the game's movement requirements. The relationship between the effort put into manipulation of the controls and the affects it had in controlling the game was felt to be part of the element of enjoyment and pleasure of game playing. Where the boundary and location of the source of enjoyment and player motivation was seen to be problematic was: either in the extrinsic rewards in the game and the effort it had in furthering the player in the game; or the intrinsic reward of being able to do complex movement for its own sake.

[8]...Interactivity is picking up the joy pad, pressing buttons and something happening on the screen. That's interactivity and I ... what I think you have to measure is the reward you get out of the effort you put in. If the kids are crazy at the moment about 'combos' in fighting games yeah. I can't do them. I'm exceedingly jealous of that, I can't do them. My kid can. We've got a guy here whose absolutely incredible I mean he's 9 key combos in Street Fighter he's awesome to watch. Is the reward in mastering the combo or beating the opponent. Where's the reward point? I don't know. I know people are very proud of being able to do these combos but are they proud of the end result it achieves? or are they just proud in the action of the end result it achieves?

The control and movement aspect of 'interactivity' in the 'game-play' for player enjoyment of *Putty Squad*, tied in with the ability to enjoy the game's play objectives in the design. These related to both character movement and exploration of space:

Playability I interpret as excitement. There has to be a wow factor for me. (8).

[What was that in Putty Squad?]

In Putty Squad it was really mastering the control of the main character because once you had, you could get to other areas of the main screen that you could never get to before and all these extra spaces were not necessary to complete the game they were just fun to go to. Also there was, yeah in the manipulation still of the main character getting it go was a reward in its own right. It just felt good to control it. (8)

In this sense enjoyment and player motivation both tied in with exploration and character control.

Knowing when a product had such qualities however, was only knowable via playing it directly itself and even then the issue was felt to be subjective and extremely difficult to pin-point for developers:

... game-play can't possibly be one thing. I think game-play is the sum of many things. Many of them we don't understand. I know that doesn't help you in the slightest but .. I could pick up a game and I know if its playable and I think I know if its playable for other people. I could pick up a game and tell you if it's unplayable for other people but there is a grey area. There is an area where a game can appear initially unplayable or difficult to control or difficult to get into". (8)

Trying to decrease the chances of making a game too difficult or 'unplayable' for the user meant creating an initially easier initial section to the game.

Now we certainly try and make the first couple of levels of a game very simple. We always believe that was the right way to go. We don't kill people off too soon. We want people to get further, we don't want people to get trapped on the first screen. And it's a very easy trap to fall into. It's easy to make hard. It's very easy to make a game hard, you just pour in a load more sprites, slow something down or speed something up, it's dead easy but to make it enjoyable is difficult. Playability is definitely a lot of things, it's, for me, it's being able to pick up a game without having to read a manual.(8).

The whole aspect of regulating movement in the game (as with other games) was tied to sensory-motor, spatial and non-verbal knowledge that made detailed description and regulation difficult to ensure could exist in a game design and make creating successful games difficult. How effectively this phase is attended to has a big impact upon the game's reception, as if an error was perceived to have been made - i.e. the control system being perceived to be ineffective or too difficult to use or the game too difficult or easy, then this is seen to be a hindrance in the man-machine interaction which takes place during the play process. Therefore despite occurring at the last phase of the development process and being (often) delegated to personnel with little technical ability, other than in experience in playing games, or as a first post in games development, it represents an important part of product development.

The bulk of the effort of the testing phase went into searching for 'mechanical' errors in the program's operation:

[(Reading from the test report) ' WORDS LEVEL COMPLETE APPEAR AFTER YOU FINISH A LEVEL ARE TWO BLOCKS LOWER THAN THEY SHOULD BE'

*'ALL STAR **** BLOCKS ARE 1 PIXEL TOO FAR TO THE LEFT' - what's happening here?]*

So it means when you've got a little block which you knock up for a prize, you can see a little hole between the map and the block, 1 pixel thin and you think, 1 pixel no one will pick it out - they did because the parallax will be flashing behind it. So it's just mistakes really,(29).

8.3 To the Marketplace

8.3.1 Managing the Diffusion of *Putty Squad*. Media Tie-ins

At the point of conceiving *Putty Squad*, the creation of complementary cultural media were considered that presented the game's character across other entertainment formats. Initial work had started on creating a cartoon strip, which aimed to be included in a newspaper, but this project was discontinued after a lack of sustained interest internally. Additionally a Japanese toy manufacture, (responsible for the successful toy character T.V. tie-ins of the Power Rangers and Teenage Mutant Ninja Turtles) was contacted with the idea of creating toys based on the game. It was felt, however, that the character was not popular and hence recognisable enough across global territories to make its production viable at that point.

"..we did talk to B...[Japanese toy firm] at one point about marketing some toys but again their reservation was that the world-wide appeal wasn't there yet for that product. If we ever crack the world and I think the only chance we ever will is the PC version, maybe something will happen one day..."(28).

The proposed IBM P.C. version of *Putty Squad* (which was having its conversion completed at the time of interview at the end of 1995) was felt to be a possible format to help the adoption of the game across a wider audience across territories to make spin-off toys viable. Further, a record was planned to complement the game. This was intended to be a 'novelty record' to tie-in with the computer game similar to *Mario Brothers* and *Tetris* records that had been released earlier in the 90s.

The record was intended to be accompanied by a video showing parts of the game in it. In contrast to the toy manufacturer's judgement over the viability of toys based on *Putty Squad*, the response of the record company that was approached, R...Records, was felt to overestimate the viability of a prospective record.

"Well we were planning upon incorporating the game into the video for it, that sort of thing. We were going to have the guys singing the record for it actually in the game running around but I had my doubts. I think the record company had put too much emphasis on that the game was already a known product like Mario or Sonic. I don't think they actually realised he was a pretty unknown character - Putty and to most the general public, they wouldn't know what the hell it was. I think they were a bit ignorant in that respect". (28).

The negotiations between the game development firm and the record company fell through due to communication problems relating to different attitudes to the differing media logic regarding ownership and control over intellectual property.

[28] *"The guy who did the single for Putty touted it around and R...Records wanted to release it but we fell out with them on day one, almost as soon as we met them.*

[8] *They came in with an attitude, and as you noticed, we don't respond very well to people with an attitude.*

[28] *That was the first sort of time the games' industry had met the record industry and they didn't like each other at all. They had no common ground at all.*

[What sort of things would they have wanted?]

[8] *Well they came in with all this preworked out rights' assignments and you'll get this much money when we say so and [MD] sitting on the other side of the desk going 'who's this ...,' you know 'who the hell does he think he is coming into my office and saying that he's going to do with my product - tell him to get out'. And so it was bad... from within 5 minutes it had gone really down hill. A big wall went up between us and we didn't make any effort to scale that wall".*

The final release and development of the record beyond its demo form was dependent upon the prospective publishers of the game's need for it in their marketing campaign - (subsequently neither publisher Ocean nor Acclaim, required it and a final copy was not created).

In each of the cases of the prospective comic strip, toys and record, an extra organisational alliance would have been necessary to propagate the game idea to other cultural forms to help diffuse the game's symbolic content across -literally- 'multi-media' (many media). The specialisation of the firm so as to focus on development only, necessitated that that they were dependent on other firms to help create and diffuse these products but also represented a new area for other media firms, such as toy firms, to derive potential product ideas, i.e. from computer game creators.

More obviously, the strategic implications of switching to becoming solely a developer organisation meant that third party publishers would be needed to publish the game and represented another aspect of extra-organisational influence upon the game's creation and ultimate availability.

8.3.2 Publishing *Putty Squad*

The involvement of the publisher 'Ocean' in the creation and release of *Putty Squad* represented an aspect of the contingent nature of firms operating in the video games' industry and from the development firm's point of view, in trying to complete the game and find the consumer, it demonstrates an aspect of serendipity in the attempts of firms to form release strategies in a volatile market sector.

The publisher's release strategy in 1994, the year when the market was experiencing a severe downturn (as noted in the previous chapter), was to seek to gain market share by increasing the number of titles it released as part of its catalogue. The situation created a window of opportunity for the game's release because it guaranteed that there was a cash injection to finance the remainder of the game's development (as the initial funds taken from the first games profits had been exhausted) as well as a publisher to release it out to market for the Sega and Nintendo versions:

"[OK. So the idea of Putty Squad coming along, you said you learned from Super Putty, you wanted a wider audience, at what point does Ocean become involved?]

[28] They picked up Putty Squad on the consoles. Ocean basically at that point, they at that point were buying anything on the consoles from anybody. They wanted to have every console game that was being generated in this country to be released by them. Big, big, big mistake.

[8] When the market declines, one of the tactics you can use is to become the single biggest supplier in that market, thereby you exert control over the market hoping you restabilise it and that was Oceans plan. They bought 16 titles of E[lectronic] A[rts]. and they were complete ...

[28] At EA. they were falling around p... themselves laughing, they had all this... a barrel load of shite they couldn't release or they were told not to release it because it wouldn't sell and they managed to off load it on to Ocean

[8] Ocean bought the lot

[28] For a huge amount of money and Ocean were just sending their agents around everywhere picking everything up.

[8] We thought, we'll have a bit of this (laughs).

[28] We thought 'Yeah its good' because we were getting very worried at that point that the market had collapsed from under us on the consoles and we had no hope and so luckily they paid up for all our expenses and the cost of the product. We put our store in the PC and Amiga version, okay Ocean have done their bit, they've flooded the market, they've cocked it up for everybody and there's still Ocean stock piled up in warehouses of all sorts of titles, piled up everywhere, it's not getting into retailers because the shelves are still blocked with Ocean stuff from last year - so they've shot themselves in the foot here".

The final aspect here reveals that the publisher's release strategy for the cartridge version of *Putty Squad* had a flaw, in that unwanted games became stockpiled which

affected demand for subsequently acquired games. Additionally, a possible weakness in the publisher's acquisition of *Putty Squad* for its catalogue of cartridge games for 1995 release, was that towards the end of 1994 the publisher had already announced and had acquired *Jelly Boy*. This game was held by the designer of the original *Putty Game* to be a derivative, as it featured a similar malleable shape-changing character in a platform style game. *Jelly Boy* had been reviewed prior to the release of *Putty Squad* (Games Master 1994, p.60), and was also displayed by the publisher at the Autumn 1994 European Computer Trade Show (Computer Trade Weekly 1994c, p.49). With the backlog of unsold games and slowing demand for cartridge games in 1994/95 onwards, (see section 2.3), the prospect of two games with a similar character and style being released by the same publisher seemed to be illogical in that the two would potentially compete with each other for sales.

8.3.3 The Amiga as a Target Platform for *Putty Squad* in 1994

Although the Amiga version had been completed first and reviewed in 1994, (McGill 1994), it had its release held back until the other versions were complete and these subsequently were expected to be released by another publisher. Acclaim, (the same publisher as *Bloodshot* in chapter 6), had expected to release the game on Amiga and PC formats in 1996.

According to a survey of 20 publishers, by 1994 the Amiga represented 20 to 30 percent of the polled publisher firms' game sales and this was expected to dwindle by 1995 and to be "*totally gone*" by 1996. Where firms were still expecting to publish and create games for the Amiga it was perceived as a tool to test the market for potentially more lucrative console hits. One publisher noted:

"You can only make money in the Amiga market if you have a big hit and even then you can't make much".

(Channel 4 1994, p.471).

This was in comparison to the IBM PC compatibles that was being seen as the most viable home computer to produce for, due to its "*true expandability*" and "*world-wide compatibility*" (*ibid.*), which emphasised the increasing trend of global operations of publishers' production strategies.

In this respect, the profitability of the Amiga, as a perceived viable format to create games on, was losing support with the major publishers on an aggregate industry basis. Additionally, the financial status of US parent part of Commodore and piracy issues were seen to be relevant factors in declining to continue to create games for the Amiga.

The Commodore Amiga 1200 as 'a home computer' as opposed a games console, was by 1994 not exempt from a weakened market position as the parent US arm of Commodore had entered receivership in 1994 and the Amiga 1200 was not produced for a period of over one year until the UK arm was bought by a German P.C. manufacturer, who also acquired the rights to the Amiga technology. As the A1200 had been released in the end of 1992, its installed user-base was smaller than the A500 and therefore developing for this machine proved, in hindsight, a strategic weakness given Commodore's demise and the holding back of the Amiga version of *Putty Squad*.

8.3.4 Finding the User

A Japanese third party publisher undertook the Japanese release of *Putty Squad* and as mentioned earlier in (8.1.3), the market was a primary focus in the game's release strategy and had influenced the game's content choices. It was felt that the Japanese firm had trouble trying to understand the game's aim and had changed the game's name.

"...we pinpointed Japan as a major target for it - which I think possibly was a mistake because the Japs didn't understand it at all. We sent them a demo version and stuff. They changed its title for a start, they didn't understand Putty Squad they'd called it Putty Tears. (28)

[Putty Tears?]

Yeah (laughs)

[And that's Nintendo's decision was it?]

No that was a Japanese 3rd party publisher.

[8] They couldn't understand the word 'Squad'; it didn't work for them.

[28] Then I think they started to wonder why there was so much carnage with those people dressed up as American GI's with Bazookas in what was meant to be a cute game. Yeah, they didn't understand the concept totally."

This reflects part of the problem in trying to create entertainment products for a foreign market. This issue is continued below in the final section.

8.3.5 Magazines. The Relevance of the Games' Review Press to Product Diffusion

An element of aiding the prospective diffusion of *Putty Squad* was the emphasis put on the magazine review of the game. The need for a promising review reveals the strategic importance developers place on game magazines' reviews in game development, (as well as highlighting their own understandings of industry structure interrelationships affecting the successful release of *Putty Squad*). Additionally it highlighted how it is felt that a good or bad review affects a product's success.

From an industry structure perspective, it was felt that the role of the game review held influence over the game's selection for distribution. This was because reviews were seen as a source of information informing distributors over what product was worth stockpiling for sale to retail outlets.

[How responsive are market sales to reviews?]

[8] Right, there was a time as this industry started to go through a lot of troubles, a lot of inventory floating around, there was over production and there was a lot of product of very questionable quality. The distributors started to go through the magazines and started to just pick out product that was scoring high and would only order quantities of that product. They would then hard sell that to the retailers, obviously to make sure they got rid of it all. This meant that there was a sort of a grey area of product that wasn't being properly handled in the industry. The 75-85 percent product was being passed over, and that's not really fair".

The implication was that the overall percentage score a review gave a game was felt to affect the game's selection by distribution. Historically the distribution network had taken over mail order as a form of selling games and their presence was felt to act as a

serious buffer between the audience and the retailer and the publisher. A small number of distributors selling to high street chains and independent computer retail outlets were seen to be controlling the main selling focus of publishers and they could demand up to 50 percent discount on products.

"They are a necessary evil, distributors, but we haven't had real contact with the retailer for years. So it could be argued that do we create games for distributors which is two levels away in effect from the games player and its a very serious question that we've asked ourselves". [8]

Given, this the role of a good review was seen to be vital. The adequacy of reviews to adjudicate the quality of a game, however, was felt to be flawed, as it allowed scope for journalist bias in assessment and mistakenly attempted to put a quantitative value on abstract phenomena such as a game's 'playability'. Tactics open to influence the reviews of games included scope for offering incentives to journalists to look favourably upon a game:

[What's the implications of having good links with magazines?]

[8] Essential. They will crucify you or praise you its very difficult to tell which. We try and work to a philosophy of only ever putting out product that reviews 88 percent or better and we've been very, very consistent with that, very consistent indeed. Now we have been accused of manipulating the press, we've never ever, ever bribed the press,

[Could that be possible?] yes.

[You can pause it if you want]

[8] No I don't mind it, We've never bribed them and we've never handed money over and we've never handed over a gift. But we did take 7 of them half way round the world to Bangkok and they stayed in the best hotel in the world free of charge for 4 nights. That's not a bribe, it's a thank you. It's just a question of words isn't it really and definitions?

Also another perceived bias in the journalist reception of games was felt to be in the area of personal taste preferences of the journalist that predisposes them to be biased in favour or against a game designed in one genre or another.

"I know for a fact that magazines don't pick reviewers for specific products. They don't say right, 'He's an RGP player so he's only going to choose RPG games.' It doesn't happen like that. He could review a platform game one month and he could be no good at it, and if he's no good at it he's going to mark it down. You get another reviewer and he's really quick and he picks up the control method instantly he'll give it a big score. Now does that mean that the game is good or bad? I don't know". [8]

In this respect it is suggested - as before with the issue of accepting game concepts for developing and publishing - that scrutinising games needs a specialised knowledge base in order to evaluate the merits of a game. Given this perceived non-objectivity a tactic used by the development firm to try to influence the press reception of *Putty Squad* was to clearly demonstrate the full depth of the game's design to journalists.

"...You can actually fool the press. We did it last year with Putty Squad . I broke every rule in the book with that one on the Amiga.

[Describe the design]

It was a platform game, probably the best of its kind on the Amiga, beautiful graphics and there was a lot of playability, real playability of the old type. You know. Good product and it was certainly an 85 % or better product. I think I managed to get 90s and upwards on it. I did something I've never done before which was, I went to the journalists and I said 'What do you want? Do you want me to come in and sit there and play it for you? Do you want me prepare a demo of the first half dozen levels and put a cheat in so you can go anywhere on the screen and see anything or what do you want?' And they said 'We'd like a two page detailed description, a page of features, 20 slides or screen shots and a video of the whole game being played'. And that's never been done before. I said 'you're on'. By giving the journalists what they wanted we got what I believe was an extra 3-4 points on the average score. I didn't feel too bad because it's such a good game but I could have applied that to a bad game and applied that to reasonable game and that's what marketing's all about."

In addition there was a demonstration (demo) release of the game for the Amiga on a cover disk of a magazine which carried a few levels of the game to demonstrate it to users for potential purchase and pre-purchase sampling.

8.3.6 Reviews of *Putty Squad*

The Amiga review of *Putty Squad* came out in September 1994, a year before the SNES and MegaDrive reviews of the translated copies in June 1995; (e.g. Games Master, September 1994, issue 21, p.54-55 (see Tucker 1994); Amiga Format, September 1994, p.50-51 (see Ellis 1994); Games World, June 1995, p.79/81). These focused on the aspect that this game was another product designed in a platform style and that the character designs and play objectives of the game were novel enough in this respect to differentiate it from others in a saturated market. For example: (McGill 1994, p.51) *"Platform games are ten a penny nowadays"* and categorised it as *"just another platform game"*.

One review did stress that, in relation to its prequel, there might not be enough new here relative to the first game to justify the sequel game's purchase - therefore not reading the designers' intentions in the differentiation of the content or the game's increased complexity of aspects of the game's play action. For instance, the inclusion of *Dweezel* the cat as a 'buddy' to assist the player's character, or the availability of the 'pod' could quite feasibly have been focused upon as unique points that were significantly 'new'.

"[Funny Software] have followed up their first Putty game with more of the same, which is either a good thing or a bad thing, depending on your politics. Good if you loved the first game (like me) and wanted to play some more of the same, bad if you thought the original was, er original and that more fresh ideas are needed to make the follow up worth purchasing".

(Tucker 1994, p.54).

Therefore the critical function of the comment in the review was to address the problem that cultural producers have regarding the issue of how sequels should be designed in relation to their original material in order to create a 'new game' whilst still containing an element of recognisability and continuity. Secondly the review placed the Amiga release in a context of evaluating the game's aesthetic design in relation to the political economy of computer hardware firms operating in the video games market:

"...This proves that the Amiga can handle what the consoles do best, i.e. cute platform games. Putty Squad is visually stunning and plays like a demon once you get into it... with all the troubles the Amiga is having lately its great to see that top games like this can still appear. Well worth getting".

(Ellis1994, p.55):

The Amiga and PC versions ultimately was never released as planned because the prospective publisher for these versions, Acclaim, had cancelled their release in 1996, (Flaherty 1997). The publisher had sought to focus their resources on only releasing key high profile titles after experiencing financial losses incurred from a strategy of trying to remain in the cartridge-based games' industry despite the downturn in that market, (as noted in 6.5.3).

8.4 Aftermath

8.4.1 The Post Release Feedback of the Game and its Interpretation. The 'Problem of the Audience'.

The feedback from the release of *Putty Squad* was mixed and reveals the difficulty of the development firm's attempt to try and predict the nature of demand for the sequel in terms of content requirements for entertainment products in foreign markets.

An aspect of the release of *Putty Squad* that was felt to be a possible strategic mistake was its targeting primarily at the Japanese market. The understanding of Japanese players and their wider culture and the understanding aspects of their popular cultural trends was felt to present a problem. Specifically, this had entailed a design choice in producing the graphics in a 'cute' style that had been associated with Japanese games such as Mario Brothers. (The 'cute style' of artwork depicts pre-pubescent art work with child-like characters having a 'sweet' baby-like appearance with over-proportioned heads and eyes, with black cartoon like outlines around the characters, which typically are representations of baby animals or non-realistic characters in pastels or bright primary colours). Here the interpretation of this style for the character graphics used in *Putty Squad*, for example, could be seen with the most numerous characters that the player's character faced - the 'GI Pups' - meant that soldiers in the war zone were represented as puppies dressed in green US army style clothes and armed with military hardware.

There was some puzzlement why the style used in the game may not have been successful in the Japanese territory:

[8]" Which is odd because when you look at Japan, 'cute' is a religion. You know its bizarre because we've completely missed the essence of what they see as 'cute'. Whereas we thought - you know..

[28] We thought we hit on it a lot. I think the problem of Putty Squad was the military angle of it. It was very military, all the nasties were organised into battalions and units and had all this military hardware and American GI helmets and all sorts of stuff. I don't think they liked that. I think it was out of their imagination, I mean they like everything cute and pink".

The post-release rationalisation of why the game may not have been successful in Japan, then was felt to be the misunderstanding of the contrasting military aspect of the game and the 'cute' style. Possibly the whole game, if it was to have succeeded in the Japanese

market, would have ideally had to include the main character in a totally 'cute' game environment. The other territories, however, were felt to have found the game's design acceptable.

[28]" The Americans liked it though, they've gone for it but they didn't like the first one. So I think by accident we appealed to them there.

[8] We certainly broadened our market on the second one, but its more acceptable throughout Europe and the Americans like it, but again we completely missed the Japs and their mentality.

[What is their mentality?]

[8] We don't know.

[28] We've played lots of their games,

[8] Yeah we like their games

[28] Everything is very fluffy and I don't know it sort of nursery-like ... you know, it's ultra ultra cute ... minimalist. In Putty Squad there was too much going on. It was too frantic, lots of violence, explosions. There was this cute little character but everything else they hated and I mean, I think it was...they just didn't fit in with that at all, they didn't latch onto the idea of a Pythonesque environment.

[28] Putty turned up in Japan in a form, I mean the Puyu Puyu games which were basically bits of Putty jumping into a bin and merging together. I mean the character was Okay I think if we put him into a character with everything fluffy then..."

The producer reading of Japanese popular culture was that it was felt to be very difficult for western firms as only a few western games were seen to succeed in Japan. Yet, Japan was seen at the same time to be a "fun factory" (28) in terms of their production of games successful world-wide. Additionally other innovative trends in Japanese popular-cultural consumer goods such as the Japanese 'Manga' comics and the role of implicit pornography in the art work also proved an example of how unique Japanese consumer culture was and why their market trends were problematic to understand from a western point of view:

[8]" I always have a problem with a nation who, as I say, has made a religion out of 'cute'. You know young Japanese girls will wear pink Walkman covers and matching pink shoes. No other race I know of will match their bloody Walkman covers with their shoes, you know. It is painful this cuteness that they go for. But the other side of the coin is that they have the most perverse obscene comics in the world.

[28] There're too bizare for us Europeans and Americans to work out".

This final aspect does raise an interesting trend in the diffusion of popular culture from the west to east and visa versa with the influence of Japanese entertainment forms upon the west such as 'Kareoke' and 'virtual pets' and possible concerns firms face in interpreting, (and possibly mimicking), it in their own cultural goods to compete in terms of design fashions and trade. *Putty Squad* with its design emphasis on 'violence', i.e. shooting elements that were seen to be acceptable to the Japanese market after the subsequent redesign of the first game on the SNES; added together with the 'cute' artwork and from scrutinising other market titles that had been successful in Japan, was possibly felt to have made a strategic mistake in terms of skewing its design to maximise sales in the Japanese market. The US release was felt to appeal "by mistake" (28) in terms of reception from reviews but the collapse in demand for cartridge-based

games meant sales were poor in the US, (Roberts 1997c, p.27), with European sales faring better in the context of the industry's state.

8.4.2 *Putty Squad* and the Market Environment

The whole strategic role of *Putty Squads*' creation and subsequent plans for release were different in practice from the initial planned intentions when the development and design started in 1993, i.e. an intended short development schedule to capture the preformed *Putty* market and access multiple hardware formats in Japan, the US and Europe.

The delay from the planned quick release of the sequel product caused by creating a much larger sequel meant that more expenditure was needed to complete the game as well as increasing the time before any returns in royalties were made. The input of development funds from the publisher for the cartridge-based versions of the game for the SNES and MegaDrive had proved fortunate (given the fall in sales of games in the cartridge sector) and meant that the game could be completed as a fully designed and running game. The released product as a commodity good however, while reaching the market on the console platforms, had a much diminished market share to compete for potential sales. The planned release across a range of machines was also inhibited by the fact that Commodore had entered receivership and the Amiga's production was halted.

Both the PC and the Amiga versions were subsequently not chosen for release by the publisher Acclaim who acquired them, because of its own financial troubles instigated by writing off over produced cartridge stock and changing its release strategy.

The release of *Putty Squad* in the Summer of 1995 had meant that the games it would compete against for sales within its design category were more advanced in technical content than they would have been had the game been released earlier - either as a very quickly developed game or as the intended SNES lead version (if it had been completed first, as intended), or on the Amiga version on its own in 1994. Examples of successful media revered platform style designed games such as Nintendo's *Donkey Kong Country* (with its unique selling point based on the use of advanced graphics' technology and additional chips on board the cartridge to run the game) ; or 'Earthworm Jim' (with its unique fluid animation style of cartoon movement), were prime examples of quality competition that *Putty Squad* would face as it vied for purchase by users within that subgenre of cartridge game.

Given that demand for cartridge-based games was diminishing from 1994 and 1995 and that a small minority of 'blockbuster' or 'triple A' high quality games - such as *Donkey Kong Country* - absorbed a very high percentage of sales, crowding-out demand for other titles, and sold for a relatively longer time than other titles and had a demand that was relatively price inelastic, the timing of the release of *Putty Squad* was not an advantageous one. Additionally the perceived misreading of the nature of taste preferences of the Japanese audience had meant that the intended target market territory for *Putty Squad* had not been successfully reached as the prophylactic content and design strategy had tried to anticipate.

8.4.3 Summary

In summary, the initial strategy of the development firm for the design and release of *Putty Squad* had been shown to be significantly revised and readjusted. This was due to the consequences of extra-organisational events in the overall demand for video games

and the consequences and reactions of other actors in the industry to this. Ultimately this affected when the game was released, on what formats and to which audience.

Recounting the creation of two *Putty* games revealed insights into the process of initiating a game concept or idea and its creation by a third party developer and publisher. The game's success and attempts to recreate the conditions of its success and expand upon it by trying to find a wider audience by redesigning aspects of the original game was outlined. This sought to represent familiar aspects of the original game in a known, tried and tested genre and reconcile this with relatively new elements, such as a mixed scenario with new elements in the design to distinguish it from the original game as well as from other competing games.

Additionally, this account showed how a seemingly straightforward attempt to bring games to market were complicated with the interplay of macro- and meso-social factors that had created intended and unintended consequences upon the game's trajectory of development and release. Paradoxically these served to: delay the game's development, provide opportunities for improving aspects of the game design, or diminished aspects of the quality of other versions of the game's content; inhibited the game's release on some formats and yet allowed the game's ultimate completion and release. The element of randomness of events and opportunities provided gateways of opportunity and barriers to the provision of creative and material resources to bringing the sequel game to the player.

The next chapter contrasts the case study game's creation and draws insights from the creation of games from other designers in other firms to broaden the discussion with the identification of recurring themes and trends.

9 Discussion

9.1 Introduction

9.1.1 Objectives of the Discussion

The objective of this discussion is to examine points of similarity and uniqueness in the in-depth case study accounts of the design and development process of the three games: *Bloodshot*, *Silly Putty* and *Putty Squad*. In addition to the cross comparison of the three games, references are made to the creation of other games from the other research interviews. This is in order to give breadth to the discussion by relating issues to the creation of other types of games, by other firms, and accounting for broader industry developments. The discussion relates issues raised in the theoretical part of the thesis in chapter (3), by accounting for how games emerge along their technological careers and interact with heterogeneous social groups. Therefore, the discussion identifies these relevant groupings and the political implications of their agendas and interpretations of the game. Of special reference in this work were the relevant groups or influences that were identified as the thesis objectives given in (3.4.6) and at the start of chapters (6,7 and 8). These related to the understanding of:

Objective 1, the motivations of the designer's content choices and see how these were mediated by the following:

Objective 2, the influence of the development context in relation to technology, group and organisational impacts

Objective 3, the influence of the console manufacturer's licensing conditions and the software quality control or approval process

Objective 4, where the user or player entered into the development process and how their 'needs' were considered in design.

This demonstrates the relevant social group interactions upon the game's design as it "*firms up*" or stabilises as choices are made out of a "*garden of forking paths*" to create a technology belonging to the group of artefacts or 'product space' of 'video games'. By examining the problematic nature of the choices made in design and development and examining what content is also excluded, this chapter illustrates Bijker's concern over alternative design possibilities for the product space of 'video games' and how else "*they would have been otherwise*". A leitmotif of this discussion, consequently, is a de facto definition of what constitutes video games as a category, as a consequence of the interactions between relevant social groups. (See 3.3.8, 3.4.1/2 for definitions and source of quotes). In doing this, the social construction of this leisure technology is elicited and reveals how issues of power and authority revolve in and around the emerging technologies. Subsequently the technology in itself becomes a 'political artefact' and/or possesses a source of power influencing its use – (as in line with Winner's (1985) observations about these two dimensions of power concerning technical artefacts, (see 3.4.1)).

9.1.2 Structure of the Chapter

For ease of analysis, the discussion of the process of developing the games is split into three sections. This typology of the development phases uses the terms:

Phase (1), The Imagined Game

Phase (2), The Crafted Game

Phase (3), Releasing the Game

These divisions are not totally clear-cut, as aspects 'blur' into each other occasionally as recurring issues were tackled in non-discrete ways at various times along the products' 'careers'. Given this, however, there are themes that are stable enough to give a general ordering of the development process for each of the three games in their attempts to allocate resources to their designs. At the start of each phase the key theoretical issues, interactions between relevant groups and salient industry issues are highlighted to help give order to the complex themes that arise. When the case study games' illustrate issues that are relevant across the industry, the discussion deals with the theme there and then. It was felt that abstracting the issue or problem in a separate section would weaken the discussions' structure in the attempt to capture the continuity of the three phases. Therefore these wider illustrations should not be seen as tangents but embedded issues that influence product design. Where issues were relevant to illuminating the more specific objectives 1 to 4 above, these were noted in bold within the text.

9.2 Phase 1 of the Process of Product Innovation In Game Creation: The Imagined Game

9.2.1 Product Initiation

The first phase of examining the case study games' origins contrasts how resources came together. This comparison between the three games is done with a view to understand the implications for content selection. Secondly, it sheds light on how the initial intentional design ideas for the games were formulated at this stage and what influences were impacting upon the game and from what source. Subsequent sections of the discussion go on to examine the influences on the games' pathways or trajectories in their development 'careers', as their content configuration stabilised. Finally, the options available for the games' configuration that were closed off are considered - i.e. by attending to how "*they would have been otherwise*", Bijker and Law (1992, p.9).

The institutional pre-conditions that existed throughout the industry - regardless of what specific games ideas were initiated - are discussed. These have implications for what resources were available for the games and what influence the pre-existing organisational relationships had, over and above the specific demands of the game's content.

The creation of each game's content took place over different time frames and in organisational contexts that themselves were facing specific conjunctions of historical relationships or networks and competencies. These have a bearing on defining what ideas could be initiated and how they would be subsequently initiated by semi-autonomous actors, in the actual creative process. The key theoretical issues relevant to this section are to note that phase (1) relates to Silverstone and Haddon's macro-social stage of the innovations process, (3.2.2). Of special note is the emergence of the alliances between the relevant social groups in sections (9.2.3/4/5/6); the issue of the imagined user noted by Silverstone and Haddon, and Woolgar (see 3.3.9) in sections (9.2.7/8); and issues relevant to the defining content of the product space of video games - in sections (9.2.9/10/11/12/13).

9.2.2 *CyberPunk, (Bloodshot)* as an Imagined Game - Phase 1

Rocket Software's own historically situated nature as a computer and video games publisher with a relatively new development department in-house, had meant that the resources and networks to create and diffuse the new game were in place before the game's idea had even been initiated in its primary form. In conjunction with this, their programmer, artist and musician were personnel in situ having worked on pre-existing projects. On an organisational-production strategy level, the publisher's product release output at that point, had put priority on producing games for the Sega MegaDrive - over 6 million pounds of its 8 million revenue were derived from (mainly) Sega video games in 1993 which gave an indication of its dependency on the market sector - (HMSO 1995, p.123).

9.2.3 Organisational Alliances - Preconditions

The MegaDrive's large installed, demographically pre-defined user base that Rocket Software was targeting meant it was committed to the institutionalised relationships between the organisation Sega and its licensed hardware. This pre-arrangement formed an aspect of the network of actors that the game's development process could not alter once the hardware choice had been made. This restriction was in terms of the power relationships that constituted use and approval of the game that the licensing agreement set up. It included conforming to parameters at the start of the project, to the basic technical specification that the MegaDrive had and with which the software and game specification would have to comply. Secondly, the legal-financial relationship between Sega and its third party licensees were prearranged due to Rocket Software's release strategy that sought to benefit from the monopoly over supply that Sega provided - including, for instance, the logistics and financial arrangements involved in cartridge production. The implications of being a licensee and 'locked-in' to a pre-existing extra-organisational source of power and influence over: target machine choice, ultimate software approval, quantity and price of the commodity, as well as initial concept approval of the design (which initially was not exercised here). This then was the pre-existing infrastructure that the game was to be developed within.

In conjunction with this, Rocket Software's own autonomous and historical strategy of product release had made use of licensed properties as a way of associating game designs with other symbolic media. Therefore the licensing agreement with the film firm Tame Films to recycle symbolic aspects from the film *CyberPunk* led to a prospective game idea that was in line with the strategy and introduced another extra-organisational source of influence over the game's content.

Both Sega and the film firm's involvement in the constitution of the game with the development firm provided, (a) hardware and software know-how (b) an installed network for releasing the game to and (c) the latter firm's licensed science fiction resources from the film which closed off options for the games initial trajectory of development direction.

For instance on points (a) and (b), had Rocket Software chosen a strategy which emphasised Nintendo or Amiga products solely, than its potential network of users and their market and demographic profiles, as well as technical restraints and resources, would also have had relevance for the parameters placed upon the design activity - (e.g. the 3D viewpoint's choice, which was seen as relevant relative to the MegaDrive's catalogue of pre-existing games). On point (c) the film company's genre

of science fiction film also set some pre-conditions for the game in terms of providing its own conventions in its narrative for potential use with the game's plot.

Although the idea of a new game from a licensed science fiction film would provide a new intellectual property for the firm to exploit, the trend of licensing from action films was standard practice in the game's industry (see 9.2.11). A more unusual exploitation of a licensed property could have occurred if the subject matter was different - such as a love film or musical (as with *The Rocky Horror Show* in interview (19)) which would have been a rarer subject choice. Yet the bias towards action based films and game designs give an aspect of compatibility in transferring their symbolic content given the visual emphasis on special effects and motion that both entertainment forms emphasise.

Therefore in this sense points (a), (b) and (c) represent aspects of extra-developer organisational influence that the design and development work of constructing the game, within Rocket Software's own unique set of goals and competencies, would have to take into account in the initial phase. The strategic implications already imply that, before any attempted autonomous design choices are made - regardless of deviation from source material - that the imagined user would own a Sega MegaDrive and fit in with the typical age group of that user base. Secondly, they would also have possibly watched the film *CyberPunk*, want to buy the game, and link their imagination with the characters of the film and identify with them in play with the game, in a 'preferred' mode of play. (This is part of the media logic of the use of licences in video games). Haddon's (1988a) research interview with the game firm's joint MD explained the use of the licensed film *Friday the 13th* in the game's design and the intended user reading of the game as pretending that they were one of the film's characters and avoiding 'Jason'. This reflects the use of licences in the orthodox toy industry in using character representations in narrative driven play - e.g. *He-Man* dolls or *Teenage Mutant Ninja Turtle* collectable characters, Kinder (1991), Flemming (1996), Dawson (1990).

Therefore the relevant groups here were Sega, relating to **objective (3)**, and the film firm which interacted with the development firm, **objective (2)**. This was in the absence of the designer – **objective (1)** – or the presence or explicit feedback of the user – **objective (4)**.

9.2.4 Phase 1 Preconditions of *Silly Putty* as an Imagined Game: The Emergence of the Game's Concept

The pre-conditions that revolved around aligning resources for the first *Putty* game differed from *CyberPunk* in the following respects: The time frame for *Putty* was three years earlier than Rocket Software's embarking upon the new production project. The implications here are that the domestic market still had home microcomputers such as the Amiga (and to a lesser extent the Atari ST and Commodore 64) as formats to target the games at. The market penetration of the Sega MegaDrive was still felt to be weak in 1991, with its official (pre-*Sonic the HedgeHog*) launch having to make a significant impact on the domestic market and the Super Nintendo Entertainment System had yet to be released in the UK, (see 5.4.2/3). In addition, Funny Software's own competence in producing for the Amiga and the absence of a licence to produce for the Sega or Nintendo machines, meant that from the point of view of the hardware-user base 'network', the potential user for the imagined game was to an extent predetermined as an Amiga and Commodore 64 user.

In contrast to Rocket Software's selection of *CyberPunk* as an idea for a game to produce in-house, *Putty* existed in the form of a demonstration of a character for a game seeking a firm to mobilise resources to develop and diffuse it. The other firms' selection and rejection process of the demo of the moving character as a viable investment for firms to publish gave rise to another aspect of *CyberPunk*'s inception.

For *Putty*, the idea for the game existed in a visible form rather than a yet to be made imagined film (beyond) the script's narrative. The basic movement of the character, changing shape and moving between platforms, had given it a meaningful identity for its potential genre - 'a platform game' - and therefore, in this respect, there could be some consensus of meaning of what the 'platform' games were. Despite the bracketing off of the demo as a potential play concept and as a 'platform-game' to constitute a viable investment by publishing firms, the perceived viability of the character's movements did not fit in with the consensus on content within that game genre, i.e. running men / or other characters. In other words, the issue over rejection or acceptance of the game idea revolved around what was viable content for a platform game based on precedent. In this sense, the game had an identity - a prospective platform game - that did not conform to the firms' output strategies or perceived ideal for such a game, i.e., as a platform game similar to the characters within other competing games of its type. This aspect of the rejection of the demo - because it was not similar enough to other platform games was felt to be one of organisational bureaucratisation due to rationalisation of the production process in firms. This was noted in other entertainment media organisations, e.g. Crane (1992, p.68), that communicating with managers removed from the creation process also occurred. Here, the designers comment regarding the growth of producer organisations and their responsiveness to assimilating new ideas has relevance. For example, "*I went back to Mirrorsoft*" (28) and the observation and sense of organisational change in meeting management staff in authority to veto prospective project proposals was also noted by other developers as an example of organisational changes in the industry, (21), (4), (23), (13). This was seen as a potential barrier to innovation and specifically to this game's acceptance. The issue of rationalisation, with management scrutiny of games and attempts at structured management of their creation, had a historical precedent with the rationalisation of Atari in the early 1980s and the disputed influx of non-game conversant managers, (Cohen 1984), (12).

The idea for *CyberPunk* was not subject to this level of scrutiny as the licensed deal had been conducted before game concept formation had been begun in any detail and development was to take place in-house. The implications here are that the selection process of demonstrating the demo of the game idea to bring resources to its creation was dependent for its approval upon an in-house 'product champion' (someone sympathetic to the concept and willing to influence decision-makers to accept the proposal). Organisational change in the formalisation of routines of scrutinising game concepts by these 'gatekeepers' was felt to be a further barrier to acceptance as they were seen to be non-conversant with game design conventions. For example, personnel changes and organisational changes in MirrorSoft would have changed the informal process of project selection to a more formal process. This would have involved calculating cost increases and prospective increases in target markets - especially if the prospective agent is without a 'track record' and if the game's concept is given an unsympathetic response. (A track record and small elite pool of producer personnel was found here in the interviews as well as being noted by Turrow (1992), and Crane (1992, p.62-3) with relation to film and TV writers).

If, however, the project had been accepted by an alternative publishing house or development firm, then this organisation would have its own unique network of competencies and organisational strategy to influence the technical, personnel skills, and financial resources made available to the design. Because of this, the chosen firm was "*very low on my list*" (28), due to being of small size and possibly having less resources to channel into the design. Yet, part of the very acceptance of the concept by the firm, was because it was small enough for the product champion or gatekeeper to be the MD, who had a knowledge of games and "*who actually programmed games himself*" (28). At this point, the designer's own imagined game, with its graphical expression of character movement and its art work style, which was conceived in a solo 'inspirational' environment, was meaningfully communicated as a viable project. This was due to the absence of competition on the Amiga of such a potential product "*the closest thing that came to was Sonic the Hedgehog ... he could see and market for it*" (28). Also personal preference for the style of artwork influenced project selection. Therefore an aspect of the 'imagined user' was present at the point of selecting the idea of the imagined game that modified, to a degree, the view that all project product selection involves total risk or lack of predictive information as if "*putting money on a roulette wheel*" (28). Therefore *some* rationalised prediction based on precedent was used.

9.2.5 Organisation Acceptance and Rejection of Concepts

Beyond the market and micro individual aspects of organisational selection of the demo, the development firm's own market position set a precondition upon which selection of the game idea was based: the diminished size of the firm coincided with the legal dispute with a former allied publishing firm. The prospect of the royalty disputes and subsequent legal battle meant limited resources were available for the game but also heightened the importance of the project for the firm's survival. Therefore the trajectory of the firm's situated development activity in the industry, was that it was facing declining resources and this in effect inhibited any bureaucratised rationalisation that would buffer the scrutinising of external game ideas.

Therefore the issue of the demo's existence as a potential 'platform' style game, meant that it was largely a known genre and that the imagined user was defined at the rejection stage of the demo game's 'career' as someone, in the designer's eyes, looking to use a new character type as a toy to 'play with' in the game, as well as take part in the overall game as a whole. This contrasts with the other publishers that rejected the game proposal on an economic and market prediction of the 'imagined user needs' for a more orthodox platform game, where a new method of character movement was not desired. If the time frame had been different i.e. before or after the peak of Nintendo's character's popularity for its console hardware, then the issue over what constituted 'correct' character content for the style's 'needs' may not have been such a sensitised issue. The look-a-like strategy may have been less relevant in a less lucrative market. In other words in a neo-classical Schumpeteran perspective, the 'look-a-like' bandwagoning of creating formulaic games like Mario would have been less seductive or not even perceivable as a frame of reference in the first place, (Clark 1985, p.117-120).

The incentive to choose a more obscure design, at this time frame, was less likely given the perceived success of copying Mario type designs. The designer's own

explanation of firm behaviour the industry had cited production trends in, effectively, these terms to explain why his idea was rejected.

The profit motive alone would not explain automatically why games concepts are rejected and accepted. Funny Software accepted the new concept and not a more orthodox design because factors such as personal taste, selective perception and experience came into the reckoning. Another speculative explanation for rejection of ideas could be that firms' deliberately sample new ideas and reject them to feed in-house projects with no financial outlay in selecting them. (This is tentatively noted by Levy and Weingartner (1990), but they also state that similar design ideas can lie dormant in-house before being taken up later). The lack of perfect information in this research over motives underlying rejection of game proposals inhibits a full explanation of why certain firms accept and read ideas one way and not another, beyond a low-risk production strategy - and individual experience.

Therefore, at this stage, the development firm's technical and market competencies and the imagined game's configuration meant that the Amiga and Commodore 64 hardware and user-base were to be aligned with the imagined game idea. The Amiga itself had its own trajectory stabilised as a games' machine that 'could do other things' beyond its intended function as a productivity tool. Other producer selection policies which had caused the rejection of the idea had blocked off possible use of console hardware therefore the game missed out on a chance to be released to a peak audience at the height of that hardware format's popularity in 1992. This could have also blocked off the subsequent character designs and use of idiosyncratic humour that the non-licensed open-ended Amiga architecture allowed. Further the designer's own specialist competence as an artist with no programming ability also had a pre-determining influence on the imagined games actual realisation in that collaboration with a programmer was needed to write the software. Therefore, the demarcation of labour roles was influenced at this stage, and would influence the next stage content choices. Although some 'solo' programmer / designers were in existence at this time, this was a rarity and therefore some aspect of negotiation or mediation over implementation of ideas was difficult to avoid.

The interactions noted above in (9.2.4/5) have mainly been concerned with **objectives 1 and 2** and the issue of design precedent, in as much as competing designs and the designer and the development organisation and target hardware interacted directly or were relevant. The user or the console manufacturer - **objectives 3 and 4** - were not present.

9.2.6 Phase 1: *Putty Squad* as an Imagined Game

The pre-conditions surrounding the idea for creating the third game again involves different parameters including time frame, i.e. in 1993, two years after the inception of the first *Putty* game and one year before the inception of *CyberPunk*. Two aspects are relevant - as was noted in section (5.4.6) - the market for video games after the post 1992 peak appeared buoyant with all game-playing machines including the Amiga, Nintendo and Sega machines yet to experience the downturn in demand (from Christmas 1993 and 1994). Secondly, Funny Software's own trajectory had progressed with a change in strategy around the time of the sequel games production. Given this the idea for the sequel game was more open to acceptance as the designer was now in-house, as in *Bloodshot's* case, and the original game was proven intellectual property. Levy and Weingartner (1990) show that the in-house acceptance

for playthings in the orthodox toy and game industry, was less problematic when the personnel concerned were known quantities who were capable of seeing an idea through to completion. This issue had occurred elsewhere in the research e.g. Virgin Entertainment's acceptance of the project proposal for the game *Floor 13*, (13). Therefore, there were fewer barriers to acceptance. A second aspect was the continuing need for the development firm to continue to output products and the period of 1993 was described as economically bleak due to financial issues facing the organisation. Therefore, Funny Software's competitive status in the industry necessitated a project and this along with the period of market buoyancy were two factors combining to give a 'space' for prospective development activity to occur.

The 'sequel' pathway was chosen partly because of the meaning derived from the feedback on the Amiga version of *Silly Putty* that had contributed to the selection of a sequel game as a prospective project. This was due to the economic feedback of sales and the press / critical acclaim in the reviews. Also on the basis of UK demand alone, a sequel game would be lucrative if demand for another game with the character *Putty* in it could be regenerated. Therefore the 'imagined' sequel game at the inception stage was to be targeted at the 'imagined' user who had experienced the first game. This aspect of product sequels in the output logic of the video game industry represented a similarity to the film and cultural industries' attempts to exploit and extend the life cycles of intellectual properties by the use of industry structured 'repetition' (Ritzer 1993, p.88-89; Crane 1992, p.59, Day 1990, p.3). Similar patterns of game design in the games' industry were used with Sega and Nintendo's construction of *Mario 2* and *3* and *Sonic 2* and *3* and the development firm itself had produced sequels of its own successful designs.

In this respect the third case study replicates an aspect of the first games' initial production logic. Like *CyberPunk's* strategy of producer construction of the user, pre-exposure to a known artefact and recycling direct symbolic aspects from it, this strategy served as a basis of legitimating design activity and helping prescribe possible aspects of the raw content of the game as it entered the next phase. Therefore the raw materials open to both the science fiction film and the sequel of *Silly Putty* were there to be reused to a restructured audience in the producer strategy. In this respect only the second case study's imagined content had a degree of open-endedness over character selection and content - in this phase - although the definition of the game's genre as 'a platform game' had some tempering effect on the form of the content and any economic risks. Therefore precedents existed in all three games initial phases for directing to a degree the vector of the games development (but not in an immutable deterministic sense). Yet the nature of the precedents were not the same.

The *CyberPunk* game existed as an imagined 'licensed game' for its viability for initiation as a project for organisational resources to be mobilised around it. It did not have a pre-configured design template to recognise and categorise the game's form and predict the competition or market it would be targeted to in the overall category of 'video games', other than just an imagined MegaDrive cartridge and licensed movie tie-in. The second and third case study games had some graphical characteristics or known form for the imagined games to be adjudicated as to their predicted appearance and identity and present known competition from other designs. Again *CyberPunk's* design form as 'a project' first, and design form awaiting definition second, was also the case of another in-house project the MegaDrive version of *Total Football* (32) that had an open-ended choice for content within its overall appearance and design. Here again the similarity with *CyberPunk's* inception was that the personnel were in-house

and performing conversion work, and the option existed to make a conversion of another football game design from the Super Nintendo. This subsequently was renegotiated by the conversion programmer to create an original project design for the possible football-based product. The relevant point here is that there existed a degree of flexibility over product formation in the in-house publishing firm's game at the imagined stage. This gave a degree of open-endedness in the games' specifications after they had been given resources and therefore represent an aspect of possible autonomy over content for those involved in implementing the game rather than at a top-down accounts / financial level. The second and third case study games were more codified relatively in their appearance and conception but decisions on content were still made that would define what the overall final form would and would not include in the next phase. Given this, the second and third games had closed off some design possibilities earlier on by having a pre-existing demo or intended sequel form.

The points to draw from this are the interactions between the designer – **objective 1** – and the development organisation - **objective 2** – together with the design precedent of other games, interact with some flexibility regarding the design configuration. Yet some constraining guidance in design was taken from other games. This demonstrates some aspects of agency and structure between the designer's relative freedom of conduct and the organisation influence upon this.

9.2.7 *Putty Squad*. Constructing Consumption in Design. The Imagined User

A secondary issue of selecting a sequel for production was related to who the user was going to be for the imagined game. The issue at this juncture closes off certain design possibilities for configuring the game's content and edges it along a path that involved strategic decisions for the subsequent positing of which territories should the user be found in and how the game's design should be skewed to meet this. The construction of the imagined user for the sequel was tied to the meaning of the complex interactions of the approval process for the Super Nintendo reproduction of the original and the feedback from foreign reception of the original game's Amiga and Super Nintendo releases.

In relation to Silverstone and Haddons' (1993a,b) model in chapter (3), the meso-social considerations for the product and the macro-level alliances interact to try and influence what Woolgar (1996) noted as the construction of the user. The user's relationship to the artefact during play was being influenced.

What the imagined sequel game design should exclude, in order to avoid the anticipated user experiencing cultural barriers and misunderstanding the game's merits, was based on the feedback from the first game's non-UK diffusion on the Super Nintendo Entertainment System (SNES) in foreign territories. "*The Japs*" (28) – or, rather, the Nintendo approval process discouraged certain actions of the cartoon character designs but did not reject the shooting actions of characters. This, with the conversion's relatively poor success in Europe and America, meant that (i) the content for the imagined user for the sequel should be changed and (ii) the imagined user would also, therefore, change.

On the first point: (i) The issues of shooting and 'violence' was seen as an acceptable theme rather than purely focusing on what was felt to be UK-centric "*toilet humour*" (29) which the UK game's press had provided positive reinforcement for the first games content selection.

(ii) Therefore the user was restructured, beyond being someone having played the first game and wanting to experience a sequel, as now playing a game with tempered content which avoided use of idiosyncratic humour. It also included elements of games' design that would appeal to users from both non-UK territories such as mainland Europe and the US - and especially Japan, which would therefore also be compatible with the user tastes in the other territories. In lieu of this, the user would be a supra-national consumer possibly owning one of the machines - Super Nintendo, MegaDrive, Amiga or PC compatibles. Therefore the imagined user would be less tied down to the territorial and demographic diffusion specific to each machine. The technical design of the game would have to be limited to the base capability of all machines to allow the sequel games to be replicated on all machines. This would underpin the strategy of diffusing the game to wider territories than the UK.

Consequently this could influence or inhibit possibilities that the design could take advantage of, and prevent over-relying on technical idiosyncrasies of a hardware format. This would affect the 'porting' to other hardware standards and slow down the process by making necessary significant changes to the software's source code to modify it - (e.g. the Super Nintendo's unique selling point of its 'mode 7' graphic rotation abilities would be difficult to transplant or simulate in software on other machines as they lacked the custom hardware). One game in the research - *Street Racer* had sought to replicate its design on other formats but this was staggered in time and the ability of the MegaDrive to try and cope with the Super Nintendo-dependent design needed some restructuring of the code and design in order to do this. (This became part of the appreciation process of evaluating the game relative to the original 'authentic' version in magazine reviews (15)).

Therefore content selection here was influenced by two extra-developer organisational parameters. Nintendo's approval process had an influence because the Super Nintendo represented the target machine for the Japanese market that was selected as a primary source of demand. Therefore to gain access to it, the approval process was also a de facto audience and institutionalised prerequisite to take into account - in lieu of the other territories' possible readings of the game. So here it is seen that the relevant social group of the console manufacturer – **objective (3)** – impacting directly upon the emerging game without the explicit presence of the user – **objective (4)** – rather a globalised imagined user who was especially compatible with the Japanese market.

In this case the media logic of reproducing and exploiting intellectual property in a routine manner - as occurred in this and other entertainment industries - was a more complicated underlying process than addressed by critiques of the culture industries' 'mechanical' recycling of content, (as suggested in critical accounts in 2.1). The implications of the design strategy were to close off any innovations in content that would inhibit a 'non-preferred' audience reading and consumption of the game. In contrast to the first stage of *Silly Putty*'s imagined user needs - i.e. revolving around the requirements of the demo platform game with or without a novel character - the sequel game revolved around the imagined user needs being a potentially transnational consumer requiring recognisable content that the Japanese market would also understand without the humorous content that they would not understand. Therefore the meaning of the *Putty* character had gained legitimacy as a 'safe' content choice in this phase for the sequel, but the aspect of deploying the character in a particular scenario had now been made a potential problematic strategic design issue that was resolved in this phase of the imagined game's use.

The influence of globalisation in the formation of the game's content was due to the firm's attempt to maximise the game's diffusion to the widest possible audience. This avoided the cultural idiosyncrasy in the symbolic nature of the content that the first game had benefited from in its UK release on the Amiga. This aspect of globalisation on content is similar to the problems faced by other media texts' diffusion paths, (Du Gay and Hall et al. 1997).

9.2.8 The Imagined User for the Imagined Game of *CyberPunk*

In contrast to the other two games the basic form that the imagined licensed game of the film should take, even in draft form, did not stabilise into a consensus in this phase. Rather, at stake were the initial organisational issues over the imagined user needs, aesthetic choices, labour routines and management of development that influenced the availability of resources for final consent to emerge for the game design to eventually stabilise in its overall form.

This phase of *CyberPunk's* imagined formation deals with the game's perceived needs. The pre-arranged alliance for using the science fiction film and that with Sega, for the licensed use of the MegaDrive technology, operated as the first set of parameters which determined the degree of freedom for design activity of the imagined game. This was because they were taken to be meaningful issues with which to dispute and regulate what the imagined game's needs were. In conjunction with this the role of the imagined users' relation to the licensed game is in two guises - as 'player' and 'consumer'. The outcome of this phase of the game eventually meant that one design, out of a choice of the alternative game designs, emerged with the active consent of the labour force to implement its general characteristics for intended release.

This demonstrates the explicit nature of work place politics within organisations noted by Fox, Shoemaker and Reese, in (3.4.3). It is relevant to the interactions on the game by objectives 1 and 2 because it demonstrates how competing interpretations of the emerging game occur as well as illustrate some dimensions for how else the product space of games design could be different. What has been shown explicitly here, in the interaction between the designer and development group, are aspects of power and authority which relates also to Winner's (1985) analysis of technical development, given in (3.4.1).

9.2.9 Intertextuality and Media Convergence. The Attempt to Transfer Film Entertainment Conventions into Software

Sections (9.2.9/10/11/12 and 13) demonstrate how heterogeneous agents interact to create and dispute the knowledge base that defines aspects of the product space of video games. This knowledge in itself can be seen as a form of power and authority in guiding design decisions that can in turn block off alternative design configurations. The first issue of the dispute of how to translate media content from a script of a proposed science fiction film into a game, represented on a narrower scale, an issue that the computer games industry had faced within its own 'convergence' to, and differentiation from, other standard media forms (see 2.2). The issue concerned taking a full representation of the film's story into the game to pace its structure, against taking one aspect of the film that could be tied more easily to a known game design convention. The issue over what aspect of the film's story to represent in the game was tied in with aspects of (1) the user's temporal relation to the game in play, (2) the

user's relation to the games' market and consumption of games and their value as commodities; and (3) the reuse and assessment of knowledge of game design conventions.

The first point involves the issue of how closely the game follows the narrative, to include in the game the notion of the imagined user's interaction with the imagined product. The role of suspense in the film plot if translated to the game directly was felt to mean that the game's rules, which the user would engage with, would provide a controlled linear flow of temporal and visual sequences that would aim to build the suspense corresponding to the film. This was felt by the programmer to create a user-machine-software mode of interaction that would not fit known or orthodox game conventions. The issue of designs that mirrored a film's narrative structure was also considered widely at that time in the games' industry, as the initial designer conference had noted, (see 2.2).

"... this happens in this scene and that happens in that scene, if you did a game that's based on that progression of events and that's your game, it's over too quickly and it's not necessarily going to be fun", (30).

This quote gives a direct critical example reflecting the wider issue of game design's mimicking a film's structure.

9.2.10 Other Film to Game Examples

At the time of *CyberPunk's* inception as a game in 1994, the arrival of CD ROM and technical change in the industry, had seen designs that had their meaning critically contested as to whether they provided an 'authentic' computer game. For example one reviewer's typical critical response to the game based on direct transfer of video footage of the film 'Johnny Mnemonic' criticised the incompatibility of film material to games, (Edge Magazine 1995b (p.71)).

Or, from a production viewpoint on using licensed film material for inclusion in a game based on a silent film at another firm:

...Well there is a big difference because if you're designing a game based on a film and you're using the film footage you've got a real problem because games aren't linear you know they take all different routes while a film is. We....about 5 or 6 years ago we had the rights to Laurel and Hardy and we were only supposed to use the film footage and we could not get a game that worked...because you want them to walk across the road which is fine and then you want them to jump over something or jump over a ladder or what have you. You always visualise Laurel and Hardy wearing you know the bowler hats and the black suits but when you start looking at the films they're wearing different clothes all the time. So you know a certain film...one of their films may have them walking across the street which is fine but then you turn the corner you want them to go somewhere else their in different costumes and you just can't do it, which is ... the continuity is a major problem. We thought that Laurel and Hardy would be really easy because they wear the same clothes, but the reality is that they don't". (18)

Here then, the issue of compatibility with film conventions and their ease of transfer to game designs are noted. This example comes from a firm that was one of the first to use CD media for the Commodore CDTV and this gives an example of the different knowledge of the two medium's designs and the learning of their use. The

dialogue below notes how the audience communication differs between the two media.

[That's sort of a visual element of Laurel and Hardy but how about in a visual sense? I mean Laurel and Hardy are 'funny chaps' and they do funny things how ... (tape ends) ... So we're talking about Laurel and Hardy the point is how do you go about transposing those funny things Laurel and Hardy do from one...]

Well you have to try and build these into the game play and so ... I can remember one of the things - he fell down the chimney when he tried to climb down and there's lots of noise in the film and he has black eyes and is covered in dirt, which on video when you watch it is quite funny but in a game you have to build something into it to make them go up there and explore and then just making them fall down isn't enough you have to build extra things into it and so we have to put things where we, you can see that you're falling down the chimney and explain the noises and things and so you need to go a few stages further than you do in a film because...you know films...in a linear form when you're sitting back and watching are fine but seeing it on a computer screen and you're controlling him then the jokes don't cross so easily and so you have to go an extra step further to try and get that across." (18.).

This example shows an interaction between the design precedents of film and computer games media relative to the imagined user's needs. This illustrates how designers' define the difference between the two media and the next section explores this.

9.2.11 Defining the Boundaries of the Product Space for Video Games

At stake for the defining of a game's characteristics in the absence of any rigid definitions of the product space of 'video games', was the issue of linearity and repetition in user-entertainment text relationships. What was necessary for a game, by definition of industry conventions applied by game designers here, was conformity to the ideal of repetition with aspects of the game's structure. Whereas user-film consumption was perceived to be a short-term non-repetitive experience. The role of repetition in structuring the sequence of events for the user to interact with during play was seen to be a unique part of what differentiated the two media texts. The value of the game was posited in its ability to provide 'fun' for the user that was constituted as "*constant entertainment*". The perceived delivery of this would need to be undertaken by a known design convention or "*formula*" or "*a system*" (30) that could structure the flow of events which would structure the player's interaction with the text.

In this case, a known genre of game design was posited in the programmer's design brief to structure the imagined game - as "*a pacey arcade adventure*". Here the role of player failure and the learning of skills to overcome failure were to be the source of repetition that constituted the user's enjoyment as well as the mechanism in the content selection that distinguished between *CyberPunk* as a film and game. This element - as well as reinforcing the boundary between games and films - also sought to use the role of combat, which was a known design convention, (as used in for e.g. *Putty Squad* and the character redesigns in *Super Putty*). This was, however, posited as 'a problem' as a necessary deviation from the film's script to further the nature of the user's interaction with the imagined game's final structure. The 'escaping from the bunker scene' from a temporal point of view of user needs, in engaging with the representation of the film, was reinterpreted for the game to provide the user with a

longer playing session than an 'authentic' or 'literal' representation from the same scene of the film. The limitation of the film's narrative for the game's representation resided in the fact that in the film there was only one gun. This meant that firing weapons as a main focus was excluded, and this was constructed as being 'a problem' for structuring the content of the imagined game: "... as a shooting game it was bit of a no-no" (30).

Therefore at this stage an extra-design organisation limitation (from the film licensed intellectual property), had impacted on the design path in closing off *CyberPunk* from becoming "*a shooter*" in Sega's taxonomy of game's designs used to classify games to evaluate for permission for concept approval.

A further example of a game convention being excluded in this phase was the user's duration of play, in the fact that the *CyberPunk* specification document proposed "*replays from the beginning (rather than saved positions)...*". This design choice (which also re-emerged as a salient issue in the second phase of the games career as *Bloodshot*) again tied in with the temporal nature of user-game interaction. This coincided with the knowledge of the institutionalised nature of the licensed conditions influencing control over pricing decisions that were not autonomous in the cartridge mode of delivery. Hence the issue over commodity value also coincided with the need for repetition as well as being conducive to providing "*constant entertainment*" (30).

The impacting issues of the status of the user, the economic and temporal nature of user/game interaction issues in the consumption context of the game, on content decisions revolving around *CyberPunk*, in this phase, could not be totally relegated to a 'black box' economic explanation of firm behaviour. For example, the equating of design choices to the pure pursuit of some exploitative structured intentional obsolescence in cartridge-based game designs to explain their popularity is given below:

A contemporary example is given in: Hertz (1997, p.142)

"Cartridge games on the other hand, are not built to last because home console manufacturers do not make money when a kid keeps playing the game. The only way the cartridge company makes more money out of that kid is if he buys another cartridge in a reasonable amount of time. Voila, the digital narrative develops a finale".

At the level of behaviour of design decisions by reflexive agents in their intentional activity, the influence of economics was not considered in this type of explanation by designers'. Although consumption processes are articulated in the designer's considerations, they do not conform to the aggregate attempt to control the flow of supply and demand over games in the capitalist production system. The subsequent design pressure influencing the difficulty of the game could by default, or latently, tie in with the aims of sustaining the flow of consumption of cartridges as commodities. These actual decisions, however, were directed by other influences, as is covered in phase 2 of this section of the thesis, (section 9.3). This is important because it demonstrates how the individual is informed in their design decisions. This is of relevance to **objective (1)**.

In the issue of story or narrative, the transfer of story line from one text to another was questioned. This again, makes problematic any simple categorisation of the value of narratives in changing the form of video games over their recent history as an entertainment medium. In the following example the implications of hardware design

of the cartridge based Japanese consoles are seen to be influential on software design and its place in youth consumption in capitalist consumer society:

(ibid.) *"When the Nintendo Entertainment System and Sega Genesis [or MegaDrive] replaced arcade games as the engine of the video game industry in the mid-eighties, the structure of video games shifted decisively from the open-ended spirals of the arcade heyday towards the current narrative chassis, which looks like a freight train. The object is not endless replay. The object is to explore the latest video game universe until the sidewalk ends. Then you buy a new world".*

Here *CyberPunk's* narrative from the film script and compatibility with the needs for a 'licensed game' were scrutinised and abstracted to fit game conventions that would slow down the pace of consumption. Specifically it was attempting to become a video game but not be like *all* video games, in that *CyberPunk* as a 'film licence' had specific logistical production issues and tradition and authenticity issues which it faced in the content selection relevant to a game in that category. The issue of narrative for Hertz's (1997) observation in changes in game texts in order to facilitate the cycle of consumption, was not here an inevitable industry-wide issue that was uncontested in the design process. Rather these issues tie in with wider debates over authenticity and representation of film texts in gaming conventions, mentioned above.

The issue of film licences and the symbolic intellectual property and story line for structuring game designs (like *CyberPunk's* design debate), had been disputed as to their appropriate interpretation. The discourses of criticism that articulate the meaning of film licensed games in either being literal or general attempts at representation are two sided: On one hand, as seen in (9.2.10) if the game models the films narrative too closely it may not be regarded as 'a game'. Alternatively, if the game deviates outside the film's narrative, using content that is too generic of other computer game design conventions, then it becomes too inauthentic a representation of the licensed media. For example, the other interviews and materials provided by designers (7), (12) and (8) regarding licensed games produced by them or within their design firms - such as *E.T.- The Extra Terrestrial*, the *Lethal Weapon* series of films, or cartoon *Battle of the Planets* - were examples of where the source materials' narratives were not deliberately used to structure the games design. Rather, what was reused was some symbolic character placed in a typical pre-existing conventional game design environment, (or in the last case just the title reused!). These were described as examples of exploitative, inauthentic use of licensed properties, making shallow attempts at modelling an aspect of the licensed material in the game.

For example, in the case of the licensed game derived from the film *Lethal Weapon*, a pre-existing game style was used to help structure the graphical layout and play characteristics of the game.

P.1 *"To help clarify the style of game this document outlines, the readers attention is directed towards comparable products. In this instance, the best examples are Golden Axe and Double Dragon.*

p.2 *As the set pieces from the films will not be incorporated verbatim into the game, it is intended that the main playability factors be based on personal attributes and abilities of the two main characters - Martin Riggs (Mel Gibson) and Roger Murtaugh (Danny Glover)."*

(EuroCom 1992: design document).

Other influences on the game were the Nintendo style guide's impact upon vetoing references to drugs or racism which the films do make explicit reference to.

Another proposal to represent the film of *Lethal Weapon* as a licensed game by a different development firm also attempted to use a known design format to represent the 'new' game. Again with voluntarist acknowledgement of deviation from the source film narrative:

(P.01). *"The publisher has indicated to Probe Software that it would like the Lethal Weapon game to be similar in concept to the well known game - Spy Hunter. That is, an upward, left and right scrolling overhead view 2D car race/chase game".*

A clear reference is again made to another game design by name and content, to structure the imagined game of the film:

"The game will be very weapon orientated. Some of these weapons may be rather fantastic in concept when taken in the context of a Lethal Weapon scenario but when designing the weaponry we have been aiming more for playability than realism. Thus weapons like shields (Lethal rotating balls) have been introduced which would never have been seen in any of the movies but have been introduced into the game for good playability".

"The players vehicle also had the ability to jump, which again, is infeasible when taken in context of the movies but in playability terms adds a whole new dimension to the game. We believe that the player will overlook the non-realism aspects because he will be too involved in gripping game play from the outset".

(Probe Software 1992: design document).

Here then, at the design level, the imagined game is 'bent' towards the needs of borrowing conventions from the pre-existing computer games to form its structure. The implications for the imagined user is to consider their 'needs' as effectively being decoyed away from the parallel content with the film, towards the interaction with design concepts from a pre-existing game. This makes a point of the deviation from the film as a potential 'problem' worth consideration. Hence, the issues of "*non-realism*" are traded off against the game's need for 'playability' and the use of convention to drive the players activity in play. This is similar to *CyberPunk's* "*literal*" (30) game / film textual relationship issue in the formation of design problems which had to be overcome at the stage of initial planning and the representation of the imagined game and the user's relationship to the final game.

If, in its final form, *CyberPunk* had been perceived to be too deviant from symbolic aspects that related it to its source of reference, i.e. the film, then it could be subject to a body of criticism that was targeted at licensed games as being inauthentic representations of their source material.

For example the review of the game *Lethal Weapon*:

"Oh dear this is the crappiest licence I have seen in ages. Take action packed films with tons of large scale shoot outs and fight scenes and transfer them to the NES and what do you get?...You get a twardy 'Double Dragon' clone, where there's bleedin' all difference between the two characters....As Riggs and Murtaugh limp from one spot to another, gangs or 2 or 3 villains appear for them to punch, shoot and avoid and err...that's it".

(Computer and Video Games 1993b, p.98).

An alternative scenario to be considered is the attempt to mirror too closely aspects of the film when they are being concurrently made, as both the *CyberPunk* game and film were. An example of the licensed game of the science fiction film *Terminator 2* showed that in following the script as a resource to design the game, the dialogue did not portray visual aspects of the salient visual features of the film. This became apparent once the sets were created for filming. Hence, a scene featuring a water viaduct had to be designed for the game once it was realised it was relevant, (4).

A further issue to contend with is that, had a 'literal' game of the licensed property been accepted as the dominant design principle for *CyberPunk*, as the film was late in its production and eventually canned, the game would lose its source of reference and symbolic resources from which the player would seek to identify aspects of the film.

Therefore, the issues of representation of a film within a game fell between two poles or industry game design discourses. In this respect the programmer/designer emphasis on action and longevity in designing the game had been used to push the design away from a 'literal' representation. The implications of the choice weakened an aspect of the extra-organisational influence of the film's intellectual property on the game's design and designer autonomy to a degree such that the whole design was not dependent on the film for its identity. Therefore there was no automatic process of translating mass media texts from one medium to another, despite the simple explanations of automatic media 'synergies' between intellectual properties often used to legitimate entry into the market, as for example, Kinder in section (2.1). Examples of this included vertical integration of media and consumer electronic firms by strategic acquisitions of games' software firms that took place in the mid-1990s, e.g. by Philips, Sony, Pearson, Time Warner and Viacom. Negotiation and mediation of design intentions over content selection and the user needs were invoked to make the translation a complex issue.

So far the role of the designer – **objective (1)** – and the imagined user – **objective (4)** – have been noted in defining games. Additionally the issue of precedent, ad hoc media definitions of films and games, media licensee organisations and magazines have been heterogeneous influences that have been 'enrolled' to 'police' the definition and acceptable content of the category of video games. (This notion of policing was introduced in section 3.3.9). The next section examines aspects of the interaction between **objective (1)** and (2) in defining the product space.

9.2.12 Production Conventions. Where Does Knowledge of Game Design Lie in Development?

A dispute over labour roles in the design process was involved in stabilising the imagined game's eventual design in this phase. The dispute over content and production responsibility represents an aspect that also occurred in the implementation of the second and third case study games. This related to the role of the programmer and the absence of stable routines to regulate labour activity in creating games with a specialised division of labour with clear-cut roles.

This aspect had also been noted in other interviews and one example had a subject contrast their own experience of creating screen plays for television with the making of computer games, whereby the former was described as more rigid:

[What's the difference between video games and films?]

Oh a huge difference. The biggest difference is that the video games' industry is really a mixing pot of different skills. Nobody really...everybody overlaps...programmers are also designers, designers are also programmers. It's taken a long time for all the different skills to filter through and to become easily identifiable. It's exactly the same with all the others, you know you look at the early days of film the cameraman was also the director, the same with radio and television and its going to take a long time with games because the technology is so much more complex for those different skills to filter out and become separated. So there really is a huge difference and when you're working on a game project where you're not only thinking about the script but you're also thinking about the technology, the way it's going to be programmed, the technology you want to use, the market, the financing of it, everything, and you think about all of it simultaneously.

With a script writer you don't have to worry about it, you just write the story, that's because it's not your job to work that out and that's right and it shouldn't be your job to worry about whether it's feasible to shoot a script in the first place, you know if you can write a script with flying horses in it - that's not someone else's decision as to whether you can or not but if that's central to your idea you have to go out and do it but if a producer comes back and says we can't do it then you have to take them out and you know what your creative parameters are. But in games it's not like that at all. In games everybody regards somehow every aspect of the project to be under their control.

So if I wanted to make a game about flying horses or something, I wouldn't be able to go out and do it because the programmers would have suggestions about the design. In film or any other media, for example, it's considered very inappropriate for anybody, possibly other than the director or the producer to make comments about the script for example. I mean not even the actor - well actors do do it but you ignore them basically, unless they make a suggestion that is very, very unusual indeed - you just completely ignore them. They've no contractual right either to enforce them but I think they have the right to make suggestions of course although that's considered slightly bad form but they don't have any contractual right to enforce them but that's not the same in the games' industry, everybody seems to think that they've got a contractual right to stick their oar in which is why as a side of that you do tend to notice that most games do not tend to have what one would call a creative director. There is a producer who is in charge of a creative project but actually he is fulfilling a hundred other roles to start with. I mean some are completely incompatible. The creative director and the financial director in the film project are permanently at war with each other but in the game's business those roles are done by the same people.”
(3).

This long but useful quote gives a different perspective on the 'convergence' of media forms beyond symbolic form. Instead it draws parallels with the creative process and suggests the regulation of routines should be similar. The existence of routines in media organisations are part of the need for patterned, regular activities that direct individual workers behaviour in enacting their tasks in a specialised way to reach their goals (Shoemaker and Reese 1991). They serve as procedures to deal with sifting through information to limit choices in selecting aspects of it. The disputes over who the designer should be, what authority the programmer holds and how should a game's development process be managed were, together, the key issues that once resolved, set the game on a line of content choices similar to its finalised form.

The fact that initially no fixed pattern of labour existed in the attempts to form content choices for *CyberPunk*, gave rise to the game's initial flexibility. The formation of a labour structure or hierarchy of authority occurred by conflating designer and programmer roles officially with one person. The ultimate control over decisions of programming and design was centralised at the end of the first phase.

The need for clear-cut labour routines for regulating what should be included in the imagined game's content was tied in with the requirement for a specification document. The programmer's need to represent game ideas in an algorithmic manner had been seen as a wider industry issue of the programmer influencing game concepts and ideas (8) and as a difficult problem in the management process of realising creative ideas in a tractable way. The programmer's need for "*certainty*" (30) in the implementation of *CyberPunk* and ideas expressed in a 'non-ambiguous' manner was a wider issue that tied in with the problem of defining the 'designer' and the concept of authorship. (This is covered in section 9.3.10). This aspect of the programmer's role, was given consent by the artist's own view of the labour process as the game was seen to be the "*programmer's baby*" (31) - a view not reflected in the other case study games' programmer-artist-game relationships.

In conjunction with this, in terms of the overall responsibility for the game as an in-house project, the issue of conflating the role of the programmer's implementation of the game's design content, with the need to be a 'producer' in charge of the project's ultimate finalisation, created a change in management authority. Another aspect of the programmer's need for "*certainty*", beyond expression of ideas in documented form, was at stake. In addition, the need to create a situation where the game was not seen to be under the former producer's power of content selection (i.e. being "*his game with a capital 'H'*"), to a condition of being ("*my game*" (30)), and under the programmer's control, occurred.

This dispute over ideas and labour roles represented an in-house source of politics that steered the game's content. This was semi-autonomous in the sense that no manifest external influence was exerted over the content selection of the design activity in terms of the meaning of the legitimate use or interpretation of licensed games. These issues were solved by individuals drawing on knowledge of other game design conventions and the discourses that surrounded them. The stabilisation of the production roles created the pre-conditions for the next phase of constructing *CyberPunk*. Carried over from this initial set of content decisions were the individual programmer's aesthetic preferences for constant action and prolonging the game's play-life cycle. This was combined with of the following extra-organisational influence, below, of *Doom's* critical acclaim. The next section reveals influences on the game beyond the interactions of objective (1) and (2).

9.2.13 The Impact of an Industry Landmark Game - How Games Interact with Each Other.

The final section of this phase shows another use of design precedent. Rather than being used to skew design content away from other designs, here this precedent is used as a guide. This shows why repetition of content occurs as design knowledge is interpreted and diffused between design firms.

The impact of *Doom's* 3D display industry-wide had been part of an overall trend to turn to 3D graphical displays in games' designs. This had also coincided with the factor of technology change to the more powerful 32-bit processor 'next generation'

based machines and the increasing use of IBM PC compatible hardware specifications. The strategic value of 3D graphics in the industry were crucial and the managing director of Sony's software arm noted their significance:

(Roberts 1997a, p.43):

"If you're being profound about gaming in general you'd say that those who saw the 3D revolution coming have done very well ... Companies who were locked into 2D 16-bit market got left behind overnight and were more or less bankrupt".

The growth of the number of games that also used the 3D display by 1995, when *Bloodshot* was released, prompted one magazine to create a section in its pages called *The Doom Dungeon* to keep watch on the number of "Doom Clones" (Games Master 1995b, p.31). The nature of the industry adoption of the display was partly based in awe of the radical nature of the technique. This was reflected in the subjects' interviews which had described *Doom*'s merits, (13), (28), (8), (21). The nature of player - game identification again was described as the key attraction and served as a source of motivation for wanting to create a game like it:

[What's the appeal of the game?]

It was the speed it ran at, the perfect 3D environment. It was real time combat and when you get a real time computer game it ceases to be limited by the computer hardware if it actually becomes real life to you playing it, then, therefore the appeal of playing it is enormous.

[Would something like Doom influence you do you think?] It did influence me yeah, very much so.

[In what sort of ways?] I wanted to go out and build a Doom game that day (laughs). (28)

[8] We're all plagiarists at heart.

[28] There was no programmer of the capability it needed. We didn't have the tools. Still so 3 months of frustrated sitting there thinking 'we want to do it we want to do it' and nothing was happening and then we sort of like gave up – it's not our type of game we can't do it. Let's do something else and we did. We sort of found our own niche which was to create the Constructor project which is a new thing game. Which I think will spawn millions of similar games when it comes out".

Beyond the appreciation and wider strategic value of the future role of 3D in the industry the meaning of the display was important on a more specific level. *CyberPunk*'s programmer's own market awareness of the demand for *Doom* and the absence of similar products on the MegaDrive's catalogue of games, represented an extra-organisational influence upon the game's possible formation. This was because it considered the 'imagined game' and 'imagined user' in the light of possible competition from other game design attributes as well seeing as the user as being part of the possible demand base for a 3D game. The MegaDrive, by virtue of Rocket Software's production strategy, represented an obdurate technical 'barrier' that could be overcome with the new technique and also possibly stave off competition. Therefore the game's 3D relevance had an extra-organisational influence to give it meaning and inform the content choice. The description of the MegaDrive as being technically *"the wrong machine"* (30), was due to having aspects of its hardware architecture 'frozen in' during its conception in the late 1980s. This related to the then

relevant issue of its competitive strategy against the Nintendo NES and its optimisation for 2D style games.

The actual flexibility of work patterns that allowed experimentation to surreptitiously create the prototype 3D display for the machine, despite not being in the design documents, meant that the MegaDrive's hardware, even without 3D custom chips, was not a technical determinant in closing off a choice of display in the software. Therefore the reinterpretation of the MegaDrive was prompted by competing games' designs, the need for a type of display for *CyberPunk* and its 'ripeness' for applying a new approach to its look, given the aforementioned circumstances. The 3D viewpoint was also competing with other proposed viewpoint possibilities such as a side-on point of view (that the *Putty* games used), or an isometric 45-degree top-down viewpoint approach. The 'needs' of the *CyberPunk* narrative for atmosphere therefore legitimated part of the designer 'search' for display types.

Consequently the implications for any totally deterministic conceptions of technologies embodying power and control upon design choices as may be suggested by Winner's (1985) argument (in 3.4.1), were not applicable directly in any ruling out of a novel application of the hardware in software design.

Had the *CyberPunk* game not used the 3D technique, then its meaning as a game identified by its viewpoint, (as the game subsequently was), would have been enough to put it into another category of classification e.g. 'a platform game'. Consequently it would be subjected to a different regime of value and aesthetic standards of judgement - even bracketing the game to a comparison with the *Putty* games! Further, if a method had been used to implement the obscure and unusual aspects of the film's story - such as the 'anti-characters' and lack of shooting and role of telepathy and non-kinaesthetic character interaction, this would have given some novelty value to the potential game. This could have possibly even made its design sympathetic to the critical academic suggestions about the 'needs' of games that section (2.1.4) had noted, (e.g. Provenzo 1991).

Therefore in this cluster of choices converging upon the decision for the need for the 3D display and content, the designer operated with awareness beyond a "*nuts and bolts, wires and equations*", (Edge,D 1995, p.27), appreciation of software design. The wider macro-economic and industry issues that feedback to intentionally inform design choices were considered. (This too was similar to *Putty Squad*'s intentional design strategy).

The breaking away from the extra-organisational influence of the film upon the game's design trajectory was the perceived problem of keeping an authentic relationship between representing one gun in the game from the film. Together with the staggered logistics of the game's production cycle and that of the film, the new scope for redesigning content around the 3D display gave rise to new alternative design configurations. These would then be compatible with a perceived user wanting a simpler game rather than a strategic game that *CyberPunk* was formally skewed to.

At this point then, the game stabilised in a consensus of meaning at the end of phase 1. Once consent over the basic format of the imagined game had occurred, the process of crafting the game in its subsequent development phases (2 and 3) are attended to.

9.2.14 Conclusions of Phase One

The most distinctive aspects that marked *CyberPunk*'s interpretative flexibility at its first stage from that of either *Silly Putty* or *Putty Squad* was its number of possible product formations. The other two games were largely pre-conceived in their overall form before full-scale development occurred. The politics over labour management were also more marked for Rocket Software in making *CyberPunk*, than in the other development firm at this phase of the games 'career'. A major implicit cause of *CyberPunk*'s volatility in product formation revolved around the construction of 'problems' about user needs in cost / play and the nature of 'interaction' in consumption. These issues related to the attempt to keep a distinction between film and game product spaces.

In contrast the formation of the user for *Silly Putty* had been implicitly selected once the platform style and Commodore machines had been considered as targets for release. The post-*Silly Putty* and initial *Putty Squad* rationalisations of product design had reconfigured the user for a globalised market, as had happened by default for the first version when "*UK journalists*" (28) became the 'localised' audience. The three games had graphical styling as their initial starting point for pre-structuring what the nature of the game's 'new' attraction was. *CyberPunk*'s 3D display technique was targeted to the wider conception of the market and a niche in the MegaDrive's catalogue of games. In this sense the user was pre-structured by default as being a MegaDrive user that would be aware of the 3D viewpoint created by *Doom*'s popularity. Therefore the MegaDrive in the design decision process was 'doubly articulated' in that it was both an object of consumption in its own symbolic right (a mature 16-bit console), as well as a software delivery mechanism providing a novelty game. This is interesting because Silverstone and Haddon (1993a,b) only acknowledge double articulation in the micro-social phase of their model, (see 3.2.4). Therefore similar attention can be given to the construction of the meanings of the hardware in the macro-stage.

Silly Putty's and *Putty Squad*'s emphasis on character movement was not dependent on a novel software technique on a particular hardware format. Given this, multiple conversions of the game were possible and - in the sequel - were planned for diffusing it globally. In terms of extra-organisational constraints and resources, *Bloodshot* and *Putty Squad* both attempted to use the installed network of Sega and Nintendo users that had its infrastructure set up by the hardware and software releases of Sega and Nintendo and the other third party software licences that created software to enable the critical mass of adopting users to expand. *Putty Squad*'s design was intentionally conscious of this extra-organisational influence in forming its design and diffusion strategy. *CyberPunk*'s design had drawn its meaning from the hardware vendor's influence - first with the issue of value for money and longevity of the cartridge software, and then at the capacity of the hardware technology and the lack of precedence of a 3D game for the MegaDrive. This demonstrated aspects of the influence of the interaction of objective (3) on objective (1) because it showed how designers interact with the resources and constraints of hardware and hardware firms.

The need for certainty in allocating resources to a game that would eventually be played was dealt within all three games' designs by references to other pre-existing games that acted as precedent. These served to locate the games' meaningfully as attempting to provide the 'new' as well as being familiar. This was also seen in other game project initiations, such as the licensed games' references to other products. The use of conventional knowledge or an existing genre and graphical styles served as

examples of industry-wide knowledge that informed design in the organisation at this stage and ensured that it did not occur in an individual or organisational vacuum or in splendid isolation from the user.

The formations and sources of power and influence from 'relevant social groups' over content selection were different for all three games. *CyberPunk's* in-house dispute provided aspects of power and individual agency over concept formation at a micro actor / group level. Thus demonstrating the interaction between aspects of **objective (1)** – the designer -and **(2)** – the development team and organisation - upon the game. The antecedent events leading to the severing of the link to the licensed film was testimony to this, in that it changed the whole release and design strategy of the game. *Silly Putty* experienced the effect of economic power in its struggle for legitimacy to meet the criteria for recognition as a viable project for publisher support as well as a recognisable platform game. This shows another aspect of the interaction of the **objectives (1) and (2)**. *Putty Squad's* design strategy was intended explicitly to cope with unanticipated sources of influence over approval and diffusion by choosing to skew the game to be compatible with both Nintendo's process of scrutiny and the Japanese / foreign user at this stage. This demonstrated how, in Silverstone and Haddon's model the anticipated diffusion of the game at the meso-social phase was anticipated at the macro-social phase and this involved the interactions relevant to the designer the development organisation and the imagined user – the concerns of **objective (1), (3) and (4)**.

None of these games were initiated by a marketing department as a 'bottom up' product imagined by users solely, and then their needs reflected in the design with the designer implementing them. This type of approach was felt to not really yield anything newer than could be done anyway or to be technically naive or not to be 'cutting edge' and this was reflected in other interviews (22), (26), (17), (8). The feedback from the first *Putty* game had reinforced aspects of the popularity of the game but this was secondary to economic and critical media acclaim of the game. Therefore in relation to **objective (4)** the physical presence of the user was not evident.

In summary of this first phase of the macro-social phase of the innovation process the issues of alliances between heterogeneous actors were noted with reference for how they influenced the games development. Of special reference has been the concern with the four relevant social groups that related to the four objectives. None of the interactions between **objectives (1), (2) and (3)** could be seen to be dominant, unidirectional influences upon the game.

9.3 Phase 2 - The Crafted Game

9.3.1 Introduction

This section deals with how the three games' design trajectories were influenced once the first phase of gaining consent or achieving 'closure' on the games' basic forms had occurred, and before full commitment of creative resources to their development had been obtained. As all the case study games' designs became more embodied in software routines, completed for testing and prepared for release, the more sources of influence from unanticipated and non-design team and extra-developer organisational institutions were encountered. As more actors enrolled into affecting the development

and preparation in diffusing the games, so the meanings of the games became contested.

A key theme to observe within this section is the problem of defining the games content that reveals some dimensions of the product space of video games. This theme continues from phase 1 and illuminates new tensions to reveal areas of alternative design possibilities that were relevant to the theoretical issues in (3.4.2). Again, issues of precedence emerge as they relate to issues of novelty and diversity in the definition of games. These issues of defining the product space map onto sections (9.3.3/4/5/6/7/12/13/14/15/16/17/21). Also to be noted are how issues of labour and design autonomy bring out these design motifs, in sections (9.3.9/10/11/18/19/20).

9.3.2 Communication by Design in the Game's Design. The Intentional Design Aims of the Games Content.

The next section compares the manifest aims or intentional aims (Mansell 1996), of the designers in encoding their games' designs at this point of their projects' game 'careers'. It examines the type of knowledge that the designer articulates consciously over their content decision. This relates to the concern of objective (1).

9.3.3 The Emerging Game: *Bloodshot* and the Meaning of the Display in Games. Aesthetic Issues in Design

The 3D viewpoint and addition of a shooting type of game meant a two-tier structure which implied two points of communication with the user via the intended game's content. The viewpoint in itself had relevance by virtue of its appearance on the MegaDrive. The value of the graphical aspect of the game was seen to appeal in its own right to users and this was seen as part of the wider attractions of all video games per se. The issue of graphics / player relationship (that "*drags them in*" (30)) and the issue of player / character role-play unique to the 3D display - ("*..it's like as if it's through your own eyes*" - (31)), gives an indication of the significance of the role of graphics for games and in particular this game's meaning as a 3D first person display. These had a wider significance beyond the game *Doom* to the populist rhetoric over the promise of virtual reality technology that had begun to take root in the early to mid-1990s. This, at a media and academic level had created discourses over user-machine interaction possibilities and the user's 'immersion' in the simulated software scenario. (Schroeder (1996), Helsel and Roth (1991), Provenzo (1991), Rhingold (1991)).

Again, the value of graphics in game design, in the firm's overall response to the industry adoption of 3D display technology, could be seen in the design of the game *Fighting Fantasy, Death Trap Dungeon* - (which had been undertaken at the time of the case study and formed a topic with the subjects interviewed). The issue of supplying 'state of the art' 3D graphics comparable with the competition - i.e. *Into the Shadows* which was being developed by a rival firm - was seen as a major communication issue in portraying the game's value to the user, demonstrating a game's innovative merits and obtaining positive media coverage and influencing sales, as well as gaining a competitive edge:

[I mean you're talking about Into the Shadows doing 3D and things and the graphical style of the game. How about the objectives of the games - does that honestly matter because they are different styles?]

"The thing is in magazines they do really seem to rave about especially in...the pre-publicity it always seems to be graphics, graphics, graphics and 'it can do this that and the other' because all they get is screen shots and rolling demos and so they are getting a awful lot of hype about them. No one has actually seen Doom 3 move but there's only screen shots of it but there is awful lot of rave about it already. I mean we haven't really released any screen shots of our graphics' system. People have only just seen Into the Shadows move - well they think they've seen it moving because they've just seen a rolling demo of it - it can do this that and the other but we can do this and we are quite happy about it. So I mean graphically it's got to stand out but when the game's released...I mean it will sell on the graphical front but, there was a game called Rise of the Robots, appalling game, it sold loads". (26)

Yet in contrast to the value of graphical content in games for communication and competition purposes, this was traded off with the issue of the rules the game used to regulate play, which motivated the design of the games 'combat system':

"...It's like Worms and if you sit down and I want to shoot a missile and hit them and you fire a missile and it seems like there's no game there but you fire a missile and it creates a hole and that affects how the games played later on and there's all these simple starting rules like point at him and shoot or fire a missile over there and create a hole - you can get all these tactics building up and the longer you play it the more tactics you get and it builds up and the rules of the game are dead simple but their complexity ... and lots happening with all these simple rules, which is what seems to have happened with our combat system we've got these remarkably simple rules for it - there's just 3 attacks and apparently that's it but the combat system seems like its going to be... especially when you get more than 1 character, like you can have 5 Orcs attacking you and so we want to get it so the Orcs don't crash into each other at the moment and so they spread out around you. Just the 3 attacks and the 1 parry should be enough to give it a dead easy starting position and incredible complexity dropping out of it - Like Doom, which basically was left, right, run and fire and there's nothing else to it and I think that's the best-selling PC game ever but that had, from those 3 simple rules, that had a significant amount of complexity dropping out of it, there was loads of tactics, like if you hide here and do this and that then you can shoot these guys. I mean if you ran into a room then you get shot, blown to bits immediately but if you like hid over here, shot, ran over here shot, and you've followed the rules in the previous levels then you could do it and its all this hidden complexity that seems to be the magic game play thing. That's definitely what we're trying to achieve and I don't think that's what the 'Into the Shadows' people are going to achieve but I do think that's what the Doom 3 / Quake people are going to achieve".

This emphasis on the role of graphics and their value in games differs from Malone's (1981) and Turkle's (1984) accounts of the main attraction of games, but is similar to the Sega and Nintendo research given in Hayes and Dinsey (1995) of user motivations for what influences them in their purchases. In this respect, the defining games as having an either/or emphasis on their graphics' content or kinaesthetic and rule driven design, gives a producer-driven categorisation of types of innovation games have, as well as their proposed user-attraction and strategic implications. For instance, games were defined as 'playable' games with 'simple rules', compared to other games' designs with emphasis on graphics' technology and outperforming other products.

Etymologically, *Bloodshot* by being a 'video game' and placing emphasis on the display was literally intended to be an 'eye-game'. Its visual basis of intended communication represented part of the attraction that Defanti (1984) had identified as the non-verbal component of communication that facilitated the globalised diffusion of video game technology.

9.3.4 Further Dimensions of the Product Space - Defining a 'Video Game' and in Turn Defining Specific Products

One aspect of the issue of graphics is relevant to providing a contemporary definition from a production perspective of 'what is a video game': Defining it by a set of techniques in their own right or, techniques expressing wider symbolic design ideas. For *Bloodshot*, the programmer's attempt at a 'state of the art' 3D technique relevant to the MegaDrive's capabilities was the game's main focus in the second stage to which a game design was fitted around as it evolved. For the two *Putty* games, the artist's images and characters were the main focus of the game's novelty and the software techniques were just to move the characters and therefore less 'conspicuous' than *Bloodshot*'s use of software routines in the game's novelty. Other subjects, (7), (26) had seen the role of programming techniques as an element of the game's content that in itself had a meaningful identity not unlike the role of 'hacks' in Levy's (1984) observation of programmer's virtuous programming, as examples of 'elegant solutions' worthy of critical appreciation.

9.3.5 The Value of Graphics

The following section gives an example that illustrates the value given to providing graphical techniques and their essential role in defining the games content. For example, the game *Fighting Fantasy: Death Trap Dungeon* during its development was effectively in an interactive dialogue with the design of the rival game *Into the Shadows* via the design teams mediating interpretation of the games in terms of their design merits:

[So you obviously look at other games?]

Oh yeah we have a damn good close look at them. We had a long look at the Into the Shadows demo and so we worked out what it is its doing and what it is we're doing and what are the differences between it and we were...we were you know it was quite depressing to see it initially because we thought 'good God this is fantastic' and now we know what it is it is doing and now we are quite happy that ours is going to hold up to it.

This demonstrates another example of other games' influence on games and the significance of sharing of aspects of their contents for selection and refining.

[That would be interesting can you talk me through it and say what you like about it ?]

I'll show you exactly how that...I'll tell you exactly how theirs differs from ours but there is actually...it's quite pleasing to see in a way...because they do have a remarkably high frame rate, so they may have x frames a second - we're not doing that yet but we know why we're not doing that because we haven't optimised the low level code that's drawing all the polygons and all that but we've got technology that they haven't got. We can like...get an object say a fiery spell stick alight at the end and

lob that down the end of the corridor and it will light up, cast shadows on everything as it goes down the corridor and they can't do that – it's really nice to see..."

So we got all these pieces made up for this dungeon and they're too big but the hero's this tiny little guy and we've got this h-u-g-e dungeon around him and we saw this demo ... and we got the huge dungeon and we justified it with the film sets and larger things because basically it was down to, no one knew where the hell the camera's going to go and now we have seen this demo from another games' company called Scavenger and the games called Into the Shadows and that had really confined spaces in it and it's yeah – it's another Dungeon Master type thing but its more of a Virtua Fighter complicated ...you know - the bad guys are out there to kill you not the dungeon - where ours you're lucky if you can see the roof. So I mean we're going to spend...we'll have to spend a lot of time bringing our dungeons down to scale ", (26).

Given the programmer's emphasis on routines and their graphical novelty, the scrutiny of competitive games and feeling of the need to out-perform existing competition, there is also therefore, another explanation for the non-economic emphasis on copying or 'cloning' elements of games. A feeling of reward from improving incrementally upon known techniques or emulating them on different machines acts as a mechanism for steering content choices in video games to building upon known releases rather than pure copying of game design templates as had been seen in the example of licensed material earlier.

9.3.6 The Value of the Game's Rules in Defining its Meaning

The second aspect of *CyberPunk's* design content, the rule driven play aspect of the game which was fitted on to the design, had a secondary imagined user. This had paradoxically been posited as being both a typified 'MegaDrive user' and, to reflect the designer's own taste for games, as being representative of the user in general. The imagined user of the machine was felt to prefer less complex games due to the type of games produced for the machine (which was less complicated to use than a home computer and was reflected in games' designs as only 3 buttons were available for use).

Part of the duality of designer and user compatibility of the game's 'needs' in designing its rules, was the issue of simplicity inherent in arcade action type game designs. These were seen to be compatible with the MegaDrive's limited user interface control pad or I/O (input/output) device and its perceived user profile. Additionally, tied in with this issue, was the intentional design choice of using pre-existing aspects of other game designs within this game. This intentional communication-by-design in *Bloodshot's* rule-driven play design for the game was described as providing a game where having "*fun with weapons*" (30), was seen as a generic design choice that was compatible for "*that kind of game*". Therefore the user's understanding of how to play *Bloodshot* was also partly dependent on being familiar with the rules of "*that kind of game*" (30), beforehand. Indeed the aspects of use and familiarity over design conventions were described as having the effect of creating a "*language of games*" (30), that would be easily read by the player. This follows the notion of 'new' consumer commodities seeking to be both recognisable and new by providing both "*the familiar and the strange*", (Silverstone and Haddon 1996, p.48). Therefore, the design's 'familiar' use of conventions of generic aspects of game designs were mixed with the 'strange' 3D display on the MegaDrive which was

how *Bloodshot* intended to communicate its 'newness' to the user as a designed artefact and consumer commodity in a competitive market environment.

9.3.7 Redesigning *Bloodshot*'s Intended User

The intentional design aims of structuring *Bloodshot*'s content were amended with in-house influence from the unsolicited sampling of the game by other personnel in the firm. The basis of this was due to *Bloodshot* being compared with *Doom* - "*Word got around I was doing Doom but I never was*" (30). This contrasted with the designer's preferred use and meaning of the display. This aspect of the in-house non-technical influence on design had also been experienced in the development of a parallel game *Total Football* by its programmer (32). Here ideas and comments were made about the game that did have some minor influence on aspects of the football skills the characters had. This too was felt to be a distraction and encroachment upon the design teams autonomy and control over content selection.

For *Bloodshot* the intended simplicity of the I/O design to enable a "*quicker control system*" (30) for the imagined user and the pressure to make it comparable to *Doom*'s control and movement method meant there was a recycling of another pre-existing aspect of a game in the design. Yet the issue of changing the corridors to a simpler layout while changing the intended design was not objected to because it was compatible with the game's emphasis on 'simplicity' and the tenuous link to *CyberPunk*'s emphasis on movement to negotiate a complex space. Therefore influences were not all simple unwanted pressure but could have the tacit consent of the programmer as the changes were compatible with the game's aims or at least were not in conflict with them.

Further indeterminate effects upon the intentional aspects of the game's explicit design came from the organisation's interaction with magazines, which had created the reason for including a map to influence the review score as well as bringing information of competition and *Zero Tolerance*. This had another unanticipated effect upon the games intended design and here the emphasis was a strategic motivation to change the design to individuate the final game from prospective competition and keep any sense of 'uniqueness' that was part of the initial strategy. Therefore the influences upon the game came from two other games and removed an aspect of the design teams definition of the game away from it having its own unique identity - "*can't this just be this*" (31) - to an explicit dialogue of similarity and competition with the other two games.

The influence of magazine journalists on design activity was also seen in a parallel product in the firm, *Total Football*, which had absorbed an ad hoc design change to the control mechanism to make the Amiga version play with more complicated joysticks, (McGill 1995). Again this link between game magazines and firm's design activity was repeated with advice provided by an editor who came to the firm to describe the present state of football games on the market before the firm embarked on a new one for the Sony machine, (32). This demonstrates an example of design occurring via the interactions of objective (1) and (2) together with magazine journalists as a relevant social group.

9.3.8 Silly Putty Phase 2

The second phase of realising the demo of the character into a working game further demonstrates aspects of interpretative flexibility in the game's meaning and design

form. This provides evidence of the designer's intentionality in encoding the game, as it progresses, being mediated by information flows from other intra- or extra-organisational sources.

9.3.9 The Labour Process as a Source of Design Choice

The role of labour and the influence of the programmer in implementing the design in software were apparent in this phase - in contrast to *Bloodshot*. The issues of artist-programmer interaction and labour roles were seen to be political. This was in the sense that they involved negotiation and control over content selection, which was described in gatekeeping terms e.g.: "*the programmer shelved that*"; or in terms of balance and persuasion e.g. the programmer "...*having too much say*", or (artists) needing to "*stand your ground*" (28). This mode of defining and negotiating what is possible and what can and cannot be included in the design was also noted in the implementation of the 3D elements of *Death Trap Dungeon* by the programmer in the dialogue with the artists as well as specialist designers (26). This showed a more complex facet of the interaction and influence of the programmer, beyond the style of the game, to inclusion and operation of play elements.

The source of this account, in conjunction with evidence of *Bloodshot's* construction, does give an insight into the debate on the nature of the potential importance non-programmers have over the implementation of games. Also this makes attempts at defining the 'making' of games and trying to sustain any notion of the relevance of 'authorship' in the design process and the 'essence' of a game's creation being attributed to an authoritative figure difficult to sustain. Despite the media representations of games being the creation of a genius-like figure - such as Sigeriu Miyamoto of Nintendo as Mario's designer/genius (Sheff 1993), or one of the firm's leading figureheads in this research - P.Molenux - (10), there is wider scope for blurring the nature of authorship of games. This leads on to the next issue.

9.3.10 Who is the Designer?

This question is pertinent to the identification of the relevant social groups and the sources of creation in the development organisation. This illuminates a dimension of the interaction of the designer – objective (1) - and their conduct in the development organisation and the development team – the concern of objective (2).

Despite acknowledgements of group efforts and the evidence of the influence from other sources upon design and content issues, the belief in games having an author with full authority over content still had some currency. Despite the use of external ideas and resources from other games and use of others' labour skill, the individual was seen to be the main source for creativity or human identity behind the game as in an auteurist sense. This was reinforced by defensiveness over ideas about content choices from external sources or from others at certain times within the group. The identification of an individual with the design was expressed in the interviews explicitly in terms as referring to projects as "*my game*" (30) for *Bloodshot*, "*My baby*" (32) for *Total Football*, or the response to my question:

[*Would a different programming team have changed the design?*]

"Of course! - *Putty Squad is P.... [The Artist (28)]!*" (8).

Yet this is a belief contested in the development process where programmers are seen to influence ideas in implementation. The statement that "*Designers don't make*

games" (31) "*programmers do*", represents a divide between the role of abstract game ideas and fantasy scenarios defining 'a game design' versus a definition stressing their materialist embodiment in software techniques. This reveals an explanation of differences in views of authorship in computer games. It ties in with the wider historical trend of the emerging division of labour in making games, away from the individual programmers in the 1980s for the home computer market (14), (7), to a 'team' approach to groups of people labelled as artist, musician, producer, programmer and tester. In this sense, the issue of what the programmer should be responsible for, can be placed in the wider industry context of removing aspects of responsibility and control in content selection compared with what was experienced before. The creation of roles such as 'support programmer' had been seen as a further method of creating a split in the programming activity and meant that the support roles were becoming more specialised and more dislocated from creating and controlling a whole project, (10).

9.3.11 *Silly Putty's* Design Flexibility

The second aspect of change to the intentional design aims of *Silly Putty* related to the issue of complexity of the character's manipulation that went beyond labour role negotiation, in that it defined the user's relation to the artefact in play. Again, as in *Bloodshot's* first phase, the end-user relationship to the software relates in either a direct or indirect manner to how labour disputes in implementation are resolved. Here, the labour dispute over implementing character complexity affects the complexity of the users' play itself. Retrospectively the artist did concede that this aspect of cutting the character's repertoire of moves was a 'correct choice' and parallels the debate about the moves in *Bloodshot's* combat system. Another in-house project - *Fighting Fantasy* - had a team member contest the issue of its combat system's operation and the number of moves to operate it because it did not mirror the control system of another successful product, (26). Therefore the issue of simplicity and complexity in control interface, control choices and user interaction with the software was not clear-cut in games' creation.

Another aspect of *Silly Putty's* creation comparable to *Bloodshot's* development in this phase, was the firm's interaction with the games' press in relation to the game. Here the same institutionalised strategy of using the preview mode of initial scrutiny had been enacted. This included an element of managing the game's preferred message communicated to the press, in the sense that 'idealised' pictures were distributed which deviated from the actual state of development. A secondary aim of allowing press coverage of the game was to acquire negative feedback and to modify the game's design in accordance while it was still in its development phase. Again, this interaction was similar in motivation to that which led to *Bloodshot's* inclusion of the map. The emphasis put on the developer-press relationship was one of dealing with uncertainty and aiding product forecasting. The absence of negative feedback was interpreted as the product being a success and the firm getting closer and closer to a "winner". An unintended consequence of the press feedback here as with *Bloodshot* also led to changes in the intended design. The journalist rewarding of the "*cartoony effects*" (28), leading to reinforcement and emphasising them in the game's development had meant that the game's identity was felt to have shifted significantly.

By including more redesigned characters and sound effects from the library of sound effects, it had meant that the unintentional side effects had altered the meaning of the game from being "*just a normal game*" (28) - i.e. a familiar artefact to becoming this

"*strange thing*". The recombination of the intended unique character with added characters and sounds was seen as an element of serendipity and illustrates an aspect of uncertainty in the realising of ideas in development with extra-organisational influences. Here the "*accident*" (28) or element of 'serendipity' in the development process (Roy and Wield 1986), was a function of journalist feedback which was given a high value and credibility due to their institutionalised position in diffusing the game's image through previewing and reviewing games.

The implications for the user attraction here, as with *Bloodshot* was its graphics in providing a special visual element and the arresting of the watchers attention - "*being rooted to the spot*" (28). Yet the emphasis on attraction here was not 3D technique, but, cartoon-like entertainment and extra scenarios independent in meaning from the specific customised hardware abilities of the Amiga computer.

9.3.12 Phase 2 - *Putty Squad*. Questioning the 'Need' for Novelty and its Interpretation in Design

The intentional design underlying the sequel game represented an effort to control any unintended consequences that would affect the diffusion and reception of the game's design detrimentally. This had been the first *Putty* game's experience in its console conversion.

From a perspective of content choice, the implications of the co-ordinated design and proposed release strategy had sought to manage the trade off between continuity and innovation, or 'familiar and the strange', by reconstructing the user in identity and significance. This in turn impacted on the game's content. In contrast to the first *Putty* game's elements of adaptation or 'spontaneous' changes to the game's appearance, the intentional design choice to exclude the idiosyncrasies of the UK-centric character design, i.e. - "*everybody's packed in ... from every country*".. "*there's very little in the way of ... cultural stuff in it*" (28) - had the imagined users' needs in mind to reach a maximised global audience at the outset. In conjunction, the Nintendo approval process was held as a significant extra-organisational barrier to bear in mind for design. This in effect, represented another 'user' or 'audience construct' intentionally considered with a view to representing both an institutionalised barrier (for cartridge production) as well as a cultural mediator in terms of approving items that would be in sympathy with Japanese culture. The scanning of content of other game designs in the Japanese market, and choice of a war scenario, where shooting was appropriate, together with a 'cute' style character emphasis on the art work, therefore constructed the Japanese market as a target for the game which other users in other markets, by default, would also comprehend. Content and markets were homogenised in the sense of the user being a globally-situated player. As Japanese games were generally successful worldwide and the reverse diffusion of games into their market problematic, the user would play what the Japanese user would find acceptable.

Aspects of other games' content were scrutinised intentionally for how Japanese games were felt to 'encode' success in their design. This again has an element of similarity to *Bloodshot*'s designers transplanting aspects of other known designs for the purposes of the 'kind of game' to communicate familiarity to the user. Here, for the sequel game this also served to play part of the planned, controlled approach to design. This had involved the attempt to co-ordinate both the transplanting of the coded game from the lead machine to other multiple hardware formats and the

intended co-ordinated diffusion of the game to users in a less staggered way than before, as well as co-ordinating (ideally) the labour process.

In this sense if *Silly Putty's* design was intended to be different from "*other platform games*" (28), than the sequel game by contrast made a more purposeful attempt to embrace generic aspects of platform-type games' content in a more rationalised design effort. The first *Putty* game was felt to be too 'strange' and the sequel was intended to communicate the 'familiar' globally. This demonstrates another use of precedence in the macro-social level to anticipate adoption and consumption in the micro-social phase of Silverstone and Haddon's model in chapter (3).

A secondary aspect illustrating how the firm attempted to manage the creation of the new game and the balance between novelty and familiarity ties in with the logic of firms operating in other cultural industries, (T.V., films, books, pop music), that seek to produce new products for economic survival, as a "*desperate search for novelty*" (Crane 1992, p.10). In this sense *Putty Squad's* production, in continuity with the industry's output of all games in its platform game genre, was not enough to warrant novelty in identity in its own right: "*It is after all a platform game*" (8).

The constituent elements of the game that defined its identity as belonging to the category of platform style games were described as having to "*disguise the fact they are totally unoriginal*" (8). Therefore the emphasis on popular culture and the cultural industries use of repetition in content, (Skirrow 1985, Crane 1992, Day 1990), are in operation here in the sense of the game recycling present known aspects of cultural goods and representing them. This aspect, Gitlin (1983, p.77) described as "*cultural recombination*" and "*recombinant thinking*" that T.V. networks use to recycle and imitate existing programs, and Monoco (1979) saw as applicable to cinema films' logic of content selection.

Here, *Putty Squad's* use of "*disguise*" of the familiar or "*mundane*" (8) and conventional aspects of the genre the game belonged to, involved use of new graphics and slap-stick style interaction between characters as well as just new designs for the characters appearance and backgrounds. In this sense the disguise at operation could be seen as similar to Adorno's critique of operation of the cultural industries standardising output as with conventional industrial firms' operation and provide (Crane 1992, p2), "*an illusion of novelty*" - but at the production level.

9.3.13 Interpreting 'Novelty' in Defining 'The New' in the Product Space. Design Examples of Other Games

Paradoxically the whole aspect of repetition and cultural 'recycling' of pre-known aspects of culture to produce new combinations of goods for consumption in popular culture is part of a wider issue relating to the debate over innovation in the games' industry, its definition, and necessity in product design. These issues were present in critiques of the industry's operation. How this issue is interpreted is relevant to the theoretical issue in (3.4.2) that brought attention to the possible alternative configurations of technology.

Bloodshot's programmer's own admission not having to innovate in producing new games was an explicit example:

"but a lot of people will want to play games and pretty much anything you release if its good, will sell and so you don't need, I don't sort of lay awake at night and think 'Oh God the next game has got to be different or nobody will buy it'" (28).

Rather, his expressed aim was to produce competent quality games that did not necessarily deviate from other known designs - and the example of known game elements being 'a language' was an example of this observation for 'deconstructing' games into constituent parts. Other approaches to the issue of originality in game design contested the relevance of the whole notion of there being a 'first' example in the first place. As precedent existed for all 'new' concepts so all ideas were 'borrowed'. Rather, the mark of quality in design was in technical or craft competence, (15). Additionally the need for originality was questioned as to whether it was a relevant need of users - "*They don't necessarily want new games*", (22). In the latter respect, this illustrates that part of the user's enjoyment of games as an example of the operation of wider popular culture which uses familiarity with conventions and repetition as its derivative source of familiarity. This in turn, drives pleasurability in the consumption process, (e.g. Skirrow 1986; Eco 1985). With one exception, (which placed emphasis on the role of gossip and conversation in a game design (12)), none of the interviewees produced active examples of demonstrably radical aspects of games' design concepts that were available in a form that could be scrutinised, conceptually discussed, or mocked up for prospective funding. Many firms, however, had new graphical approaches or 'engines' to implement in a known games' design style, so as to add a product feature. For example, one game *New Day* that used 16 digital cameras to simultaneously film characters for rotational character data was featured, shortly after my visit to the film set, on the BBC programme *Tomorrow's World*.

An explanation of the bias for emphasising graphics as the site for defining games as 'new' products, is the ease of scrutiny and observability of that element of the game. The industry benchmarks of graphical quality (as in *Bloodshot's* designer's case) used quantitative technical criteria such as 'frame rate' (frames of animation per second), or number of pixels on screen or polygons, to measure relative competence or progress or quality of a game's look. Such benchmarking does not exist for I/O and control standards in game design. Additionally, graphical bias in design had compatibility with the magazines' mode of operation, in their using screen shots of games to demonstrate them and create awareness - as with *Silly Putty* and the competitors to *Death Trap Dungeon*. One subject who had worked as a magazine editor revealed the bias given in coverage to games that were supported with pictures, (3).

9.3.14 Questioning the Need for Alternative Designs Choices

Despite the lack of explicit examples of alternative designs, there persisted the idea in the interviews, (as in section 2.2), regarding the derivativeness of designs and their publishers' being risk averse and establishing 'barriers' to innovation'. An example being the rejection of the demo of *Putty*. This explanation of the industry's selection of games was applied to one game, *Populous*, and has been used in industry lore as the example of a game that created a new genre ('God' simulator) and was repeatedly rejected for its obscurity but sold millions once finally accepted, (Roberts 1997b). Given this, however, the lack of examples made this problematic as there was no evidence in the research of a design deliberately seeking to be unique when rejected ideas had been discussed. This could only be studied with an explicit examination of rejected game proposals and the creation of a fixed indigenous definition of 'innovation' or 'quality' and its relative parameters. Where proposals were rejected, it was felt to be due to it being a proposal which did not fit in with the publisher's time frame of production, or the wrong machine was chosen or there was a logistical

production issue, but not a conceptual design problem (8), (22), (1). In the case of (1), the design of a proposal and demo was made with aspects of familiar generic design concepts and the thematic choice of 'tanks' to aid acceptance by a publisher. This has aspects of similarity to Ryan and Peterson's findings (1982) in demonstrating the thinking behind choosing 'safe' content in entertainment software and therefore manage its 'product image'. That is, conservative choices are made in content selection in order to anticipate the perceptions of other actors in the next links in a decision chain that affects the product's acceptance for production and therefore minimise the chances of rejection. As a consequence product content becomes recycled.

In absence of any 'essentialist' definition of innovation or quality and concrete criteria for judging content - as with T.V. (Mulgan 1990, p.6) - the evidence from the case study and interview data shows that a pragmatic definition of what content providers think is 'new' and quality content *is* 'new' and quality content. This judgement helps to decide what is adequate content for release and is effectively communication-by-designing new graphical scenarios, as had been discussed in the section above (9.3.13). The first *Putty* game had eventually recombined other icons of popular culture into a known video game style. *Bloodshot* used both known 3D graphics and point of view maze shooting as a source of design reference to represent on the MegaDrive. Intentionally, *Putty Squad* used aspects of a narrative to drive the design for a new 'strange' scenario or "*wacky environment*" (8) or "*pythonesque world*" (28), where the user could experience new locations as Fuller and Jenkins (1995) argued - with the *Putty* character now familiar in the video game context.

9.3.15 Institutional 'Barriers' to Novelty in Design Configurations in Historical Perspective

From a production perspective, the whole issue of the creation of new play concepts and new ideas in games and the problems associated with it, as noted, had historical as well as contemporary relevance. The issue at stake in exploring this is to reveal how designers in the industry decide what counts as 'new', and given this, what possible product configurations are blocked off. The 'problem' of originality, as mentioned earlier in (7.1.3), had been used by game developers themselves in their discussion about the industry's production logic. An example from a decade ago, is comparable in rhetoric to modern statements:

e.g. Penn (1987, p.50-1). Interview with designers from Sensible Software.

"There are so many TV tie-ins or arcade conversions that just won't work. A tie-in comes out, it sells – it's crap. Who cares? It makes money".

or on the issue of new ideas

"If a game is going to impress it's got to be a totally new concept - or an extremely innovative adaptation of an existing concept. It's far easier to produce new presentation than it is to come up with new concepts".

An example of a new design concept involving risk and criticism that received press coverage was one programmer's new control mechanism over a method to eliminate objects in a game. Here a 'killdroid' was used, instead of bullets, to collide with enemies. This came in for press criticism, due to its unconventional nature in a shooting game format, and was blamed for influencing distributors not willing to handle the game subsequent to a poor review, (Lidden 1985, p.80).

As with *Putty Squads* design solutions for overcoming the issue of newness and familiarity, one solution was described:

Penn (1987, p.51).

"In the arcades ... people are stretching the old arcade concepts and simply glorifying the presentation without bothering with new ideas. With Wizball we're trying to present new concepts in a familiar way but whether it succeeds....We want to do Wizball with a company that could give it a bit of hype. So they could actually hype what we feel is a decent game...You've got to get inside [the industry] to influence [content decisions]. You can't influence from the outside, by being anarchic, say".

In this sense, the issue of newness in game design concepts is related to incremental implementation changes and this is counted as 'risk'. The implications of the above accounts about design are to show that actors themselves, in their production and design choices at this stage, are critically aware of their situated design activity in production choices that involve risk in the industry structure that diffuses games. Yet their own design activity is conducive to recreating the overall pattern of content release by acknowledging the scope of risk averse design choices and engaging with incremental design choices in the absence of any belief in, or existence of a viable radical, game concept innovation. Therefore designers do elicit an uneasy tension between both critical observer *of* and active participant *in* a wider process of the industry recycling of content in games.

The issue of precedence and communication as part of the problem in game concept formation explains why the 'helping' behaviour of the 'anti-characters' in *CyberPunk* was seen as a difficult concept to implement algorithmically. The issue of communication of ideas was seen again:

Penn (1987, p.50):

"We've got loads of new concepts that we'd really like to sell but we can't find an outlet for them. It's so hard to go about it - actually communicating with someone else is the problem, making them see things as you see them".

In this respect, derivative descriptions, help to describe imagined games' workings, as was seen earlier with the explanation of licensed games' content selection. This shows how producers regard 'new' ideas or concepts as well as benchmarking the use of such terms in talking about design.

9.3.16 Voluntarist Repetition as a Source of 'The New' in Product Innovation

Given the historical nature of the debate over design and originality which pre-dates the widespread impact of either Sega or Nintendo's licensing and approval strategy, the aspect of a 'lack of innovation' or communication problems cannot be totally blamed on the cartridge mode of production. This is because an aspect of designer voluntarism is relevant to making decisions compatible to the limiting aspects of institutions that scrutinise and diffuse games. In the interviews the designers' own preferences in design were themselves formed while playing the computer games as consumers or hobbyists and these served as influences to be replicated, out of appreciation of, or reverence for, the 'original', e.g. (1), (2), (7). The designer of *Bloodshot* tried to replicate the experience of playing other arcade action style games and (8), had revealed that they played competitors' games to examine how they achieved effects or events and how these created emotion in the player. This is of

relevance to **objective (4)** because it shows how designers consider the user in their absence.

Other examples of voluntarist reproduction of existing content by designers who were attempting to simulate aspects of a game's display, includes (14), *KnightLore* and *Chimera*, (32) *FIFA Soccer* and *Total Football*, (15) *Street Racer* and *Mario Kart*. One artist whose work was influenced by a seminal 3D game that copied an isometric display from an industry 'milestone' game – *KnightLore* - had felt rewarded when the press had mistaken the iterative use of the display, in the game *Batman*, as being a sequel from the original firm, (21).

Where console manufacturers were seen to demonstrably influence a game, there was observable impact upon developers autonomous design choices, seeking to revise them in favour of more standardised content choices. This shows the interaction of the concern of **objective (3)** upon (1) and the games content. The aspect of approval then, is another institutionalised form of communication that games must traverse, beyond the magazines and distributors that existed from the mid-1980s onward. The communication of game concepts can only be made more problematic with more power holders entering the 'conversation', which moves across transnational boundaries with different expectations, cultural values and symbolic content. By standardising content choices and having a tacit agreement to choose content that has been used before in a proven game, design can be regarded as a 'conversation' between the imagined user via the mediating influence of these actors in diffusion. This conversation is made less prone to, but not totally without misunderstanding. So, for instance, the designer's criticism of journalists or publishers as 'not being games players' or 'not understanding games' reveals a belief in there being a consensus over games' content which one can communicate about. This in turn suggests that the 'product space' for games as a category is held together by some unified knowledge. Also, it suggests that such knowledge is regarded as necessary to support a legitimate scrutiny of game designs.

9.3.17 Should There Be Innovation?

Critical academic arguments are voiced in favour of alternative computer game designs in section (2.1), (Provenzo 1991, Flemming 1996):

"what this remarkable technology could support is a much richer play space ...[rather than]...so many endless variations on the same basic game format of beating the opponent or progressing through various stages or levels of complexity in terms of eye brain co-ordinate challenges".

Flemming (1996,p.57).

This type of criticism suggests that the product space of video games can be different. However, this does not account for the underlying content choices of actors in the production phase, autonomous or influenced, who would create the games where any such alternative possibility lies. Further, they offer no alternative strategies for design for a supposed shift in the 'product space' or application of the technology that would not in itself represent aspects of influence along 'hegemonic' or ideological lines. Also while the recycling of content can appear to be in accordance with critical theorist critiques of the working of the cultural industries' pursuit of profit, the compatible voluntaristic choices and motivations of developers that constitute dualistic patterns of behaviour which are compatible with this working. This can inadvertently give

legitimacy to the mode of operation of the institutions that regulate content choices and has to be taken into account.

A second aspect of defining 'new' in the producer perspective was emphasis on the technical code and structure of software, where routines were scrutinised for their effectiveness and impact on the design's operation. The programmer of *Bloodshot* examined the routines of *Zero Tolerance* to evaluate its comparative merits to his own technique of creating a 3D display (which he felt was less advanced - but could see that they had similar problems). This activity had been seen with the sequel *Putty* game but also had historical precedence:

e.g. Rignall (1985 p.79). Interview with designer Archer McClean:

"Minter's games I suppose are the most prolific but he's got the same set of routines which he reorganises making his games rather monotonous".

As with the example of scrutinising graphics in games, the rewarding of technical merit gains meaning in programming circles. Also it gives definition to the product space of 'video games' beyond being 'a design', an abstract idea or plan for a game, but also regarding it as an optimised, technique-driven, running piece of software communicating these game concepts. The next section returns to the case study games.

9.3.18 *Putty Squad*. Emergent Design Choices in the Changing Contexts of the Organisation of Development

The overall intentional design strategy for the control, prediction of diffusing and creating the game, was eroded by the indeterminate effects of other agents encountered in the development process. The situated nature of design and development of the game within an organisation, that had changed its market position by specialising in development, committed the firm to finding an external publisher to diffuse the game, so taking an aspect of control away from the development firm. Therefore issues of timing, price and quantity of supply, location of release were no longer under their control. Further the growth of the game's size necessitated that more resources be put into the game's development. Given that the period was marked by increasing costs in development in the industry, *Putty Squad's* creative conditions matched those across the industry, where increased costs and specialisation of organisations was becoming apparent, as well as buy-outs by big publishers, that sought to integrate development teams in-house (which this game would be competing against). In this respect, the increased development costs were similar to those of the film industry, (Crane 1992, p.63), the implications being that the element of risk is minimised by avoiding unusual content and aiming for safe conservative content and also for a 'blockbuster' hit.

Therefore a combination of the organisation's changing economic circumstances and strategy, together with industry trends and, individual choice based on the interpretation of feedback from the first game, continued to influence the sequel game's design and to increase its size. The apparently voluntaristic or spontaneous design decision to expand the game's design therefore had a wider context in trends of the industry's operations. Therefore this demonstrates the interrelated and situated nature of the development organisation – **objective (2)** – within which designer activity – **objective (1)** – too was ultimately embedded. The next section continues to illuminate issues related to this theme.

9.3.19 Autonomous Labour Impacts on Design

Another aspect of indeterminacy affecting the proposed implementation of the design was caused by the disputed quality of the routines and shift in emphasis on design and the Amiga machine becoming the first target platform. This unanticipated issue illustrated the point of concerns over quality for the new games 'needs' as being pertinent to producer values. Additionally the issue illustrates an element of the programmer / artist role relationship to design in relation to *Bloodshot*. It was felt that changes could occur because the programmer himself, by virtue of his skill, could give authority to veto or issue changes in the game's ideas.

Another indicator of product quality concerned the dispute over music selection that also proved problematic. As with the selection and redesign of *Bloodshot's* sound effects and the autonomous inclusion of the exclusive CD versions rave music, *Putty Squad* had unanticipated content choices made for its music by the autonomous decisions of musicians regulating their own labour practices. As with film score music writing, (Crane 1992, p.68), the issue over the communication of music forms for accompanying pictures and the problems in obtaining agreement over quality were apparent. However, the state of affairs in the film industry experienced by musicians, where their "*autonomy is constantly threatened*" (Faulkner in Crane 1992, p.68), was not totally present in the video game industry. This was shown with the use of rave music for *Bloodshot* and the "*experimental blipping noises*" (30), were autonomous content decisions and occurred in other games. Despite the legal action that occurred over the music's suitability and authorship, the music choice for *Putty Squad* for the SNES machine (again using rave type music), by default, remained an autonomous content decision by the musician rather than following from the designer's intentional demands. This was also the case with the IBM PC version's rewritten score that used jazz influence.

Therefore, for both the sound *Bloodshot* CD version, the SNES version of *Putty Squad* as well as the ad-hoc addition of sound effects for the original *Putty* game, the addition of sound to their respective designs was felt to create unintended distortions of the game's meaning in relation to playing atmosphere and product identity, relative to the designer's initial intentions. Both *Bloodshot's* CD version and *Silly Putty* were felt to be transformed by their sounds, according to their designers, whereas the SNES music addition for *Putty Squad* was felt to be detrimental to the game's intended operation. From a producer perspective, the influence of sound affected the communication of the game to the user and was not possible to control in all circumstances - both *Bloodshot* and *Putty Squad* had used appeals to authority to try and change aspects of the sound that the games would include.

In this respect, *Putty Squad's* process of crafting the game in this second phase introduced aspects of uncertainty and unintentional design influences into the game's content which its imagined design strategy could not perceive, in the earlier phase.

9.3.20 Finalising the Game's Operation

This final section of the second phase of 'crafting the game' examines *Bloodshot's* and *Putty Squad's* attempts at finishing off implementing their designs' final operations. This stage of the labour process in development involved, in effect, emulating the user / consumer in test procedures that in turn influenced player - machine interaction and the style of play allowed within the game's rules. In this final stage, the intentional design configurations are influenced by perceptions of user

needs in play which serve as models to direct the present artefact's design attributes. This relates to the consideration of user needs in design which was the concern of objective (4).

What is of contrast between the two games attempts to finalise their development and seek 'closure', or consent over their final implemented formation, is the degree of contention derived from extra-organisational sources around the meaning of the design chosen and what final form the design could be allowed to take. *Putty Squad's* intrinsic difference to *Bloodshot* as 'a video game' beyond its style, was its existence as a development project that was intended to be available for both an open-ended home computer hardware architecture - and a closed, 'policed' console hardware architecture. This unique aspect of the project's multi-format release strategy gives the research a comparative glimpse of how the same game design is influenced when placed on the two different hardware configurations.

9.3.21 Constructing the 'Problem' of Difficulty in Games

For both games the basis of testing and adjusting the aspects of movement and rules relied on other comparable products which served as models to influence their own content. *Putty Squad's* tester referred to the influence of "other games" (29) and in particular Mario's movement as a source of influence. In addition to this, the skewing of the game's difficulty was an attempt to prolong user involvement with the game. This 'try - and - see' approach of adjusting elements of the game reveals an ad hoc method of changing the play area in an attempt to prejudge the player's activity and prolong the sense of achievement while staving-off frustration and boredom. This choice was based on interpretations of other games' operations and their "difficulty curves" (4), as other developers termed the tempering of the problem of managing the game's play. Again with *Bloodshot* the faxed dialogue of corrections to the test versions had to use vague statements such as "control is loose" to describe these 'problems' and then seek an interpretation to rectify them. Therefore, a tacit and subjective knowledge base of this aspect of video games conventions influenced the given game, rather than any pre-worked algorithm of known movement and fine-tuning.

This type of knowledge was not pre-calculated in some pre-rationalised behaviourist technique but was based on subjective judgements about sensory-motor skills used to regulate the movement of characters in the game. This aspect then does not really match Sudnow's (1983) or Provenzo's (1991) findings in their interpretations of the working of video games and the belief in a methodological preconceived and premeditated pattern of play that the user faced in the games 'micro-worlds', see (2.1.4).

The effect of varying the movement aspects of the same design on different architectures was experienced in the 'porting' of *Putty Squad* to a different hardware format. This required human judgement to amend the design's operation and was not totally replicable across machines by 'mechanical reproduction' or in any 'Fordist' sense. The encoding in software of the player's anticipated play regime in an idealised and intentional form was realised in the Amiga and PC versions. This was where the autonomous developer firm's 'preferred' implementation of the game design was felt to be realised, (as with the original *Putty* game). The SNES version, due to external requirements in I/O interface, pre-designed hardware restraints and the institutionalised practice of making games accessible or "easy" (29), meant that the

Nintendo version was felt to be "*the most flawed*" (28). Therefore, preconceived influences affected how the game should play. Other interviewees revealed that their products had experienced pressures to make their games easier on cartridge formats which served to shorten the play / consumption time of the game. For instance, the creation of the game *R-Type* on a Nintendo machine was made easier to play at the expense of longevity despite the development firms reservations, (4).

In this respect, therefore, the whole psychological discourse or 'moral panic' over the problems of games 'addicting' children (e.g. Shotton 1989, Ellul 1990, Winn 1985), is problematic where there is institutionalised pressure to make games' playing shorter. From an economic perspective, this strategy could be seen as trying to raise the overall number of games a player purchases or plays on average. This is an aspect of design choice that appears to support one motive of operation in the industry's production logic but actually having scope for being motivated by another disputed imperative.

The conflicting production value over the problem of 'difficulty' for a third party developer with the desire to prolong use of the game, providing value for money or 'fun', could be misinterpreted. This could be reinterpreted as creating 'addiction' in a different discourse, relating the position of the child's relationship to new media and moral panics, e.g. Boethus (1995).

This issue of difficulty as a contested production value was made salient as a geographical and transnational organisational issue with *Bloodshot's* creation and Rocket Software's own MD making a public statement about the US mode of development as providing a design "*philosophy*". This regulated the difficulty in games and contrasted with UK programmer's orientation to design choices and difficulty. Added to this, the Sega classification of the game, defining it as inaccessible for the imagined user by awarding a 'class A bug' to 'the problem of difficulty', vetoed the game's approval in its intended design form. This was another source of power placed upon the intentional aspects of content selection in *Bloodshot's* design. Accordingly, this was an additional influence upon the mode of user-interaction.

This widens the question of control over the autonomous nature of design decisions. It is not just an issue of the designer or in-house team or the organisation, but an issue at a territorial and supra-national level, of defining 'who the user is' and what their 'needs' in play are. This demonstrates a complex interaction of issues related to objectives (1), (2), (3) and (4). Beyond this, further the design influences on *Bloodshot*, to make it parallel *Doom's* design, gave it model of comparison to direct suggestions in the approval process.

9.3.22 Organisational Changes and the 'Problem' of Supply

The situated nature of *Bloodshot's* development, within an organisation undergoing financial trouble, (posting a loss in March 1995 of 3.3 million pounds and turnover down from 11 million to 4.6 million, (Roberts 1995e, p.29)), and experiencing a product supply shortage, meant that the number of significant actors that the game came into contact with was widened. Consequently the dialogue or communication of the game with other actors was broadened and further influence accumulated to affect changes in the intended content.

In the turbulent organisational phase relating to the firm's market position *Bloodshot* was translated to CD format, in order to alleviate the burden of lack of output, and the cartridge version was sold off as a liability and acquired by another surrogate publisher. According to one industry source, the minimum price to make a profit on a cartridge was 40 pounds and the sale of cartridge stock was made in the context of falling demand and price cuts. Yet, in 1996 there were still 7 million European MegaDrive console users that could potentially adopt the game, (Roberts 1995d, p.23).

Therefore in the 'crafting' phase, the economic strategies of the two publishers affected the final elements of producing and reproducing the game. These indeterminate aspects of economic volatility and uncertainty in production conditions were further aspects the designers could not have anticipated in their initial work practices. As with *Putty Squad*, part of the reason for changes, such as in name changes and difficulty, was due to the release of the game to other territories. However, rather than being anticipated and having prophylactic measures encoded *at the start*, aspects of redesign occurred in this second phase of *Bloodshot's* career as a video game. This again shows how meso-level considerations were anticipated at the macro-social level. Additionally it demonstrates the influence of the development organisation upon the designer – another issue relating to objectives (1) and (2).

If *Bloodshot's* subsequent press scrutiny provides a 'yardstick' of critical appreciation and can be taken as a legitimate source of ultimate approval, then these sources of extra-organisational attempts at the approval stage of phase 2, to encourage elements in its design similar to *Doom*, were possibly 'correct'. That is, *if* it would have gained more marks for the game (so as to influence sales) and if user 'needs' were anticipated correctly. In this way, recycling design conventions was encouraged and rewarded if not enforced in the approval process and is an aspect similar to *Putty Squad's* design that incorporated generic design features at the beginning of its design phase, (albeit more intentionally). An element of redesign was possible with the ad hoc possibility of using C.D. delivery, but the imagined embellishments were cut short due to the organisation's time-critical need for product output so that the crafted game did not exploit as fully as possible the CD technology.

A further unanticipated impact of the meaning of *Doom* upon the games' industry as a whole was that to be able to play an 'authentic' *Doom* style game meant that the particular hardware was seen as 'up to date' and not 'old'. In this perspective any pressure from Sega, real or perceived, (as suggested by the uncertainty over causes for rejection in the MD's covering letter), to encourage a game like *Doom* would have benefited the symbolic meaning of the Sega MegaDrive's status with regard to competition with the 'next generation' machines. Conversely, any attempt to delay the game could be perceived to have given the Sega official version of *Doom* for its '32-X' upgrade add-on for the MegaDrive, less competition and so improve demand for the add-on as a flagship game. This aspect of uncertainty over rejection and speculations concerning Sega's motivations reveals an inter-organisational aspect of the politics over the strategic nature of the timing of product release that the cartridge production model invoked. Furthermore this gives an indication of how the issues raised by the Monopolies and Mergers Commission, regarding timing and approval, can affect third party software-hardware manufacturer relationships, (as noted in 5.4.12).

9.3.23 Phase 2: Conclusions

In the second phase, the three games' solutions to problems in allocating resources to the implementation of the game design differed. The aspect of machine choice and publisher *and* developer status had largely insulated the development of *Silly Putty* from any external source of scrutiny that had the power to enforce content choices. Both *Bloodshot* and *Putty Squad* had been locked into a 'dialogue' with either Sega or Nintendo over their game's design and software operation by their choice of proprietary hardware. This influence was accounted for in a pre-emptive way at the beginning of development; or at the end of the development at the final approval stage. In *Bloodshot's* case the changes made in this approval phase had created unexpected delays to its final approval. The organisational change of strategy had meant that *Bloodshot* had widened the source of scrutiny to other power holders at this stage. Both *Bloodshot* and *Silly Putty* had journalists' input in their designs and this influenced content choices. Magazines (journalists) represent a relevant social group at this stage that were unanticipated by the literature in chapter (2) or (3). So hardware publisher – objective (3) – and magazines were an extra-developer and designer influence upon the game's content.

Even the in-house process of the designs' implementations involved unanticipated influences upon both game designs in development and therefore there was no isolation from sources of influence from social groups beyond the original designer(s) in-house.

This second phase has noted the interactions between the organisation, the developer and the hardware firm. Also noted were some defining issues that illustrate the dimensions of the content of the video games product space. It was also seen how the labour process reveals the underlying knowledge about what games should and should not include. These are significant to the debates about how else games could be designed, innovation, diversity and explain the issues of power and authority involved in their definition which were the concern in section (3.4).

9.4 Phase 3 - The Released Game

9.4.1 Introduction

This aspect of the discussion compares part of the three games attempts' to 'find the consumer' (Silverstone and Haddon 1993b, 1996), by examining their preparations for release and their post-production reception phases. This relates to the 'meso-social' aspect of innovation in the theoretical approach, (see 3.2.3). It explores how extra-organisational alliances are used to attempt to make games accessible and meaningful for the user to 'find' and subsequently consume. What is at stake here is the negotiation of (1) the game's meaning as a 'new' consumer good; (2) which aspects of the designers intended aims in the game are communicated as planned in this phase and (3) what aspects of the intended communication in the designed artefact are distorted in this phase.

Of special note was the perceived problem of bias and objectivity of the games press and the problematic nature of their alliance with the games industry.

9.4.2 Publishing the Games. The Games Emerge into the 'Meso-Social' Environment.

In the final phase of *Bloodshot's* publication and distribution, the meaning of the cartridge game as a commodity and its strategic value was demonstrated. Strategically the game had one of two meanings: Either the game was an economic liability as part of a declining market (by 1995) undergoing technology change - or it was an acquired asset in a portfolio of a pre-existing and mature market, where some amount of predictability was possible. *Putty Squad's* path to market also mirrored this aspect once a publisher, following a similar strategy, had acquired it. In this sense, both games shared a similar time frame of production relative to the overall cartridge market's contraction and volatility and were both, in economic terms, potential liabilities. The producer organisation's intended strategy was contingent upon the compatibility of other publisher organisations' strategy in their differential evaluation of markets. These publishers saw an alternative scenario of a potential market for users to 'find' the respective games. Both games had their intended time release interrupted. *Putty Squad's* development shift to making the Amiga as 'lead' version and *Bloodshot's* summer 1995 release had meant that co-ordinating the products release across formats and co-ordination with previews and reviews were dislocated. The delays in the contracting markets exacerbated any potential attempts to 'capture' the intended user, both in market size as well as depleting the symbolic appearance of the games' 'newness' relative to competing releases. This time delay and market change had also affected the intended release of another project at Funny Software:

"...the Managing Director decided that he wanted to do a fighting game like I said before he wanted to copy what everybody else was doing in the market because people were making money with fighting games and he thought with us being... [Funny Software] we could do the best fighting game and beat all of them -including the Japanese - Capcom and people and all of that. Now at the time he thought this up - Okay yes the fighting genre was just coming to its end and the public were losing interest in that sort of game but he, for purely financial reasons, thought we should do it. So we did it. We kicked it into gear and started it up. Now today we find that the fighting market is almost dead. 3D texture map fighting is in, but it's not a 3D texture map game that we've produced, it's the old 2D style. So now we're finding we have this massively expensive product and no market", (28).

9.4.3 The Relations Between Software and the Product Space of the Home Microcomputer

The release of *Silly Putty* for the Amiga represented a 'double-articulation' of the meaning and use of the game in its diffusion strategy. That is, it existed in two meaningful ways: for the computer manufacturer, the software gave meaning to the Amiga 600 hardware as a machine capable of running console style games 'too' at this stage in its 'career' when faced with Japanese competition. In addition, the game was meaningful in its own right by being able to compete with other platform games in a novel graphical and audio style, relative to other Amiga games.

This latter pathway of constructing the meaning of the sequel game was also utilised in the review of the A1200 version of *Putty Squad*. However, the actual market position of 'the home microcomputer' as an emergent 'product space' in the 1980s, that by default also had meaning as a games' software player (Haddon 1991, 1998), had been eroded by 1995. The diffusion of the cartridge based hardware technology

and the increased domestic diffusion of the business computer IBM PC standard with dedicated monitor and hard disc technology had superseded the home micro. This aspect of wider hardware competition had squeezed out one pathway for the intended release of *Putty Squad*. The Amiga's software designs, as had been noted in section (7.2.3, 7.3.1), had been influenced by both console and PC style software, and it tried to match these in producing strategy-based games as well as action-based games. Yet, as was also shown the lack of global penetration and assumed piracy of Amiga games had meant that this hardware pathway had begun to be phased out in the mainstream games' industry. The proposed PC version offered, in compensation, a hardware format for diffusing the game in a cheaper format than the cartridge versions. In this respect *Putty Squad's* release, as a sequel in comparison to its original, was time dependent on the overall diachronic shifts in the hardware industry. This demonstrates the symbolic interaction between hardware and software and shows how hardware itself exerts an influence of the game as if it were a relevant social group. This exemplifies the analytical point made in (4.4.2).

9.4.4 'Inevitable' Media Crossovers and Synergy?

A further attempt to manage the strategy of publisher diffusion of the game via other media tie-ins or synergies was also weakened. Although using a method applied to Sega's and Nintendo's flagship games' characters (*Mario* and *Sonic*), Funny Software had attempted to make popular their intellectual property, the application of this strategy for the sequel game was incompatible with perceptions and routines of other cultural industries (toy and record firms). These were seen as having a different understanding of the industry and market dealings with rights and ideas of diffusion on a global basis. The proposed game of *CyberPunk* and its attempt to tie-in concurrently with the film by producing a game had seen the game's designer describe the film creators as being "green" (30), regarding evaluating ideas of viable game content. Similarly with *Putty Squad*, the record publisher was described as "ignorant" (28) in their attempted understanding of the game's nature. The licensed use of the trade marked name, *Silly Putty*, from the toy firm also subsequently fell through due to competing notions of the value of the brand name. In this sense, all the games had attempted licensed associations with other media or toys to mobilise awareness for their products. This again reflected a wider industry trend of the use of licensed associations with other media in the video games' industry, a trend which Levy and Weingartner (1990), had also seen in the toy industry. For instance, in 1995, 38.2 percent of all console games were estimated to have a licensed association with them and 34 percent of all console games were sequels in the same period, (Tabizel and Rosen 1995, p.19).

In hindsight, the value of the official *Silly Putty* trade mark may have been of benefit for penetrating the Japanese market by giving a pre-known point of reference for the game. This was seen as a tool by western firms seeking to overcome cultural / communication problems when entering this territory, (Roberts 1998, p.7). Again we see that the critical accounts of game development, as with Opie (1996) in (2.1), who saw a 'colonisation' of playthings by mass media influences, are not appreciative of the problems firms face in co-ordinating the alliances needed for the game's content and release.

9.4.5 Magazines as a Relevant Social Group and the Problem of Objectivity

Part of the institutionalised relationship between game producers and the games' magazine press had been noted in phase 2, with the use of preview exposure and the seeking of design advice. *Putty Squad's* production approach, again in line with a more controlled attempt at managing the creation and intended meaning of the final product, had sought to influence the journalists' perception of the game via demonstrations. This was opposed to seeking proactive journalist design advice. As with *Bloodshot*, the aim of the interaction between development firm and journalists was to improve the final review score. Yet given this, an aspect of indeterminacy existed in the press reception of the games, which cannot be accounted for in terms of mirroring the designers' communication in the content selection. For example, this relates to the attempt of the designer to avoid the subsequent magazine comparisons of *Bloodshot* to *Doom* and secondarily to *Zero Tolerance*. The redesign emphasis of *Putty Squad* was described as "*more of the same*" in relation to its original.

Part of the benchmarking of the games in the process was effectively rewarding aspects of simulation and consequently the recycling of aspects of game design in designer sub-culture. This went on to have an impact on subsequent designer behaviour and related to how well the software made the hardware mimic the designs on other machines (*Putty Squad* for making the Amiga computer like 'a console'; *Bloodshot* for attempting to mimic the PC game *Doom*). Secondarily, the games were evaluated in their varying degrees of abstraction on their simulation in games' software of a cartoon or the atmosphere of shooting people. Therefore software techniques as well as aesthetic content were relevant conventions here. This aspect of the rewarding of simulation in contrast to Provenzo's (1991) description of games simulating sexism or violence, is closer to Eco's (1985) original view of creation, art and quality following a craft approach building upon known traditions.

In this sense, in conjunction with reviewer and market feedback, the games in all incarnations were in some aspect felt to be misrepresented relative to their designers' initial design intentions. *Bloodshot* met with in-house, extra-organisational and press redescription and definition of the game, and the software 3D technique was not rewarded in its own right. *Super Putty's* conversion from the Amiga to console hardware technology was felt to be both misunderstood by "*the Japs*" - Nintendo in its approval phase, and the non-UK territories it was released to - "*it was successful in the UK and absolutely nowhere else*" (28). *Putty Squad* despite its non-spontaneous design strategy was felt to be unable to communicate with its main target market, the Japanese publisher, that changed its name and its user base reception - "*we completely missed their mentality*" (8). In each case the designers interpreted the feedback from reviews and market as an error in the strategic nature of their designs as consumer goods. *Bloodshot* was seen as, "*too derivative of another game*" (30); the Amiga version of *Silly Putty* as too UK-centred to be globally diffused and appreciated, and *Putty Squad* as "*not cute enough*" (28).

The magazines' mode of operation in the reviews for the game had invoked the issue of industry output and consumption practices by making reference to 'clones' and other comparative games. This channelled the readers' perceptions and 'reading' of games in a relative sense while performing its role of scrutinising 'new' games and operating with a media logic of sustaining demand of the very goods it reviewed and carried adverts for. This represented the paradoxical and uneasy relationship between the games' press and the industry, with the press being both informally involved in design and critically reviewing games.

The implications of the press reviews are their bearing on the product space for games in that criticism can be levied at what a game *should* be like. Given that phase 2 saw press interaction with designers, the development organisation – objectives (1) and (2) – here in phase 3 they help to produce the games identity by critically informing prospective users. The press represent a key social group in both the macro- and meso-social level of the innovation process. The political implications of the wider industry criticisms of the press's relation to the games industry relate to their perceived objectivity in this definition function and their validity as a de facto quality control mechanism, (Cambell,C 1995; Cambell,S 1996 and Perry 1996). The specific issues range from questioning journalists knowledge and competence to the economic influence of publisher advertising upon magazine free-speech in reviews that mislead retailers and users purchase decisions. This issue of bias and objectivity illustrates tensions in the alliance between both media. It relates to struggles over power and authority and attempts to manage the symbolic meaning of games' identities in the course of the alliance. This can be related to how technology and its management involve political dimensions, as in (3.4.1).

9.4.6 Reproduction and Recreation. Developer Firm Attempts to Re-release 'New' Designs

Both the *Bloodshot* Sega CD version and the *Super Putty* Super Nintendo version were staggered attempts at reproducing the game by producer firms attempting to widen the markets for their products and reveal how the lack of hardware standards effectively reposition the user. *Bloodshot's* intended improvements were cut short by time restraints; *Super Putty's* design had been affected by the approval process and both games had to take into account aspects of the respective hardware idiosyncrasies that affected the re-implementation of the designs. Here the redesign in the third phase after already crafting the 'original' version reveals an aspect of production that industry software providers have to manage quickly. This is in order to avoid time delay and decline in novelty value and competition, e.g. *Super Putty* was faced with competition from other "*amorphous blob*" (28) games. This again revealed an indeterminate aspect of operation in the industry. The attempts of firms to create certainty over demand by 'mechanically reproducing' their content to further demand were in no way simple economic exercises but possessed an aspect of unpredictability over the fate of the reproduced games. The prospect of competition reveals how the symbolic meaning of games are affected by other games and can be regarded as a relevant (social) group or actant, as with the case of hardware.

9.4.7 The Legal Basis for Games in the Product Space to Share Design Conventions

Legal precedents over intellectual property and copyright that operated in the industry (and wider software industry) acted as a source of legitimising an industry consensus over the reuse of convention in game designs - as all the case study games had. It also served to legitimate competition to the games themselves. The "*amorphous blob*" type games that provided competition are examples of 'second mover' firms learning from other firm's design knowledge and reproducing it, as *Bloodshot* had too, over its use of the 3D display.

If a different set of legal conventions were in operation in the industry, or the firms in question had the resources to apply legal pressure, delays caused by 'look-and-feel' cases could be applied regardless of their substantive merit - e.g. Universal Studios

Vs. Nintendo in Sheff (1993) and Capcom USA Inc. Vs. Data East Corp 1994 (Computer Trade Weekly 1994a, p.3). The implications of these types of cases also give a fillip to the pattern of all firm design behaviour that allows the critique of 'cloning' to exist at the non-economic phase of critical aesthetic evaluation of games in the press and industry. The lack of protection of ideas in copyright legislation - only protecting their specific expression in software - and patent protection covering just technical processes, converge in the games' industry to prevent brand names and the hardware vendors mode of cartridge production from unwarranted copying. Yet international law is not framed to prevent the recycling of other forms of computer software technology (in a broad use of the term) and knowledge from being reproduced such as generic game design concepts, (Gardner 1995).

Ironically, part of the diffusion of these games were inhibited from autonomous production by the official licensing agreements in access to intellectual property, 'know how' and use of trade marks from hardware vendors *just* to be allowed to reproduce variations on known design themes in reproducing generic software designs. The degrees of freedom open to designers to 'borrow' from other known aspects of popular culture represents a 'grey area' for the law, or are in a de facto sense in the public domain for recycling, was the movement operation and styling, basic design form and rule driven aspects of the games. Aspects of content that could not be recycled, included parts of the English language that were trade marked such as *Bloodshot* in the US or *Silly Putty* or 'assault cannon' (26) which in comparison are a more tangible form of culture for copyright legislation to protect in international law. Therefore regulation in legal terms of what can and cannot be recycled can act in favour of design firms seeking to build upon other firm's design knowledge while some barriers exist in adopting aspects of symbolic language that go to conjure up fictional description over design aspects and product identity.

Therefore legal-structural arrangements cannot protect games crafted at the macro-social level from experiencing competition. In relation to the overall product space of video games this does not inhibit generic designs from emerging or make design experimentation imperative.

9.4.8 Conclusion of Phase 3 and Overall Conclusion

If the process of designing a game is a simple communication process between artist and player, as suggest by one of the first books about game design - Crawford (1984) - and one of product design, involving trading off 'familiar' and 'strange' aspects, the investigation here has shown one overriding similarity. Despite having a recognised and known precedent or framework around which to organise content choices in each game, all the games experienced problems in arriving at market. This was in part due to economic volatility in the industry and issues of difference in organisational strategy, and specific orientation to games from other relevant groups. The games' releases at that point in their careers were contingent upon a specific conjunction with the organisational careers of other publishers and their particular strategies. (These publishers were, in turn, influenced by the overall state of the games' industry at the time of down turn). Other influences included, the particular state of the hardware platforms and their status in their careers as games' machines; the influence of other games as they culminate their careers from being projects to being games attempting to 'find' the consumer; and the interpretative frameworks deployed by magazine critics to judge games at that point in time in the industry's existence.

In this respect, in the Frankfurt School's critique of economic rationality's operation in the cultural industries, seeking to provide an illusory semblance of innovation by regurgitating standardised formulaic content for reliable profits and economic certainty to 'the masses', can in no way be used as a valid explanation of the process and consequences of the design choices made in the case study games. More in accordance with Fisk's (1989a) explanation of the unpredictability of firms' operating environment in late capitalism in production of popular culture, the search for reliable profits by recombinative assemblages for products does not translate easily to explain the empirical evidence in any mechanical fashion. Rather, there exists scope for deviation in interpretation and meanings of the same artefacts even if designed conservatively, producing difficulties in predicting the reception such goods receive. The formal and informal practices of institutions that mediate the design's intended communicated meaning, to bring the game to the user, can distort any simplistic notions of designer or producer sovereignty, being totally in control of content and meaning.

What is of relevance in an accurate description of content choice, is that the locus of power over what is included and excluded can be found in both the operations of the actors' intentional design activities and in the influence of institutionalised structures that constrain actors' choices, as well as facilitate them. These macro and micro factors can operate in isolation or combination over time to influence aspects of product innovation. The outcomes of the interactions are not uniform or predictable in a deterministic fashion but negotiated and indeterminate.

One revealing point here is that despite critiques concerning the lack of innovation and creativity in video game designs, there is no stable consensus for implementing knowledge of content choices, or of user needs and how to deliver them in an automatic 'industrialised' fashion. It could be possible to note, if anything, any grounding of an aesthetic of 'quality' of video games based on the intentional designer choices of content selection biases the recycling of game conventions and defining games as 'simulations'. That is simulations not just of events in popular culture and abstract cultural 'fantasies' - such as football and films or alien invasions - but also the mimicking directly of other highly regarded games which become part of that culture. Indeed, in the duration of the games careers from 'high concepts' or just financial 'projects' to finished consumer goods, the issue of repetition in content choice and its validity were contested and reinterpreted at many points and at various levels. For instance: the issues of programmers simulating (graphical) techniques, of not simulating a film's narrative structure, or learning from or reusing known design concepts, were examples of content choices that involved the use of repetition by individual creators in their design activity. Another influence on the theme of repetition at a more strategic and less spontaneous economic level related to content in the creation of sequels, 'clones' and 'look-a-likes' and included licensed symbolic material from other media in popular culture.

Consequently, planning games production was seen to be a difficult business with projects going over schedule and content choices being disputed with regard to quality and meaning. If the industry were subject to volatility in changing design patterns or genres then ironically this would serve as another issue to make communication over the games' designs' meaning and implementation and diffusion even more complicated and fragmented.

9.5 Summary

This chapter identified the key influences upon games content and with special reference to the main objectives it was seen that no single influence was consistently dominant in defining the games absolute structure. It was shown that there existed periods of designer autonomy that gave way on occasions to countervailing sources of power and authority. The games were seen to have an evolutionary development process during which their design could have gone in various directions. What was consistent was the physical absence of the target users for the games.

What has been learned in understanding the arguments and problems involved in the selection process are why games look the way they do and how else games could be. This is the theme that underpins the theoretical issues in chapter (3) because it unifies some of the concerns of Silverstone and Haddon's (1993a,b) model with that of the Social Construction Of Technology (SCOT) approach. That is, it examines the process of innovation *and* the implications of choices within it. A determinist account, based on auteurism, economics, technology or organisational power, could not explain the complex interactions involved in the formation of this medium.

10 Conclusion

10.1 Attainment of the Research Objectives

10.1.1 Introduction

The chapter starts by explaining the evolution of the research. The following sections then summarise the empirical findings of the research as they relate to the specific objectives as stated at the end of chapter (3). Section (10.2) evaluates the utility of the theoretical framework used in the thesis and shows how the evidence reflects deeper issues of agency / structure, and idealism / materialism and relativism. The chapter finally comments on methodological issues and areas for further work.

The original aims of the research were motivated in response to the successful global diffusion of the Nintendo and Sega games playing computer hardware into the home. In conjunction with this the literature review and industry concerns in sections (2.1, 2.2), had revealed that an examination of designer's motivations in content selection would be a fruitful line of research to plug the 'gap' in explaining the making of games.

In relation to this, the thesis additionally sought to outline the background to motivations and emergent consequences of the hardware producer's strategy for mobilising resources around the hardware to ensure its success and highlight the implications of this strategy upon software design. This outline was presented in chapter (5), with regard to content selection for games and concerns, such as, the 'public interest' regarding pricing, diversity, and fair competition. The thesis then sought to examine, primarily via case study research, the actual process of designing and developing games within this environment. This section of the thesis, (chapters 6 to 9), introduced some of the 'macro-social' and 'meso-social' dimensions of designing and diffusing games' hardware and software. This was to identify the broader sources of power and influence impinging on content selection. The relevance of the research then was to enter the 'black box' of the process of games' creation.

In the course of the research additional sources of influence upon games' content selection were examined other than the hardware licensors' approval and licensing requirements. This included an examination of the game creator's or designer's intentional aims and the mediation of these aims by wider intra- and extra-organisational sources by recording how these were translated into the game's design, as the product was developed over time in its production cycle. By examining this process of content selection and noting the decision-making processes influencing the game's specification and what changes were made to these original designer aims, it was possible to demonstrate the contingent process of product innovation in this industry. This was compatible with a 'Social Construction of Technology' (SCOT) approach to technology development, as applied to the entertainment application of ICT, that had been additionally influenced by Silverstone and Haddon's model of innovation, (1993a,b).

The specific intra- and extra-organisational sources of influence upon video games that were examined was influenced by ideas from the media and cultural studies literature about the creation of other entertainment media in sections (3.4.4, 3.4.5). These, too, had similarity of concerns about industry influence upon software design, (2.1, 2.2). This was because the media and cultural studies literature also attended to

media being created for entertainment purposes by individuals in profit-seeking organisations, competing against other products in other competitive markets. These insights, together with initial speculative 'fact finding' meetings with designers at a trade show and reading relevant trade articles, helped to set up the research questions (1,2, 3, 4 below) and therefore broaden and sensitise the research to other relevant sources of influence upon content selection. The thesis sought to understand:

- (5) The motivations of the designer's content choices and see how these were mediated by the following:
- (6) The influence of the development context in relation to technology, group and organisational impacts
- (7) The influence of the console manufactures licensing conditions and the software quality control or approval process
- (8) Identify where the user or player entered into the development process and how their 'needs' were considered in design

These objectives were reached primarily by tracking an artefact's 'technological career' development from concept to final product, as these revealed evidence of relevance to the above points.

10.1.2 Objective 1: Understanding the Motivations of the Designer's Content Choice. The Significance of the Research Findings

In relation to (1), the research shed light on what aims designers' had in selecting the content of their games. The implications of meeting this objective were to provide an outline of the producer aesthetics of the medium regulating what should and should not be put into a game and then to use this as a benchmark to compare with content choices that were made in opposition to the designer's intentions. This served as evidence for identifying other sources of power and influence upon content selection. Additionally, the role of outlining what should and should not enter a game helped map out what was regarded as 'quality' content. The designer discourse regarding design practice, related to what to include and exclude, in video games content covered: the role of graphics, the role of sound and music, the man-machine interface, the role of narrative or story in games, the relation of games to films and the boundaries of their 'product spaces' and crossovers, the structuring of the game's rules, the role of repetition in 'fun' and entertainment and the issue of boredom; the need for games to be unlike one another so as to be regarded as 'creative' and 'original' and not be 'clones' and yet paradoxically mimicking aspects of other milestone game designs to reinforce their own game's value and quality and legitimate the practice of designer copying while still being 'creative' in their expression.

It is this last paradoxical issue over designer's criticising the copying other games, yet also rewarding it by using them as benchmarks for quality assessment, that really complicates and makes impossible any attempt to ground a concept of aesthetic of quality and innovation in computer games in empathy with designers' episteme or knowledge-base. To try and create a concept of quality based on designer's perspectives that could yield any steering mechanism to guide content selection, on rational and consensual grounds, would not therefore be possible. Consequently, when it came to examining the issue of detrimental affects upon quality on aesthetic design choices that were raised in sections (2.2, 5.3.8, 5.4.13), there could be no demonstrably valid 'objective' criteria to apply. This was because the copying of

content was both condoned and rewarded as well as derided. Evaluating the consequences of the pathways the games could have taken, and *'how else it could have been different'*, as the SCOT approach calls for (3.4.2), is problematic if we want to go beyond just demonstrating 'interpretative flexibility' and argue for 'better' alternate scenarios. Researcher-based value judgements on aesthetic criteria could not be used beyond the relative empathy of the designer's aims. (It was felt only objective criteria of price and availability could apply to a researcher-based evaluation). Section (10.2) returns to this issue.

One proviso, in the elucidation of what designers' value and prioritise in their content selection, is that it has an historical role in defining what the medium of video games 'should be used for' in the early to mid-1990s when the research was conducted. The process of recording the medium's history is currently being undertaken by the British Film Institute's archiving of all known video games. This is being undertaken in parallel to histories of film and TV. By examining the designer's values of content selection, the research highlights, by default, what is not prioritised. These were areas, such as, text-based interaction and written forms of communication, which have implications for what forms of man-machine communication are regarded as desirable and those that are not, at this historical juncture of the medium's development. A more didactic function of eliciting the complexities of the process of development is its relevance to video games' creation now that it has recently become a topic for design institutions at Universities such as Dundee, with courses emerging in this field.

10.1.3 Valuing Graphical Simulation

The consensus of an aesthetic value on graphics in games and the need to mirror film-like, TV-type cartoon or 3D displays with increasing verisimilitude has implications for the setting of precedents for future industry designs. From an economic, organisational and cultural perspective the bias on the value of graphics in computer games has the following implications:

In *economic* terms this emphasis has implications for increasing costs in software development and legitimating hardware innovation and technology change conducive to this bias in software design. This in turn creates a potential barrier to entry for small firms or entrepreneurs without funds to support development for games that rely on graphical advances for their innovative merits or just to compete. This is because small firms may struggle to employ increased numbers of artists, animators and support programmers *and* simultaneously develop other game projects that can absorb the consequences of their game being a flop by providing a cross-subsidy. A recent trend in the light of the value of games to the UK and European economy, has been to seek European Commission funding for capital goods to fund purchase for R&D in development tools - such as graphics packages and art tools - e.g. Roger (1997). There is also discussion about this being extended to the EC funding design proposals and games' development projects, (Computer Trade Weekly 1998, p1).

From an *organisational perspective* the aesthetic valuing of graphical form and its increasing complexity, and the standards of simulation, encourages the sharpened division of labour between designers or programmers and artists - with the emergence of support programmers, secondary artists and animators. This division could exacerbate the issue of there being a lack of designer sovereignty once implementation issues and problems occur, so requiring adjustment of aspects of the original design to accommodate it. Further, by seeking to match TV and film-like

standards in games' software presentation, the production and funding model stands to increasingly mirror the cost inflationary process of production in those industries. However, despite these similarities placed on graphical emphasis, the research does suggest that there may be 'resistance' to the 'product spaces' of video games and 'films', for example, becoming blurred or subsumed uncritically by designers.

Additionally the strategic emphasis on graphics in order for a product to gain value and meaningfully communicate its 'product innovation' carries with it great risk in terms of competition - should a competitor 'leap-frog' the firm's own product's competencies in this area.

From a *cultural perspective*, the emphasis on graphical content in games and its non-verbal or text-based communication bias, encourages to a degree, the scope for diffusing products to other global territories in search of new markets. Yet, this transfer is not a smooth inevitability, but is still open to the host culture's reinterpretation of the product's meaning. The aspect of tacit design knowledge revolving around design concepts of 'feel' and control over the games movement of objects, creates an aspect of games design where uncertainty can exist. Therefore tactile communication was not an unquestioned design element, exempt from scrutiny or reinterpretation.

10.1.4 Objective 2: The Influence of the Development Context in Relation to Technology, Group and Organisational Impacts

The examination of the labour process of implementing a game's initial idea through the interaction of the designer with other team members, hardware technology, and organisational management revealed the 'political' aspect of innovation, as sources of power and influence were used in amending original design ideas and defining 'user needs'. The cause of the need for negotiating and power brokering was the belief in the notion of there being a need for 'creative freedom' or 'designer sovereignty'. This was associated with the belief that power over content choices would not be arbitrarily enforced by those unsympathetic to the game's initial aims or design ideas be arbitrarily constructed without being viably tractable. The sources of conflict were noted to be between the roles of the programmer and artist and the designer. A second source of dispute was between management and design teams as well as external influences with design/approval suggestions.

The value some 'creative freedom' in the design and development process - even if not necessarily yielding radical, blue sky design in splendid artistic isolation - did show the perceived need for some hierarchy in allocating creative resources to games, once other team members' inputs were being felt. Secondly, it highlighted how workers can informally seek to create autonomy in their terms of employment and desire to control their workload. The value of noting the disputed nature of contributing ideas and controlling the content decisions is relevant to the process of rationalisation and creativity in organisations. Given the role of graphical communication in games and the increasing size and cost of developing projects noted in (10.1.2), then a new situation may occur in the development process. That is, a scenario where the increasing division of labour and the influence from other team members on content selection, may in future, be diminished in accordance with the magnitude of their work load.

Yet, conversely, the increased numbers working upon the game, as shown in the case studies, creates scope for what Jones (1992) called 'the diffusion of authorship',

whereby subtle unintended changes are made to the design due to the accumulation of the process of construction in the division of labour. For example, the case studies showed the effect of the addition of alternative input/output (I/O) devices, translating designs from one hardware platform to another, the addition of music and sounds and how this questions the auteurist notion of authorship and creativity.

The organisational imperative to compete with other firms and supply products to market also impacted on the creative process by ensuring the reproduction and repetition of the games content - from creating sequels to translating designs to other machines. This economic decision-making further contributed to the industry's recycling aspects of content conventions.

Of extra-organisational influences, other than the hardware manufacturers' which were seen to impact upon the process of product design, perhaps the most surprising was that of magazines. The impact of their feedback on the design of the case study games revealed how the producer firms sought to try and gauge the success of the product's post-production releases of their games by the press's reaction, rather than those of the 'real' audience. This revealed how the institutionalised review / preview scrutiny of games and presenting their 'graphics' to pre-advertise the games, and provide magazine content, were valued by the producer organisations and reinforces the value of a design aesthetic based on the look of games. Additionally, the value of the magazine reviews to provide meaning to the games was also noted and gave evidence concerning the interpretative flexibility of a game. This showed how the post-production 'closure' of the public meaning of the game occurred after design had finished. It demonstrates explicitly how the accounting of the meaning of an artefact continues to be malleable after release as Silverstone and Haddon's (1993a,b) account demonstrates. The SCOT approach has been criticised for failing to account for this, (sections 3.2.2, 3.4.2).

Also, the actual pathways the games took were not just dependent upon the firm's careers as profit-seeking organisations. They were also dependent upon the targeted hardware's symbolic status as a games' playing machine at a given point in its own 'career' as a game-playing technology, and the symbolic meaning of being a state of the art machine. Therefore the 'double articulation' of hardware identities influenced a game's meaning. This had implications for the rationale of conceiving the games' ideas as well as their reception and therefore the meaning of the game (and software). Games' meanings are contingent upon hardware identities. This highlights the issue of multiple careers of artefacts and heterogeneous environments, touched upon in section (3.3.8), that need to be considered when dealing with hardware and software relationships.

The game publishers that sought to release the products were also seen to influence the game's content, but these were not in terms of influencing the conceptual operation of the game but the finesse of its working operation and rules of play. Tied into the magazines and publishers' assessments of games and their meaning was the impact of other competing games that were released or whose release was felt to be imminent. The aspect of competition affected games' content from either strategically skewing some content elements away from the competitor, or actually trying to borrow elements and compete directly. This revealed how responsive firms' were to their environment, how they learned about other designs and how important they regarded 'being like them' to be.

10.1.5 Objective 3: The Influence of the Console Manufacturer's Licensing Conditions and the Software Quality Control or Approval Process

In relation to the Monopolies and Mergers Commission's (MMC) concerns over ownership of intellectual property rights and control of the market and the hardware manufacturers' influence on software (as noted in 5.4.11-14), the case study of the games showed that the impact of the Sega / Nintendo approval process was seen to have influenced a game's content in a manner that was disputed by the game's producers. This had an effect on influencing the game's perceived post-production appeal in the designer's and producer firm's eyes. If the firms were granted autonomy from the licensing and approval conditions then aspects of the games would have appeared otherwise - which is relevant to the theoretical concern that the SCOT approach attends to in accounting for technology development, (3.4.2).

However, the relevance of the MMC's approach as a scrutinising government body seeking to evaluate the operations of the Sega and Nintendo mode of cartridge approval in relation to the 'public interest' in terms of concerns over 'diversity' of product design is problematic. Given the above designer-based aesthetics and in-house and publisher/developer origins of game ideas, either historically or in the time frame of this research, the issue of qualitative diversity and innovation in content was not one that was in practice actively sought. To assume that the dominant market positions of Sega and Nintendo, could as a whole, directly influence the initial concept formation of the spread of types of games by virtue of their mode of approval and scrutiny of content, is not supported when examining the origins of non-approved games made for open hardware systems. Although the ability to enforce content choices that are more conventional and conservative was noted in the research this was in no way too far from the same influences from other actors in the supply chain.

Therefore the MMC report neglects any analysis of the impact of power from other institutions upon content choice, especially the informal sources of influence in a game's creation. This is due to the fact that the MMC's frame of reference is one of examining firm behaviour and ability to compete and obtain open access to markets, is one compatible to liberal-economic concerns. Therefore the framing of the issue of diversity here, by the MMC, is really one of diversity in *quantitative* terms of the number of firms being allowed access to market and to have the potential autonomy over content selection, which 'may' in theory be qualitatively different in formation. As with the issue of the notion of quality thresholds for state de-regulation or guidelines over TV channel programming, in the period of the 1990s and its problems (Mulgan 1990; Brunsdon 1990), any attempt by a statutory body to attempt to examine the potential issue of diversity in content in qualitative terms will experience difficulties.

Yet given this, the similar problem of grounding a concept of 'quality', (seen in 10.1.2), also exists for the hardware vendor's approval process in relation to concept formation and offering 'advice' over non-technical content choices. This runs the risk of placing arbitrary barriers to entry to market to competition that does not pass the host hardware firms approval process. In this respect, the MMC's recommendation of waiving the need for concept approval, as these concerns are in the interest of the publishing firms, is upheld by the case study evidence. Further, the hardware firms' actual practical operation of the approval process for game publication did not create a scenario of preventing look-a-like games from competing, or there being an oversupply of games in that sector. Waiving such qualitative approval would have a practical effect of speeding up product release.

With regard to the MMC's concerns over the 'practice' of the 'design philosophy' of console hardware construction and software strategy and the effects of creating unfair competition or barriers to entry for a new hardware entrant, the issue of the parallel case study game designed for the Amiga was illuminating, (in chapters 7 and 8). The Amiga's hardware configuration was shown to have been redesigned in response to competition from the games' consoles, as was the design of the *Silly Putty* game and its inclusion in the Commodore hardware bundle. Additionally Commodore did seek to enter the console games market directly and compete with the CD-32 - but failed to gain wide software support. This scenario did bear some similarity to Atari's production strategy and the attempt at market entry with the Jaguar. With its the failure and the demise of the firm, it can be seen that the MMC concerns over difficulty faced by competing firms was supported to some degree. However, with Sony's entry and world-wide success in the sector and adoption of CD ROM technology, the issue seemed to be less pressing, although a similar mode of proprietary production controls are still largely followed, therefore making the concerns relevant for the future.

Additionally, with objective criteria of the 'public interest' based on price, the supply of the same game to the Amiga and the Super Nintendo Entertainment System, (in chapters 7 and 8), did show the Amiga to be cheaper for the consumer (and in the producer's eyes a better quality product). However, in returning to the notion of 'diversity' made above - a reassessment of the concept could show that the ability to produce the same game for the console hardware with some economies of scale, to more markets gives more choice of games *numerically* available to purchasers, dispersed in different territories. Therefore the network of installed console machines gave scope for a wider spread of the software to a more diverse audience in comparison to a scenario where no consoles were available. The price of entry to the console network, access to know-how to create in order to diffuse products to it, although more expensive than open-architecture home computers, could have yielded dividends for the case study firms if released in an earlier time frame, or with a content that was regarded as a 'hit' title, so compensating for the initial start up costs.

Given the scope for cultural appropriation of the Amiga home computer technology (as seen in 7.2.3), that was a games' machine in some territories and a computer in others, its 'interpretative flexibility' across territories created a fragmented market. The mode of distributing games via console hardware would be necessary if a maximised global audience was sought. This is therefore evidence of a non-economic barrier to firms seeking to enter the games market and one that excludes the explanation of unfair competition for the diffusion of software. Therefore cultural meanings at the 'meso-social level' create barriers to diffusion that may be compatible with diffusing 'exploitative' modes of technical development, which perhaps the consoles were.

10.1.6 Objective 4: Identify Where the User or Player Entered into the Development Process and How Their 'Needs' were Considered in Design

The research aim of examining how responsive game content selection was to user needs, and the place of the user in design, was met with an overall absence of evidence of their direct influence. Despite the game being a commercial product sold to an audience for profit, there was felt to be no need for their presence at the design stage. This was partly based on the lack of belief by designers and developers in the

user's relevance to the early stages of the process and relates to their feelings about encroachment upon 'designer' or 'developer sovereignty'. In relation to a belief of designer or producer sovereignty, the designer's intended communication of content was generally meant to be one-way from producer to user. This compatible with the view that games, like other forms of entertainment were not directly 'interactive' at the production phase with their intended audience. This coincided with the wider cultural role of entertainment involving notions of 'surprise' and user passivity in being served 'novelties', (Haywood et al. 1995).

The relevance of incorporating user knowledge without understanding the implementation of graphical techniques and technology issues, that artists and non-programming designers encountered, would also apply if practically applied. Despite designers being users too, in the sense they voluntarily played games or had been game consumers in the past, they differed from 'ordinary' players in respect to their *privileged access* to the workings of the hardware and its technical possibilities. Further, there was a belief that the ideas for games would be no better if they originated from users rather than designers. The place where the user was legitimately felt to affect games configuration was in I/O trials and error testing, or playing games after the fantasy concepts had been implemented in software. The basis for such an introduction of the user into the design process at an early phase would be possible if the idea of 'creative sovereignty' of the designer or development team was not present in the labour process. Designers' observed the implementation of the game ideas from external sources with hostility, ambivalence, or as being unnecessary.

Where the user's needs were translated into content choices was via an interpretation of what was selling in the market and what was popular at present - thereby making the user present in an 'imagined' way. Hence, the value of design precedent meant that a search for 'new' or alternative styles and concepts was not imperative from a production point of view.

Additionally and paradoxically conceptions of the user / audience were further constructed, on the basis of sales, to be fragmented culturally on territorial grounds as being a type with 'odd' tastes in comparison to the producer-based culture. Or the user or audience were defined as fragmented on taste preference, e.g. liking one genre or another, and therefore relatively predictable in that sense. Also present was the view that users were unpredictable in terms of following fashions by changing purchasing patterns to new 'in' design trends quite unpredictably. This produced another conception of user tastes as unknowable. As in Cawson et al. (1995), there was no real effort to test the assumptions of the imagined audience.

10.2 Wider Achievements

10.2.1 Contribution to Knowledge and Relevance to Theory

The research is significant because it addresses the construction of video games in a way that had not been done before. It accounts for the formation of the ideas for a game in its production contexts. This addressed the gap in the literature noted in chapter (2). The application of ideas, (in chapter 3), of the SCOT approach and concepts from Silverstone and Haddon (1993a,b) as a 'tool' to examine this development process were useful in many respects. Of substantive relevance was the examination of console-based video games, as this had been the subject of state level scrutiny regarding fair competition and issues relating to the public interest. The

findings were relevant to practices of competition, innovation and regulation within this market.

The research accounted for the 'evolution' of a product along its development or 'technical career' as it was defined relative to other games in its class of goods or 'product space'. This in turn revealed the multi-directional aspects that the design could take and how 'interpretatively flexible' game designs are as different 'relevant social groups' impinge upon the game along its 'career'. The identification of 'problems' with the emerging games reveal alternative possible configurations that illuminate at times the dimensions of what counts as 'a game' and therefore map some of the boundaries of the 'product space'. These may suggest alternative design paths that both the critical academic accounts and industry criticisms converge upon (albeit for different reasons), as noted in (2.1, 2.2). Although the evidence here suggests that these 'alternative' design scenarios are not 'radical' ones in any sense. The issues further revealed how innovation or producing the 'new' actually occurs in this market. It is a negotiated activity that involves considerations of time and aesthetics (fashions), space (territories and global markets) and interactive influences from heterogeneous social groups. The nature of this negotiation was shown in a quantitative and qualitative way, as it was illustrated who interacted with who *and* what issues were communicated in this interaction.

These show how the boundaries of innovation and design practice spread outside of the domain of creative individuals and the producer firm. Of particular importance is the cross-media influence of games' magazines and their impact upon content choices. This goes beyond attention to their post-production influence on the symbolic meaning of games but highlights the knowledge flows that occur across these media institutions.

The 'mapping' of the game's pathways highlight the design practice of software at the local level as this is attempted to be diffused back to the US and Japan where the hardware had originated from. This aspect of the geographical nature of the video games industry illustrates the importance of the spatial issues addressed by the meso-social level of innovation in Silverstone and Haddon's model, (3.2.3).

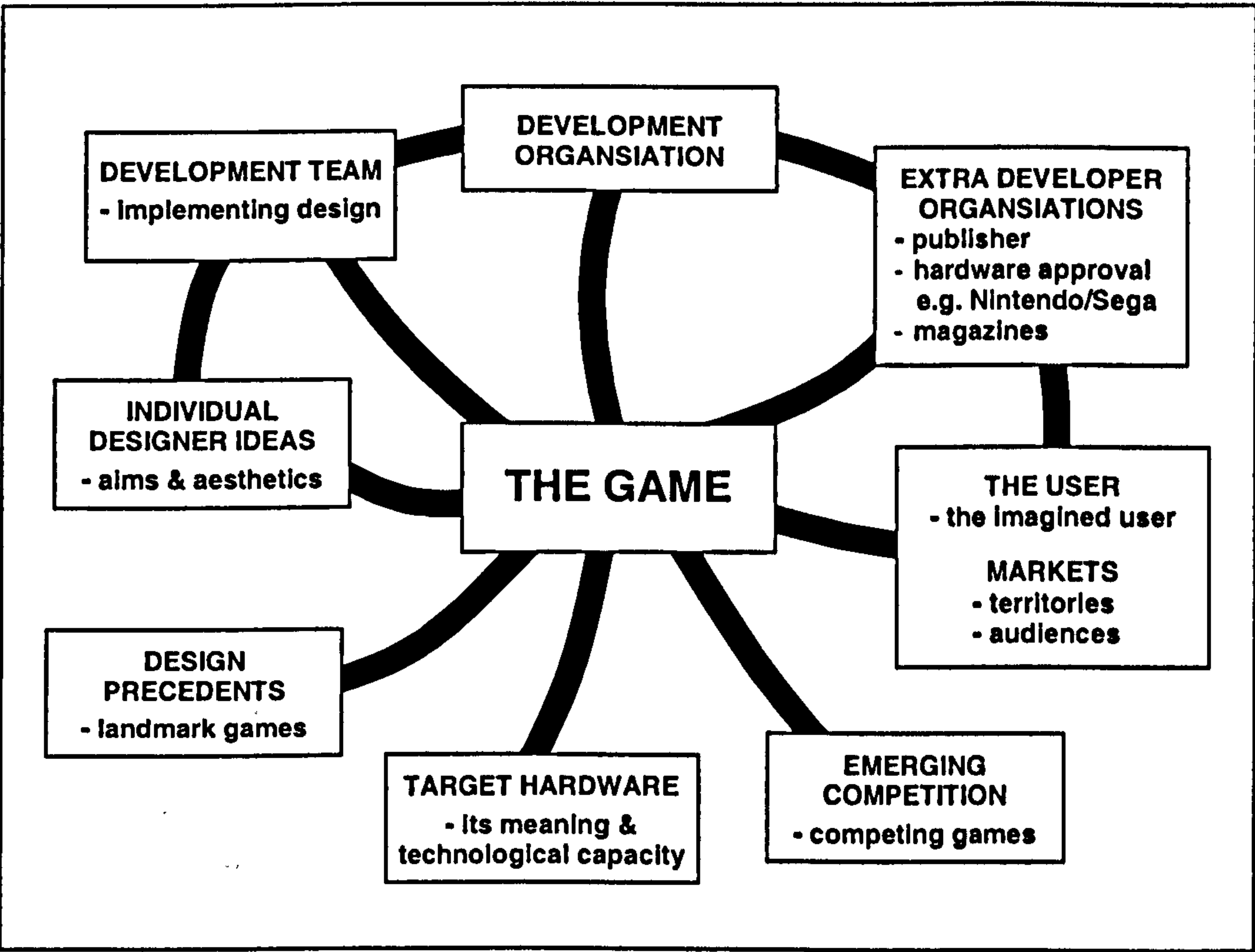


Figure 10.1: Map of Relevant Social Groups & Influences

Figure (10.1) illustrates the interaction of heterogeneous relevant social groups involved in the innovation process in the video games sector. Figure (10.1) differs from Figure (2.1) from chapter (2), in that it breaks down the general areas noted into more specific groupings. This gives some details as to the interactions between the ‘boxes’. It identifies the key groups involved specifically involved in the making of

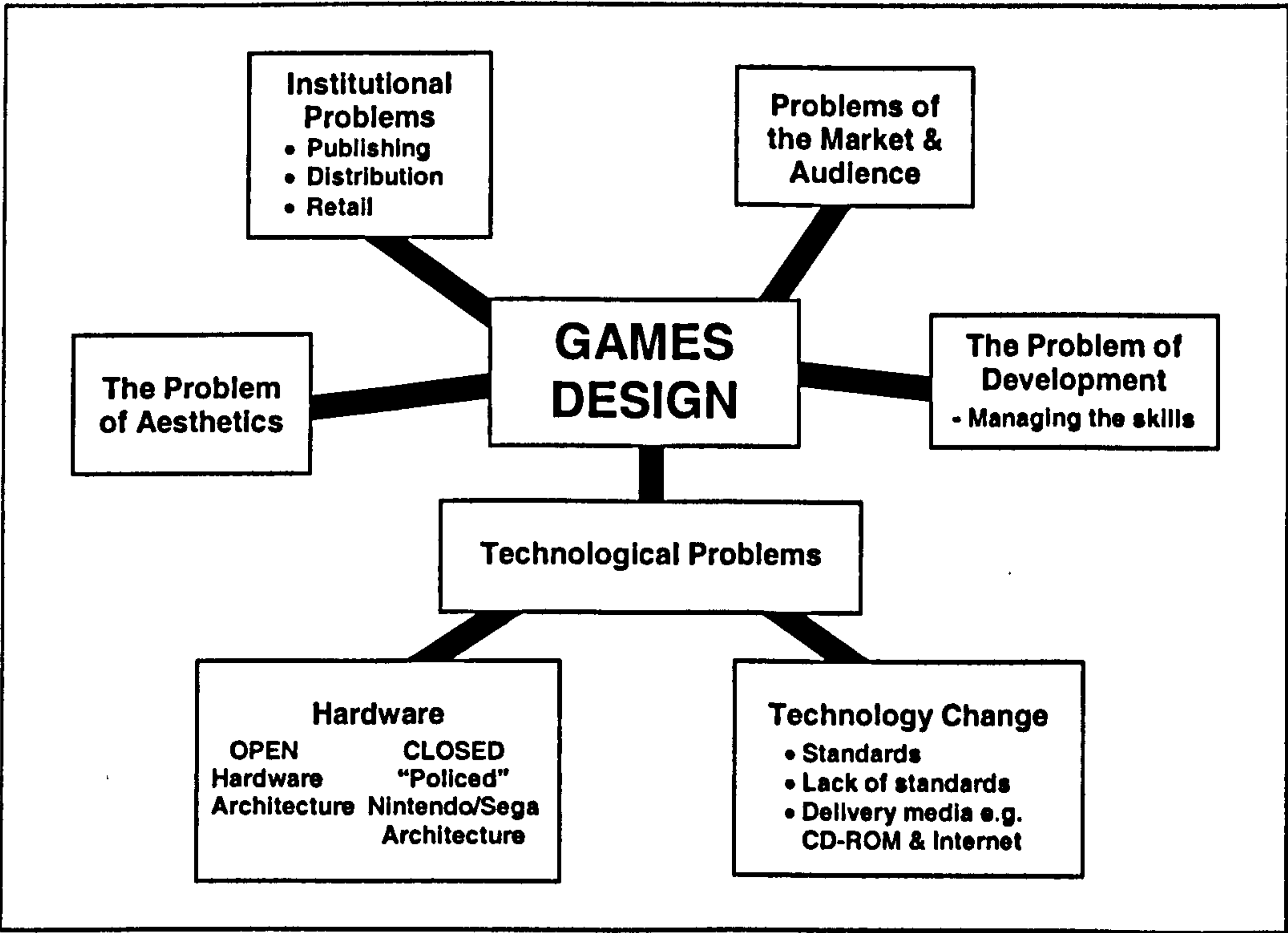


Figure 2.1: A Web of Problems

games taken from actual examples, rather than a general sweep of industry issues. Consequently a more detailed understanding can be obtained in examining issues of 'approval' and how this influences the game. Similarly specific issues underlying aesthetics, the role of precedent or what labour issues are important, that influence the game can be identified. Because of the more restricted, design focused, nature of the case study certain aspects, such as distribution and retail issues, were not examined in any detail.

The detailing also contributes to extending the Silverstone and Haddon (1993a,b) model and the production of culture and media studies approach noted in section (3.1 and 3.4.4-5), in its attending to the creation of a specific medium, a video game.

However, this application of the approach to video games does contribute to the emerging sociology of software, (Murray and Woolgar 1991), and this form of technology is becoming part of our everyday environment as it is penetrated by ICTs. Here video games' software is an accomplishment of interaction between social groups, in actual fact 'ascribing' or 'constructing' problems around ideas and objects and then trying to solve them. The games were not the products of a romantic notion of a-social genius, (Wolf 1993).

The objectives (1) to (4) given as guiding questions for the research exemplify the utility of the conceptual framework as they help demonstrate its grasp on the complex issues of agency and structure *together* with idealism and materialism, that are involved in innovation. For example the empirical findings relating to objective (1), demonstrate the relevance of human agency (the designer) and idealist issues (the design values and knowledge) that are a form of power influencing games content. The conceptual framework acknowledges the role of individuals and the symbolic meanings they give to design ideas and artefacts in the innovation process. Also acknowledged are mediating influences upon this, as shown in the empirical findings in objectives (2), (3) and (4). These note how technical, organisational and economic structures can serve as sources of power that too influence the game's content, as well as interacting between each other. They demonstrate layers of social shaping involved in innovation.

Of special note is the issue concerning the user as it is of theoretical influence in showing where the interaction in this innovation process stops. That is, which social group is not included. In relation to Winner (1985) in (3.4.1) who saw technology design as a political issue, this demonstrates a 'non-democratic' aspect of design as the user is excluded. In relation to Woolgar (1996) in (3.3.9) how the user was imagined in the design process had implications for their patterns of use and this represents a power relationship over them.

What is at stake here in highlighting the objectives are how dimensions of power and authority are expressed in a range of cultural, social, economic and technical relationships. Importantly no single variable can explain why this technology looks the way it does and how innovation occurs in this field.

The SCOT approach, as part of the Social Shaping of Technology (SST), focuses on design and so amends the Silverstone and Haddon (1993a,b) approach to make *explicit* the alternative design paths not chosen and their significance. The focus of the latter attention to the 'micro-social' phase of consumption introduced in section (3.2.3), is however, an advantage with their model, as is their attention to post-production diffusion across territories. For instance the differential diffusion of the

hardware units across the US, UK and Japan noted in chapter (5), revealed aspects of resistance to the hardware technology that influenced the reception of the software. The application of the SCOT approach here was unusual because it was applied to a non-utilitarian technology and the evaluation of alternative pathways although identifiable are not easy to evaluate in a non-relativist fashion when questions of aesthetics are concerned.

Of further significance is the need to be aware explicitly that the heterogeneous social groups or actors themselves are undergoing changes in their individual or organisational or technical careers. This makes pertinent the issue of reflexivity and reciprocal development of the changing environments' interaction with artefacts. An example of this was where development firms changed status.

The SCOT approach's analysis of 'failures' in technology development is also useful in this application on games, as it is a high-risk technology and readily yields evidence for the existence of design alternatives. This is in contrast to the presentation of a 'natural' image of 'the best' and 'only' design choice, which successful technologies do. Therefore it is possible to explain the development of game playing technology in its console style, together with its institutional structures, in relation to their underlying motives and changes made in light of the problems that are encountered, (as seen in chapter 5). This is preferential to seeing its development in a conservative evolutionist view, where the technology is designed in that way and it successful because it best 'fits' its environment and has 'adapted' better than the competition. As noted in (3.4.3), by highlighting the problems encountered in designing games' technologies, the research is illustrating the non-deterministic nature of technology development and moving away from simplistic explanations that try and explain technology development in relation to just one variable.

One consequence of using the SCOT approach as part of the conceptual framework is, as touched upon in (10.1.2), that as an analytical tool it is unable to offer prescriptive or normative insights. What this amounts to is, despite highlighting the multiple meanings actors give to technology and its branch-points, the approach cannot discriminate which pathway is 'right' or what relevant social group is 'wrong'. This notes the dichotomy between realist and relativist accounts of technical development and the implications for the 'agnosticism' of the SCOT approach in relation to Feminist or Marxist interpretations, noted in (3.4.3). A practical benefit of this 'agnosticism' in the accounting for the development of games' technology was seen in (9.3.13/14/15) which examined issues relating to innovation and novelty. These were discussed in relation to the traditions and values of the designers involved and not taken automatically to be 'desirable' or 'necessary'. The same applied to accounting for the role of the user, whereby their inclusion cannot just be automatically assumed as desirable and above questioning, without considering the nature of entertainment and the compatibility of notions of audience involvement and creator sovereignty.

It can be noted however, that despite the 'problems' associated with a relativist outlook, the empirical findings here could be of use to theorists of a more realist persuasion, such as those critical analysts found in (2.1), using Marxist, feminist or psychoanalytic frameworks. This is because the motivations underlying design choices can be addressed.

Where this thesis can be criticised is its 'blind spot' of neglecting consumption (dealt with below). Yet, in light of the literature review in chapter (2), the 'old-fashioned'

concern with the production 'black box' that the SST approach (in section 3.4.1) is criticised for, e.g. MacKay and Gillespie (1992), is relevant here in relation to this specific technology.

10.2.2 Methodological Contributions

This research cannot claim to have used or created an innovative technique or set of techniques with which to acquire and analyse data. The only point that can be made is that, relative to the academic literature on video games (with the exception of Haddon 1988a), the thesis is to a degree different methodologically. To examine the making of video games the research has had to use a number of data sources and this reflected the theoretical framework's emphasis on heterogeneous influences. This combination advanced the understanding of how games are designed and what influences them. Each approach on their own would not have given the fullest understanding of the individual and the wider structural dimensions of design activity. For example noting the content of the game's operation gave details that the interviews alone in the work place could not account for. Similarly the facts and dates gained in the trade press gave historical and strategic details of the firms' activities that interviewees may not articulate or be aware of. Therefore the research contextualised design activity with attention to the textual, aesthetic, individual, group, organisational, economic, geographic and historical "messy story" that Biker (1987) had referred to in the theoretical framework, (3.4.2).

10.2.3 Weakness in the Research and Further Work

The research, due to being mainly case study based and dependent on *ex post facto* accounts of events, had various weaknesses that an alternative research approach could overcome. An ethnographic account with a number of researchers or as in Cooper et al. (1993), over a wider time frame would gather evidence that the approach used here could not. For practical purposes the personnel could be interviewed before disbanding on completion of the project or during the project. Additionally, the lack of documentation of design and work practice used at the time frame of the design activity (with some exceptions) hampered the clarification of facts, details and times.

Further the mobility of staff and access problems meant that researching to the fullest extent every person encountering the game was not possible. Additionally, although generalisability may be an issue, even with the supplementary accounts from other games in fixated time frames, the games were at that time part of very popular design genres. In fact the 3- dimensional model of presenting games is still very popular with the current wave of 'next' generation machines and PC graphics cards emerging for 1999 emphasising 3D graphics' software capabilities.

The application of the SCOT approach to this technology in this industry has to rely primarily on interview data in order to account for the designer's choices if these are not documented and archived. The perceived 'triviality' of the technology or high turnover of projects may influence this. However, with the increased cost of documentation as designs increase in size and initial project scrutiny as firm strategy changes to focus on one or two 'key' titles, rather than a 'catalogue' of titles, may encourage a change in work practices.

10.2.4 Accounting for Consumption

More pertinently, in sympathy with research that attempts to examine the whole career of an artefact and define innovation as a process that continues beyond production and into the micro-social phase with its consumption in the home, (as noted in 3.2.4), an analysis of production of a computer game title that *continues* to track the games practical use would be illuminating. This could contrast the imagined user with the real user and provide practical design implications for publishers and designers. The practical application of such an approach within the economies of a strict time frame would have to note that, to compensate for the disbanding of staff, the production interview would need to take place either at the immediate end of the project or during it, with agreed and confirmed access to the sample. The research experience here noted in general, that publishers with development personnel in situ were more accessible than smaller firms. Additionally with the close location of other functions such as PR and advertising then the research effort too would be eased. Additionally liaison with a publisher would possibly be easier with them being more receptive to the practical usefulness of user feedback for marketing needs. The publishers would be able to accelerate access to users through product registration cards, etc.

In order for the research to 'find the user', record their 'search' and initial consumption activity promptly, limiting any delay would be vital. This would make it possible to record the subjective feelings of the appropriation of the 'new' artefact close to its temporal occurrence and continually track its 'career' from there with the sample. Finding retrospective consumers of a game title could be problematic, if the game was not a success selling in large numbers. Memory problems would also be encountered, as would the problems of interviewing children.

This chapter has outlined the motivations behind the research and its progress. It noted the empirical findings in relation to the guiding objectives and speculated on some of their future implications. A diagram showing the key influences upon game design was given, together with an account of issues relevant to the conceptual framework. Finally some problems noted with the research were covered with ideas for future work.

11 References

(NB. Some of the game review and industry articles had no attributable author and so the publisher, magazine or game title was taken as the 'name'. This approach to referencing was copied from papers that referenced similar non-academic material relating to computer games).

(A)

Acclaim. (1995a). Faxed Communication to Rocket Software. 'Battle Frenzie Q.A. Bug Report'. January 10th 1995. 10.04am. Unpublished Document.

Acclaim. (1995b). Faxed Communication to Rocket Software. 'Re:QA Bug Report'. January 10th 1995. 6.25pm. Unpublished Document.

Akrich,M. (1992). The De-scription of Technical Objects, in Bijker,W and Law,J. (eds.) (1992).

Amiga Format. (1992). Hall of Fame. Amiga Format Special. 1993 The Annual. Special Issue 2, pp. 133-135. Future Publishing.

Amiga Format. (1993a). The Early History of the Amiga. Amiga Format: Special The Encyclopedia of the Amiga. Special Issue 4, pp. 16-17. Future Publishing.

Amiga Format. (1993b). Format Golds: The Great Format Gold Mine. Amiga Format Games. Special Issue 7, pp. 81-95. Future Publishing.

Amiga Format. (1993c). News Analysis: The Next Generation. R.I.P A600. Amiga Format Annual '94. Special Issue 8, pp. 74-75. Future Publishing.

Amiga Format. (1993d). News Analysis: Pirate Parts Exposed. Amiga Format Annual '94. Special Issue 8, p.87. Future Publishing.

Avedon,E. (1982). Games, Game-Playing and Technology. Impact of Science on Society. Vol. 32, no.4, pp. 405-417.

(B)

Becker, H. (1982). *Art Worlds*. University of California Press, Berkeley

Bijker, W. (1987). The Social Construction of Bakelite: Towards a Theory of Invention, in Bijker, W, Hughes, T and Pinch, T (eds.) (1987).

Bijker, W. (1992). The Social Construction of Fluorescent Lighting, or How an Artifact Was Invented in Its Diffusion Stage, in Bijker, W and Law, J (eds.) (1992).

Bijker, W, Hughes, T and Pinch, T (eds.) (1987). *The Social Construction of Technological Systems. New Directions in the Sociology and History of Technology*. MIT Press, Cambridge.

Bijker, W and Law, J. (eds.) (1992). *Shaping Technology / Building Society*. Studies in Socio-Technical Change. MIT Press, Cambridge.

Bing, J. (1982). The Electronic Games Gambit. *Impact of Science on Society*. Vol. 37, no. 4, pp. 427-431.

Blumler, J. (1991). The New Television Marketplace: Imperatives, Implications, Issues, in Curran, J and Gurevitch, M. (1991).

Boethus, U. (1995). Youth Media and Moral Panics, in Fornas, J and Bolin, G (1995). *Youth Culture in Late Modernity*. Sage, London.

Brunsdon, C. (1990). Problems with Quality. *Screen*. Vol. 31, no. 1. pp. 67-89.

Butsch, R. (1984). The Commodification of Leisure: The Case of the Model Airplane Hobby and Industry. *Qualitative Sociology*. Vol. 7, pp. 217-235.

Button, G. (1993). The Curious Case of the Vanishing Technology in Technology, in Button, G (ed.) (1993). *Working Order: Studies of Work, Interaction, and Technology*. Routledge, London.

Busby, J. (1998). The Neglect of Feedback in Engineering Design Organisations. *Design Studies*. Vol. 19, no. 1, pp. 103-117.

(C)

Cambell,S. (1995). Speakers' Corner: Talking Turkey. Bad Games are Bad News. Computer Trade Weekly. October 30th 1995, p.21. Opportunity Publishing.

Campbell,C. (1996). Spotlight: The Games Magazine Malaise. Essential Reading? Computer Trade Weekly. April 8th 1996, p.41. Opportunity Publishing.

Candy,L and Edmunds,E. (1996). Creative Design of the Lotus Bicycle: Implications of Knowledge Support Systems Research. Design Studies. Vol. 17, no. 1, pp.71-90.

Carlston,D. (1985). Software People: An Insider's Look at the Personal Computer Software Industry. Simon-Schuster, New York.

Cantor,M. (1971). The Hollywood TV Producer: His Work and His Audience. Basic Books, New York.

Cantor,M and Cantor,J. (1992). Prime-Time Television: Content and Control. Second Edition. Sage. Beverly Hills.

Cawson,A,,Haddon,L and Miles,I. (1993). The Heart of Where the Home is - The Innovation Process in Consumer IT Products, in Swann,P. (1993). Managing Innovation in the Firm. Routledge, London.

Cawson,A Haddon,L and Miles,I. (1995). The Shape of Things to Consume: Delivering Information Technology into the Home. Avebury, Aldreshot.

Charleswoth,A. (1995). Sony Sheds a Million Carts. Computer Retail News. Monday 16th January 1995, p.1. VNU Business Publications.

Channel 4. (1994). Future Publishing Survey. Digitizer. Teletext. 3rd January, p.471.

Clark,N. (1985). The Political Economy of Science and Technology. Blackwell, London.

Cockburn,C and Ormrod,S. (1993). Gender and Technology in the Making. Sage, London.

Cohen,S. (1984). Zzap ! The Rise and Fall of Atari. Mac-Graw-Hill. New York.

Computer and Video Games. (1993a). Feature: Mega CD. Computer and Video Games. February 1993. Issue 135, p.16-17. Emap Publishing.

Computer and Video Games. (1993b). Review: Lethal Weapon. Computer and Video Games. May 1993. Issue 138, p.98. Emap Publishing.

Computer and Video Games. (1995). Review. MegaDrive. Bloodshot. January 1995. Issue 158, pp. 68-69. Tower Publishing.

Computer Trade Weekly. (1994a). Data East KO's Capcom. Computer Trade Weekly. April 4th 1994, p.3. Opportunity Publishing.

Computer Trade Weekly. (1994b). (Trade advert for Rocket Software). Computer Trade Weekly. September 5th 1994. p.21. Opportunity Publishing.

Computer Trade Weekly. (1994c). (Trade Advert for Ocean Software). Computer Trade Weekly. September 5th 1994, pp. 48-49. Opportunity Publishing.

Computer Trade Weekly. (1998). EC Boosts Developers. Computer Trade Weekly. August 17th 1998, p.1. Opportunity Publishing.

Cooper,G, Hine,C,Low,J and Woolgar,S. (1993). Ethnography and Human Computer Interaction. Center for Research into Innovation, Culture and Technology. CRICT Discussion Paper No.39. Brunel University.

Crane,D. (1992). The Production of Culture. Media and the Urban Arts. Foundations in Popular Culture, Vol.1. Sage, London.

Crawford,C. (1984). The Art of Computer Games Design. Reflections of a Master Games Designer. Osbourne / McGraw-Hill, Berekely.

Crawford,C. (1986). Balance of Power. Microsoft Press, Redmond.

Cross,N and Cross,A. (1996). Winning by Design: The Methods of Gordon Murray, Racing Car Designer. Design Studies. Vol. 17, no. 1, pp.91-107.

Cunningham,H. (1995). Mortal Kombat and Computer Game Girls, in Bazelgette,C and Buckingham,D. (eds.) (1995). In Front of the Children. Screen Entertainment and Young Audiences. BFI Publishing, London.

Curran,J. (1986). The Impact of advertising on the British Mass Media, in Collins,R et al. (1986). Media Culture and Society - a Critical Reader. Sage, London.

Curran,J and Gurevitch,M. (eds.) (1991). Mass Media and Society. Edward Arnold, Sevenoaks.

CyberPunk. (1994). CyberPunk Specification Discussion Document. Unpublished Design Document. Rocket Software.

(D)

Day,G. (1990). Introduction: Popular Culture - The Conditions of Control? in Day,G (ed.) (1990). Readings in Popular Culture. MacMillan Press, London.

Dawson,G. (1990). War Toys in Day,G (ed.) (1990) Readings in Popular Culture. MacMillan Press, London.

Defanti,T. (1984). The Mass Impact of Video Game Technology, in Advances in Computers. Vol.23, pp. 93-140.

De Sola Pool,I. (ed.) (1977) The Social Impact of the Telephone. MIT Press. Cambridge Mass.

Dinsey,S. (1992). Amiga Europe: Uncommon Market. Amiga Format Special. 1993 The Annual 1993. Special Issue 2, p.52-55. Future Publishing.

Du Gay,P Hall,S Janes,L Mackay,H and Negus,K. (1997). Doing Cultural Studies - The Story of the Sony Walkman. Sage, London.

Dutton,W (ed.) (1996). Information and Communication Technologies. Visions and Realities. Oxford University Press, New York.

(E)

Eco,U. (1985). Innovation and Repetition Between Modern and PostModern Aesthetics. Daedalus. Vol.114, no.4, pp. 161-184.

Edge,D. (1995). The Social Shaping of Technology, in Heap.H, Thomas,R, Einon,G, Mason,R and Mackay, H. (eds.) (1995).

Edge Magazine. (1993). Tech.View Multi-Media. CD-Rom the Truth. November 1993. Issue 2, pp. 48-56. Future Publishing.

Edge Magazine. (1994a). Interview: An Audience with Jon Hare. June 1994. Issue 9, pp. 92-94. Future Publishing.

Edge Magazine. (1994b). News. June 1994. Issue 9, p. 21. Future Publishing.

Edge Magazine. (1994c). Interview: An Audience with Jeff Minter. July 1994. Issue 10, pp. 92-94. Future Publishing.

Edge Magazine. (1994d) Pre-Screen: Sensible Software. September 1994. Issue 12, pp. 28-30. Future Publishing.

Edge Magazine. (1994e). Making Tracks. December 1994. Issue 15, pp. 56-61. Future Publishing.

Edge Magazine. (1995a). News: Hard Times for Sega and Nintendo. February 1995. Issue 17, p.17. Future Publishing.

Edge Magazine. (1995b). Test Screen: Johnny Mnemonic. August 1995. Issue 23, pp. 70-71. Future Publishing.

Edge Magazine. (1995c). MegaDrive Hardware. Autumn 1995. Special Edition, p.111, p.129.

Elliot,P. (1972). Making of a TV Series – A Case Study in the Production of Culture. Basic Books, New York.

Ellis,G. (1983). Youth in the Electronic Environment: An Introduction. Youth and Society. Vol.15, no.1, pp. 3-11.

Ellis,L. (1994). Reviews (Amiga). Putty Squad. Games Master. September 1994. Issue 21, pp. 54-55. Future Publishing.

Ellul,J. (1990). The Technological Bluff. Eerdmans Publishing Co, Michigan.

Ettema,J and Whitney,D (eds.) (1982). Individuals in Mass Media Organizations: Creativity and Constraint. Volume 10. Sage Annual of Reviews of Communication Research. Sage, London.

EuroCom. (1992). Preliminary Game Design. Based on the Lethal Weapon Films. For Ocean Software. Presented by: EuroCom Developments Ltd. March 17th 1992. Unpublished Design Document.

(F)

Fiske,J. (1989a). Understanding Popular Culture. Routledge, London.

Fiske,J. (1989b). Reading the Popular. Routledge, London.

Flaherty,D (1997). What Ever Happened to.... <http://www.nutts.demon.co.uk/happened.html> (accessed February 1998).

Flemming,D. (1996). Powerplay: Toys as Popular Culture. Manchester University Press, Manchester.

Forty,A. (1986). Objects of Desire : Design and Society 1750-1980. Thames and Hudson. London.

Fox,A. (1971). A Sociology of Work in Industry. Collier-MacMillan, London.

Freidman,T. (1995). Making Sense of Software: Computer Games and Interactive Textuality, in

Jones,S (ed.) (1995).

Frith,S. (1978). The Sociology of Rock. Constable, London.

Fuller,M and Jenkins,H. (1995). Nintendo and New World Travel Writing: A Dialogue, in Jones,S (ed.) (1995).

(G)

Gailey,C. (1993). Mediated Messages: Gender, Class and Cosmos in Home Video Games. Journal of Popular Culture. Vol. 27, no.1, pp. 81-97.

Games Master. (1993a). Virgin Network Charts. Games Master. January 1993. Issue 1, pp. 14-15. Future Publishing.

Games Master. (1993b). Trailers: Putty. Games Master. April 1993. Issue 4, p. 35. Future Publishing.

Games Master. (1993c). Reviews: Super Putty. Games Master. November 1993. Issue 11, pp. 54-55. Future Publishing.

Games Master. (1994). Review (SNES). Jelly Boy. Games Master. October 1994. Issue 22, p. 60. Future Publishing.

Games Master. (1995a). Reviews: Mega CD Bloodshot. Games Master. March 1995. Issue 26, pp.50-51. Future Publishing.

Games Master. (1995b). The Doom Dungeon. Games Master. September 1995. Issue 33, pp. 31-32. Future Publishing.

Games World. (1995). Reviews: Putty Squad. Games World: The Magazine. June 1995. Issue12, p.79, 81. Paragon Publishing.

Gardner,P. (1995). Spotlight: Game Law. Send in the Clones. Computer Trade Weekly. March 27th 1995, p.39. Opportunity Publishing.

Gill,T. (ed.) (1996). Electronic Children. How Children are Responding to the Information Revolution. National Children's Bureau, London.

Gitlin,T. (1983/1994). Inside Prime Time. Revised Edition. Routledge, London.

Goldschmidt,G. (1995). The Designer as a Team of One. Design Studies. Vol.16, no.2, pp.189-209.

Gottschalk,S. (1995). Videology: Video-Games as Postmodern Sites/Sights of Ideological Reproduction. Symbolic Interaction. Vol.18, no. 1, pp. 1-18.

Green,T. (1995). News Analysis. Brand New System. Computer Trade Weekly. September 15th 1995, p.21. Opportunity Publishing.

Green,T. (1996). Spotlight: The MMC Report a Year On. Never Ending Story. Computer Trade Weekly. March 11th 1996, pp. 14-15. Opportunity Publishing.

Greenfield,P. (1984). Mind and Media: The Effects of Television, Video Games, and Computers. Harvard University Press, Cambridge, Mass.

Grint,K and Woolgar,S. (1997). The Machine at Work. Technology, Work and Organisation. Polity Press, Cambridge.

Groves,W. (1993). Reviews (MegaDrive). Zool. Games Master. December 1993. Issue 12, pp. 78-79. Future Publishing.

Guilliatt,R. (1992). Kiddie Cocaine. Sunday Times Magazine. November 1 st. 1992, pp. 30-35.

(H)

Haddon,L. (1988a). The Roots of the Early History of the British Home Computer Market : Origins of the Masculine Micro. Unpublished Ph.D. Thesis. Imperial College University of London.

Haddon,L. (1988b). Electronic and Computer Games - The History of an Interactive Medium. Screen. Vol.29, no.2, pp. 52-75.

Haddon,L. (1990). The Origins and Nature of Statistics on Household ICTs. Working Paper no.8. CICT. SPRU. University of Sussex.

Haddon,L. (1991). The Cultural Production and Consumption of IT, in MacKay,H, Young,M and Beynon,J (eds.) (1991). Understanding Technology in Education. The Falmer Press, London.

Haddon,L. (1994). The Career's of Information and Communication Technologies in the Home. Paper Presented at the International Working Conference on Home Orientated Informatics, Telematics and Automation. Copenhagen, June 27th-July 1st.

Haddon,L. (1998). The Role of Paradigms in the Development of Household Technologies, in Esser,J, Fleischmann,G and Heimer,T (eds.) Soziale Schliessung im Prozess der Technologieentwicklung. Leitbild, Paradigma, Standard, Campus, Frankfurt/Main.

Haraway,D. (1991). A Cyborg Manifesto: Science, Technology and Social Feminism in the Late Twentieth Century, in Haraway,D. (1991). Simians, Cyborgs and Woman. Free Association Books, London.

Hasdogan,G. (1996). The Role of User Models in Product Design for Assessment of User Needs. Design Studies. Vo.17, no.1, pp.19-33.

Hayes,M and Dinsey,S. (1995). Games War. Video Games – A Business Review. Bowerdean, London.

Haywood,L Kew,F Bramham,P Spink,J Capererhurst,J and Henry,I. (1995). Understanding Leisure. Second Edition. Stanley Thornes, Cheltenham.

Heap,N Thomas,R Einon,G Mason,R and Mackay,H (eds.) (1995). Information Technology and Society. A Reader. Sage, London.

Hertz,J. (1997). Joystick Nation. Abacus Books, London.

Helsel,S and Roth,J (eds.) (1991). Virtual Reality: Theory Practice and Promise. Meckler. Westport.

HMSO. (1995). Monopolies and Mergers Commission (March 1995) : Video Games - A Report on the Supply of Video Games in the UK. HMSO, London.

Holborn,J. (1992). Readers Questions: Everything You Always Wanted to Know About Your Amiga. Amiga Format Special. The Annual 1993. Special Issue 2, pp. 140-149. Future Publishing.

(I)

Ireland,D. (1997). System Addicts. Ultimate PC. Issue 1, September 1997, pp. 28-32. Rapide Publishing.

(J)

Jenkins,C and Sherman,B. (1981). The Leisure Shock. Methuen, London.

Jenkins,H. (1993). X-Logic: Repositioning Nintendo in Children's Lives. Quarterly Review of Film and Video. Vol. 14, no.4, pp. 55-70.

Jones,S. (1992). Rock Formation, Music, Technology and Mass Communication. Foundations of Popular Culture. Vol.3 (1992) Sage, London.

Jones,S. (eds.) (1995). Cybersociety: Computer Mediated Communication and Community. Sage, London.

(K)

Katz,A and Yates,L. (1996). Inside Electronic Games Design. Prima Publishing, California.

Kaye,M. (1978). The Story of Monopoly, Silly Putty, Bingo, Twister, Frisbee, Scrabble, et cetera. Stern and Day, New York.

Kinder,M. (1991). Playing with Power in the Movies Television and Video Games: From Muppet Babies to Teenage Mutant Ninja Turtles. University of California Press, Berkeley.

Kline,S. (1993). Out of the Garden. Toys, TV and Children's Culture in the Age of Marketing.

Verso, London.

Kline,S. (1995). The Empire of Play: Emergent Genres of Product-Based Animation, in Bazelgette,C and Buckingham (ed.) (1995). In Front of the Children. Screen Entertainment and Young Audiences. BFI Publishing, London.

Knie,A. (1992). Yesterdays Decisions Determine Tomorrow's Options: The Case of the Mechanical Typewriter, in Dierkes,M and Hoffman,U (eds.) (1992). New Technology at the Outset: Social Forces in the Shaping of Technological Innovations. Campus Verlag, Frankfurt / Main.

Kopytoff,I. (1986). The Cultural Biography of Things: Commoditization as a Process, in Appadurai,A. (ed.) (1986). The Social Life of Things. Cambridge University Press, Cambridge.

(L)

Lavroff,N. (1995). Behind the Scenes at Sega. The Making of a Video Game. Prima Publishing, California.

Law,J. (1992). Notes on the Theory of the Actor-Network: Ordering, Strategy, and Heterogeneity. Systems Practice, Vol.5,No.4, pp.379-393.

Levy,S. (1984). Hackers: Heroes of the Revolution. Penguin, London.

Levy,R and Weingartner,R. (1990). Inside Santa's Workshop: How Toy Inventors Develop, Sell, and Cash-in on Their Ideas. Henry Holt, New York.

Liddon,G. (1985). The Minter Interview. Slay it with Flowers. Zzap! 64. Christmas Special 1985, no.9, pp. 80-81. Newsfield Publications.

Loftus,G and Loftus,E.(1983). Mind at Play. Basic Books, New York.

Lowe,A. (1993a). Reviews (Amiga). Morph. Games Master. July 1993. Issue 7, pp. 48-49. Future Publishing.

Lowe,A. (1993b). Reviews (SNES). Super Putty. Games Master. November 1993. Issue 11, pp. 54-

55. Future Publishing.

(M)

MacKenzie,D and Wajcman,J (eds.) (1985). The Social Shaping of Technology. Open University Press, Open University Press.

Mackay,H and Gillespie,G. (1992). Extending the Social Shaping of Technology Approach: Ideology and Appropriation. Social Studies of Science. Vol.22, pp. 685-716.

Mackay,H. (1995). Theorising the IT / Society Relationship, in Heap, N et al. (1995).

Malone,T. (1981) What Makes Computer Games Fun?. BYTE. December 1981, pp. 258-277.

Mansell,R. (1996). Communication by Design?, in Mansell,R and Silverstone,R (eds.) 1992.

Mansell,R and Silverstone,R. (eds.). (1996). Communication by Design. The Politics of Information and Communication Technologies. Oxford University Press, Oxford.

Margolin,V. (1997). Getting to Know the User. Design Studies. Vol. 18. No.3, pp.227-236.

McDermott,C. (1992). Essential Design. Bloomsbury. London.

Mellor,C. (1995). Maturing Industry: Growing Pains. Computer Retail News. 30th January 1995, pp. 14-15. VNU Business Publications.

McGill,S. (1994). Game Review: Putty Squad. Amiga Format. September 1994, issue 63, pp. 50-51. Future Publishing.

McGill,S. (1995). Screen Play: Previews. Amiga Format. October 1995, issue 76, pp. 39-41. Future Publishing.

Miege,B. (1989). The Capitalisation of Cultural Production. International General, France.

Miles,I, Cawson,A, Haddon,L. (1992). The Shape of Things to Consume, in Silverstone,R and

Hirsch,E (eds.) (1992).

Molina,A. (1990). The Social Basis of the Microelectronics Revolution. Edinburgh University Press. Edinburgh.

Monoco,J. (1979). American Film Now. New American Library. New York.

Morley,D. (1980). The Nationwide Audience. BFI, London.

Mulgan,G. (1990). Televisions Holy Grail: Seven Types of Quality, in Mulgan,G. (ed.) (1990). The Question of Quality. The Broadcasting Debate 6. BFI, London.

Murray,F and Woolgar,S. (1991). Social Perspectives on Software. CRICT Discussion Paper. July 1991. Brunel University.

Myers,D. (1990a). Chris Crawford and Computer Game Aesthetics. Journal of Popular Culture. Vol.24, no.2 , pp. 17-32.

Myers,D. (1990b). Computer Game Genres. Play and Culture. No.3, pp. 286-301.

Myers,D. (1992). Time, Symbol Transformation and Computer Games. Play and Culture. No.5, pp.441-457.

(N)

Newcomb,H and Alley,R (eds.) (1983). The Producers Medium: Conversations with Creators of American TV. Oxford University Press. New York.

Newcomb,H. (1992). Media Institutions. The Creation of Television Drama, in Jensen,K and Jankowski,N (eds.) (1992). A Handbook of Qualitative Methodologies for Mass Communications Research. Routledge, London.

Noonan,D. (1993a). Welcome to the Future. Amiga Format Special. Games. Special Issue 7, pp. 42-46. Future Publishing.

Noonan,D. (1993b). Games Then and Now. Amiga Format Special. Games. Special Issue 7, pp. 10-23. Future Publishing.

(O)

Opie,I. (1994). People in the Playground. Open University Press. Oxford.

(P)

Panales,T. (1983). Adolescents and Video Games: Consumption of Leisure and Social Construction of the Peer Group. Youth and Society. Vol. 15, no. 1, pp. 51-65.

Papert,S. (1980). Mindstorms: Children, Computers, and Powerful Ideas. Basic Books. New York.

Parker,N. (1996). Spotlight: Market Trends. The Game Numbers. Computer Trade Weekly. April 15th 1996, p.22-24. Opportunity Publishing.

Penn,G. (1987). A Sensible Interview...for a Change. Sensible Software. Zzap! 64. March 1987, no.23, pp.50-1. Newsfield Publications.

Peterson,R. (1982). Five Constraints on the Production of Culture: Law, Technology, Market, Organisational Structure and Occupational Careers. Journal of Popular Culture. Vol. 16, no.2, pp. 143-154.

Perry,D. (1996). Speak Easy. 'Big Mouth' Hits Back Again. Computer Trade Weekly. May 20th 1996, p.15. Opportunity Publishing.

Pinch,T and Bijker,W. (1987). The Social Construction of Facts and Artifacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other, in Bijker,W Hughes,T and Pinch,T (eds.) (1987).

Pleasance,D. (1994). Letter from Commodore UK MD. D.Pleasance. Amiga Format. September 1994, p. 153. Future Publishing.

Price,A. (1993). Games Master Review: (SNES). Claymates. Games Master. October 1993. Issue 10, p. 86. Future Publishing.

Probe Software. (1992). Lethal Weapon 1, 2, 3, NES, Game Boy, Design Document. Lethal Weapon - Second Design Document. Probe Software Ltd., February 27th 1992. Unpublished Document.

Provenzo,E JR. (1991). Video Kids - Making Sense of Nintendo. Harvard University Press, Cambridge Massachusettes.

(Q)

(R)

Reich,Y, Konda,S, Monarch,I, Levy,S and Subrahmanian,E. (1996). Varieties and Issues of Participation and Design. Design Studies. Vol.17, no.2, pp.165-180.

Reid,E. (1995). Virtual Worlds: Culture and Imagination, in Jones,S (ed.) (1995).

Reynolds,R. (1992). Super Heroes. A Modern Mythology. Batsford, London.

Rhingold,H. (1991). Virtual Reality. Mandarin Paperbacks.

Rignall,J. (1985). From a Toyota to a Ferrari ... Archre MacClean Interviewed. Zzap 64! Christmas Special 1985, no.9, pp. 78-79. Newsfield Publications.

Ritzer,G. (1993). The McDonaldization of Society: An Investigation into the Changing Character of Contemporary Social Life. Pine Forge Press, Newbury.

Roberts,D. (1995a). Spotlight: Wheatley Returns to Revitalise a Games Veteran. What Ever Happened to Domark? Computer Trade Weekly. March 27th 1995, p.27. Opportunity Publishing.

Roberts,D. (1995b). The Rod Cousens Interview. Acclaim Forever. Computer Trade Weekly. September 11th 1995, p.33. Opportunity Publishing.

Roberts,D. (1995c). Research: The Drularcher Multi-Media Report. An Industry Update. Computer Trade Weekly. September 18th 1995, p.16. Opportunity Publishing.

Roberts,D. (1995d). News Analysis: Sega Bites Back for Christmas. Playing for Real. Computer Trade Weekly . October 30th 1995, p.23. Opportunity Publishing.

Roberts,D. (1995e). News Analysis: A Games Veteran Adjusts to City Life. 'The New Domark' Computer Trade Weekly. November 13th 1995, pp..29-30. Opportunity Publishing.

Roberts,D. (1997a). Ian Heatherington Talks to CTW. Sating Psygnosis. Computer Trade Weekly. September 8th 1997, pp. 43-44. Opportunity Publishing.

Roberts,D. (1997b). Interview with Peter Moleneux. Computer Trade Weekly. September 8th 1997, pp. 61-67. Opportunity Publishing.

Roberts,D. (1997c). News Analysis: Last Man Standing: Back From the Wilderness. Computer Trade Weekly. September 15th 1997, pp.27-28. Opportunity Publishing.

Roberts,D. (1998). News Analysis: Europe becomes Konami's 'Second Market' Surplus. Computer Trade Weekly. February 2nd 1998, p.7. Opportunity Publishing.

Rocket Software. (1994a). Office Memo Subject:...err...Bloodshot...not. Internal Faxed Communication from MD to Development Staff. Rocket Software. August 18th 1994. Unpublished Document.

Rocket Software. (1994b). Faxed Communication From Lead Tester US Test Report. 'Blooshot (version 8-19)'. August 30th 1994. Rocket Software USA to Rocket Software UK. Unpublished Document.

Rocket Software. (1994c). Faxed Communication Covering Letter from Rocket Software USA to Rocket Software UK. 'Re: Battle Frenzie-Genesis'. October 5th 1994. Unpublished Document.

Rocket Software. (1994d). Rocket Software Bug Report. December 7th 1994. Unpublished Document.

Rocket Software. (1995). Faxed Communication to Accalim. 'Re:QA Bug Report'. January 10th 1995. Unpublished Document.

Roger,J. (1997). Report on the Video Games Industry Workshop. Commission of European Communities (CEC) Workshop Conference Proceedings on the European Video Games Industry, November 19th 1996, Centre Brochette, Brussels.

Roy,R. (1986). Meanings of Design and Innovation, in Roy,R and Wield,D (eds.) (1986).

Roy,R and Wield,D. (eds.) (1986). Product Design and Technological Innovation. Open University Press, Milton Keynes.

Ryan,J and Peterson,R. (1982). The Product Image: The Fate of Creativity in Country Music Songwriting, in Ettema,J and Whitney,D (eds.) (1982).

(S)

Sanders,C. (1982). Structural and Interactional Features of Popular Culture Production: An Introduction to the Production of Popular Culture Perspective. Journal of Popular Culture. Vol. 16. no.2, pp.66-75.

Schroeder,R. (1996). Possible Worlds. The Social Dynamic of Virtual Reality Technology. Westview Press, Oxford.

Sega. (1993a). Third Party Genesis / Game Gear Test Procedure. Document From Supervisor, Third Party Analysis Group to Development Firms. February 1993. Sega of America. Unpublished Document.

Sega. (1993b). Third Party Concept Approval Form. Sega of America. Unpublished Document.

Sega. (1993c). Third Party Test Checklist. Sega of America. Unpublished Document.

Sega. (1994a). Sega Europe Faxed Communication to Rocket Software. Subject: Bloodshot-MegaDrive. August 18th 1994. Unpublished Document.

Sega. (1994b). Faxed Communication From Sega of America Third Party Licensing Account Executive to Rocket Software USA. October 5th 1994. Unpublished Document.

Sega Power. (1995). MegaDrive: Bloodshot. Sega Power. February 1995. Issue 63, pp. 54-56.

Future Publishing.

Sheff,D. (1993). Game Over: Nintendo's Battle to Dominate an Industry. Hodder and Stoughton, Sevenoaks.

Shoemaker,P and Reese,S. (1991). Mediating the Message. Theories of Influences on Mass Media Content. Longman, London.

Shotton M. (1989). Computer Addiction? - A Case Study of Computer Dependency. Taylor and Frances, London.

Silverstone,R, Morley,D, Dahlberg,A and Livingstone,S. (1989). Families, Technologies and Consumption: The Household and Information and Communications Technologies. CRICT Discussion Paper. Brunel University.

Silverstone,R and Hirsch,E (eds.) (1992). Consuming Technologies: Media and Information Technologies in Domestic Spaces. Routledge, London.

Silverstone,R and Haddon,L. (1993a). The Individual and Social Dynamics of Information and Communication Technologies: Present and Future. CICT, SPRU RACE Project 2086.

Silverstone,R and Haddon,L. (1993b). Future Compatible? Information and Communication Technologies in the Home. A Methodology and a Case Study. CICT, SPRU. RACE Project 2086.

Silverstone,R and Haddon,L. (1996). Design and the Domestication of Information and Communication Technologies: Technical Change and Everyday Life, in Mansell,R and Silverstone,R (eds.) (1996).

Skirrow,G. (1986). Hellivision: An Analysis of Video Games, in MacCabe,C (ed.) (1986). High Theory/ Low Culture: Analysing Popular Television and Film. Manchester University Press, Manchester.

Skurzynski,G. (1994). Know the Score. Video Games in Your High-Tech World. Bradbury Press, New York.

Stallybrass,J. (1993). Just Gaming: Allegory and Economy in Computer Games. New Left Review March / April (1993), pp. 83-106.

Stevens,S and Thomas,A. (1992). How Far is the Nintendo Horizon?, in Czarnik,T (ed.) (1992). Cogito Ergo Ludo. October (1992). Vol. 1, no. 1. [ftp.netcom 192.100.81 in pub/profile/game-dev](ftp://netcom.192.100.81.in/pub/profile/game-dev). (Accessed Summer 1994).

Storer,A. (1992). The Amiga in America. Amiga Format Annual 1993. Special Issue 2, pp. 44-49. Future Publishing.

Stutz,E. (1996). Is Electronic Entertainment Hindering Children's Play and Social Development?, in Gill,T (1996). Electronic Children. How Children are Responding to the Information Revolution. National Children's Bureau, London.

Sudnow,D. (1983). Pilgrim in a Micro World. Biddles, Surrey.

Sumner,K. (1992). 1992 - A Never Ending Sumner. A Letter from Kelly to You. Amiga Format Annual 1993. Special Issue 2, p.24. Future Publishing.

Sutton-Smith,B. (1986). Toys as Culture. Gardner Press, New York.

(T)

Tabizel,D and Rosen,R. (1995). The Video Games Market Research Supplement for ECTS Autumn 1995. Drularcher Multi-Media Ltd., London.

Takouchi,T. (1986). Hot Gossip. Computer and Video Games. December 1986, p.162. Emap Publishing.

Toffler,A. (1980). The Trend Wave. Pan, London.

Toles,T. (1985). Video Games and American Military Ideology, in Mosco,V and Wasko,J (eds.) (1985). The Critical Communications Review, Vol. III: Popular Culture and Media Events. Norwood, Ablex.

Tomczyk,M. (1984). The Home Computer Wars: An Insiders Account of Commodore and Jack Trammie. Compute Publications ! Greensboro.

Tucker,T. (1994). Reviews: (Amiga). Putty Squad. Games Master. September 1994. Issue 21, pp. 54-55. Future Publishing.

Turkle,S. (1984). The Second Self: Computers and the Human Spirit. Granada, London.

Tunstal,J. (1993). Television Producers. Routledge, London.

Turrow,J. (1978). Getting Books to Children. American Library Association, Chicago.

Turrow T. (1991). A Mass Communication Perspective on Entertainment Industries, in Curran J and Gurevitch M. (eds.) (1991).

Turrow,J. (1992). Media Systems in Society. Understanding Industries Strategies and Power. Longman, New York.

Tulloch,J and Alvarado,M. (1983). Doctor Who - The Unfolding Text. MacMillan Press, London.

(U)

(V)

(W)

Williams,R and Edge,D. (1996). The Social Shaping of Technology, in Dutton,W (ed.) (1996).

Winn,M. (1985). The Plug-in Drug. Television, Children and the Family. Second Edition. Penguin, London.

Winner,L. (1985). Do Artifacts Have Politics?, in MacKenzie,D and Wajcman,J (eds.) (1985).

Wolf,J. (1993). The Social Production of Art. Second Edition. MacMillan Press, London.

Woolgar,S. (1994). Science and Technology Studies and the Renewal of Social Theory. CRICT Discussion Paper No.41. May (1994). Brunel University.

Woolgar,S. (1996). Technologies as Cultural Artifacts, in Dutton,W (ed.) (1996).

(Y)

Yin,R. (1994). Case Study Research. Design and Methods. Second Edition. Sage, London.

(Z)

Appendix

A.1 Initial Fact Finding Sources of Information and Informal Interviews

Develop 94!. This was a conference for discussing games development and industry issues that occurred inside the European Computer Trade Show on April 10th and 12th April at the London Islington Business Design Centre.

The Lectures attended with notes taken were on a range of issues of producing computer and video games and the newly emergent software form of 'multi-media entertainment'. The notes are derived from my own notes.

The following titles and details of the lectures are given to note the issues tackled.

Monday 11th April :

11.30. 'Press Play'. G.Martin, Electronic Sound and Pictures.

Discussed the relationship between the record industry and video games industry and how the two media compete for market sales and the same audience. This give scope for the emerging CD audio interactive medium to adopt interactive concepts from IT interfaces into complementing conventional music albums.

12.30 a.m. If it Moves Squash it. J.Nguyen, S.Podell. Sigma Designs.

Discussing the role of video or 'MPEG' video sequences in future games.

2.00 p.m. Games for the Masses. D,Collier, Trip Media and J,Lynn-Evans, Phillips Media.

Discusses the need to change traditional design conventions in order to create new multi-media games for a wider adult audience rather than a 'niche' market of youths. This strategy was described by examining two games designs 'Burn Cycle' and 'Voyeur', which sought to capture game and film audiences.

3.00 p.m. When Two or More are Gathered Together. J.Sans. Argonaut.

The talk covered the future expectations for games with the rise of networked games delivery and set top box technology.

4.00 p.m. Platform Panic ! Panel Session : M.Birch GTE Interactive, A.Sutherland, Teeny Weeny Games, J,Sans, Argonaut, F.Katan, BITS., T.Heatherington, Sony/Psygnosis.

Discuss the problem of developing where there exist competing hardware standards and new delivery media to compete with cartridge technology such as CD. The need for writing in 'C' to aid cross hardware development, seeking alliances with licences with other entertainment media, and focusing on games design rather than graphics was suggested as ways of coping with the turbulent changes in hardware.

Tuesday 12th April.

11.30 am. Music and Emotion : The Heart of Interaction. The Fat Man. G,Sanger.

The issue of designing 'interactive music' and the role of technology, the musician and the audience are covered.

12.30 pm. Interface Designs for Tomorrow. Panel Session : K.Mohney, British Telecom, J.Eyre, Multi-Media Ventures, M,Sawyer, UCM.

Man-Machine Communication issues are discussed with the design of interfaces from games to museum guides and London Underground journey planners.

2.00 pm. A Soft Ticket to Real-Time 3D. Criterion Software.

The design of 3D software tools for games that have benefits over 3D hardware solutions in placing 3D models in games.

3.00 pm. The Machine .or the Message ? C.Crawford. Chris Crawford Games.

A critique of the industry's provision of software is given that describes an over valuing on 'fun' with graphics and sounds rather than 'entertainment' similar to the appeal of Hollywood films. The reason for this is that publishers and distributors and games players do not want change in the design of games that inhibits innovation in design.

Extra ad-hoc talks were made with people at the show who were from publisher and developer background. These were of short duration in 10-15 minutes in general, with notes being written afterwards and led to making further contacts for the research with the obtaining of business cards.

Name :	Firm:	Role :
M.Tyler.	Cross products.	Software Engineer.
R.Bennet.	European Leisure Software Publishers Association..	Director
D.Sorrel..	Apache Software Limited.	Director
L.Taylor.	Hoog Spel (Dutch games magazine).	Journalist
D,Butt.	Super Gamer, Paragon Press.	Editor.
J,Darling	CodeMasters Software Company Limited..	Chairman
D,Leigh-Gilchrist.	Purple House Production.	Programmer
M,Zafrany.	Formula Limited.	Technical Manager.
A,Smart.	Smart Products.	Freelance Artist
F,Katan.	BITS.	Managing Director.
Dr.M.Redmond..	University of Dublin,	Director of Computer Science Department.

Magazine articles were initially scanned in Edge Magazine 1993 to 1994 and one Electronic Journal found on the Internet for the supplementing of these in initial investigations.

A.2 Questions for Developers

These questions are split into sections :

(Please try to give examples with answers.)

[Factual/background questions]

- 1) Age:
- 2) Time worked in the Industry:
- 3) Sex:
- 4) Skill(s) / role(s) in games development:
- 5) Games worked on (inc. dates):
- 6) Who worked for :
- 7) Technologies / platforms used:
- 8) Background (educational and occupational):

[Games design aesthetics]. This set of questions are designed to discover how you assess the ideal and actual designs of games you produce and those that the industry produces.

(Questions are to accommodate past, present and future perspectives).

- 1) What is regarded as a **'good'** and **'bad'** game.
- 2) How has this **changed** over time will this change.
- 3) What **advances** have there / will there be in **games design**.
- 4) Give a **critique** of the **industries work** collectively.
- 5) What are the main differences between the types of games available (genres)
- 6) Are certain **'genres'** more popular than others - why
- 7) Do you feel there is any difference in **style** and quality between games written for dedicated **consoles** and home **computers**.
- 8) What role does / should **technology** play in influencing **games design**. Has this / will / this change.
- 9) What are your **aims** in designing a game. (Or part of a game).
- 10) Has this / will these aims change.
- 11) Do you have a **style**.
- 12) Give a **critique** of your work. (are you always happy with your finished work).
- 13) **Why** do you write games.

[Technology and tools used to make games]

[Organisation of Production]

[Action / Crafting the game]

This set of questions are designed to assess how the actual craft and labour process of writing games is influenced by technological questions and the immediate location of development.

(Questions are to asked to accommodate past present and future perspectives.)

- 1) How do games get written. (has this changed over time/will its change)
- 2) What is the difference between **design** and **development**.
- 3) Are these **revisable** or totally linear.
- 4) What is the **time** deadlines you work to.
- 5) What is the **time** gap between ideas and concept - prototype - finished article - release - retail.
- 6) What are the **cost** structures of a game / you work to.
- 7) Who **generates** the ideas you work on.
- 8) How much **autonomy** do you have in choosing the **content** and **styling** of a game
- 8b) What scope is there for **revision** and review of the **game** concepts.
- 8c) What ideas do have that get **rejected** and **accepted** and why.
- 8d) What are the implications in writing a game in **one genre** rather than another.
- 8d) How much **interpretation** is there in creating a **licensed** game (e.g. Batman, coin operated copy or original game).
- 8e) Would a **different design team** come up with significantly different work and why.
- 8f) What are the differences in **procedure** of writing games 'in house' and freelance.
- 8g) Who is responsible for assessing the **quality** of your work.
- 9a) How do you function with **other members of staff**.
- 10a1) What, if any, affects do **non-programming** staff have on the **content** and design of a game. (e.g. marketing depts. management etc.)
- 10b1) Where do **conflicts** lie in the acceptance and rejection of **game** concepts come from and how are these provoked.
- 11.1) What are the **implications** for writing for one **hardware platform** and not another (as in **open** and **closed platforms** and between platforms).
- 11.2) How does **technology** affect how games are **designed**. (Refer to the specific introduction of and decline of the console, computer , C.D. ROM, cartridge technology etc.).
- 11.3) Is the issue of high technological innovation and the **lack of de facto standards** in hardware an issue in games development and design.

11.4) Why choose to write for an untested hardware platform.

11.5) What preferences / ideal technical structures would you prefer

11.6) [Skill specific questions:] What is the role of sound, music, animation, graphics, coding etc. in games. (Has this / will this change).

11.7) Are each of these skills given an equal priority.

[The audience and the user].

(This section is designed to analyse how the consumers are considered in the creation of games).

1) Who do you write games for.

2) Who do you assume are playing your games.(e.g. age gender) How do you think they are playing the games (socially, solitary, time in day and over time l/t s/t etc.)

3) How did you arrive at this image.

4) How is this reflected in the design of a game.

5) To what extent does the publisher / proprietary hardware firm / retailer and the 'player' affect how you design a game. (Do you think this has changed (will change) over time).

6) What are 'they' looking for in a game design. Does this conflict with your own imperatives.

[The Industry]

(This section examines the overall structures that regulate and influence the workings of firms operating in the industry as a whole).

1) What problems do you see in the industry if any, are there to producing games.

2) Has this / will this change over time.

3) Who do legal issues such as COPYRIGHT, licensing technologies, censorship, shape the work you do.

4) What affect does the introduction of censorship in the industry have on the content choice of your game.

5) What is the relationship between the publishing house and the development team (and hardware firms) in terms of influencing games design.

6) Where do potential conflicts lie in design activity / goals, (between the developer and the publisher and proprietary hardware firms)

7) What do you feel about the rise in control hardware producers have in deciding what games are released for their hardware platforms. What are the implications for this for games design.

8) Does the 'moral panic' about the psychological effects of video games upon children affect what you do.

[Choosing a specific game that you have worked on, what were the main influences shaping the content and styling choices in its design].

A.3 Case Study Questions

Useful Materials to help form a time line of the evolution of [Case Study Game] and to generate further questions and revive memories : [Development firm] gameography / history e.g. old reviews of other games (to show company track record) ; Old reviews and players letters about [Case Study Game]. Story boards, design briefs and documentation internal and external. Prototype versions of [Case Study Game]. Project proposal to and feed back from [the publisher]. Sega or Nintendo feedback. Written play-testing reports. [Case Study Game] ! Feedback from [Case Study Game].

[Case Study Game] Production Questions.

[Development firm] and [Case Study Game]].

- Brief history of [Development firm]. (Company philosophy)
- Strategy behind [Development firm]'s catalogue of games releases.
- Why [Development firm] developed [Case Study Game].
- What was learned from releasing [Case Study Game].
- Why release [Case Study Game].
- [Development firm]'s relationship with [publisher] as a publisher.
- Strategic and economic issues of producing [Case Study Game] : platform support, costing, time budgets, pricing, release timing, distribution and geography.
- Diffusing [Case Study Game]. What marketing tactics were used.

(NB What is different about [Case Study Game] as a project)

[[Case Study Game]'s Game Design] :

- [Original Game's] relationship to [Case Study Game]. What was learned from [the original] games design, (feedback internal / external).
- Aims behind [Case Study Game]'s content and styling.
 - A) Game play objectives and structuring of [Case Study Game] (playability, interactivity etc.) a level by level break down.
 - B) Aesthetic content : graphics choice, sound effects and music.
 - C) Hardware dependent nature of the game design. What influence did technology have in conceiving the ideas for the game. (I/O and machine specific properties).
- Designer(s) motivations for taking part in the design of [Case Study Game].
- [Case Study Game]'s relative design merits to other games in-house and other games on the market.
- Were you happy with the final design of [Case Study Game].

[[Case Study Game] and the Audience and the User].

- Who was [Case Study Game] written for.
- Who was intended to play [Case Study Game] and why would they want to play it.
- What would the player want from [Case Study Game] as a game.
- How would they play it (duration per session and overall).
- How do you arrive at this image of perceived use and player needs.
- How was the design of [Case Study Game] influenced by the view you have of the player's needs. (Does this conflict with your own design imperatives).
- To what extent were other members of [Development firm], Ocean, Nintendo and Sega and distribution and retail and Magazine reviewers to be seen as an audience when designing [Case Study Game]. What are each looking for in the design of [Case Study Game].
- Do these actors influence the design of [Case Study Game] and conflict with your own design imperatives.
- Was external players advice accepted into the design of [Case Study Game] (reviews / letters from feedback from Super Putty).

[Implementing [Case Study Game]].

- How was [Case Study Game] designed. (Who did what where and when).
- What ideas were rejected and why.
- How was [Case Study Game] developed. (Who did what, where and when)
- How much autonomy did you have in designing (part of) [Case Study Game].
- How was it decided who did what.
- Did the development process affect the design of [Case Study Game].
- What was the total time gap for making [Case Study Game] from idea to finished product.
- What time deadlines for developing [Case Study Game] (internal and external).
- Cost structures for making [Case Study Game].
- Who assessed the quality of you work on [Case Study Game].
- What other members of staff did you interact with during the development process (inc. non-technical). Did they influence the design.
- What were the implications of developing [Case Study Game] for each platform.
- How relevant were the issues of technical standards in influencing the design and development process. (e.g. Portability)
- What was the role of coding, graphics and sound in the development of [Case Study Game].
- Was each skill given equal priority.

(NB. What was different about developing [Case Study Game].)

[Play-testing and feedback]

- What are your objectives in play-testing.
- What did you do and when did you get involved in the project.
- How were your suggestions received.

[Wider external influences].

- How did the issues of copyright, censorship (ELSPA / Nintendo), licensed technologies affect [Case Study Game].
- What influence did [the publisher] have upon the [Case Study Game]. (Development milestones, price, timing of release etc. as well as content).
- What affect did Sega / Nintendo licensing contracts have on influencing the content of the game.
- Were there conflicts with these organisations.
- Did the moral panic of video games and their effects influence the design.

A.4 Main research interviews:

Interview number :	Role :	Duration of interview	Firm :	Location :
(1)	Artist	> 3 hours + notes.	Freelance. Virgin. BITS.	Home.
(2)	Programmer	3 hours 20 min.	Freelance. Virgin. BITS.	Home.
(3)	Designer	1 hour 13 min.	Myelin	Office.
(4)	Programmer / M.D.	1 hour 15 min.	BITS	Cafe.
(5)	Designer / Play Tester	30 min.	BITS	Film Location.
(6)	Director.	40 min.	Freelance.	Film Location
(7)	Programmer / MD	2 hours 30 min.	Tao Systems	Pub.
(8)	Manager / Designer	(1) 2 hours. (2) 30 min	Funny Soft (pseudonym)	Office. Meeting Room.
(9)	Programmer.	1 hour 15 min.	Bullfrog	Office.
(10)	Programmer	1 hour 25 min	Bullfrog	Office
(11)	Artist	1 hour 10 min	Bullfrog	Office
(12)	Designer / MD	55 min	Chris Crawford Games. Atari.	Cafe.
(13)	Programmer / Designer	3 hours	Freelance. Virgin.	Home.
(14)	Programmer / Designer	1 hour 45 min	BITS. Freelance.	Home.
(15)	Programmer / Designer / MD	1 hour 45 min	Vivid Image.	Work Place
(16)	Programmer	40 min	Vivid Image	Work Place
(17)	Programmer	45 min	Vivid Image	Work Place
(18)	Artist / MD	2 hours	On-Line	Office
(19)	Designer	2 hours 15 min	Diverse Interactive	Work Place
(20)	Designer	1 hour 30 min	Diverse Interactive	Work Place
(21)	Artist	2 hours 15 min	Cranberry	Office.

				Sauce	
(22)	MD / Manager	2 hours	Teque	Office	
(23)	Project Manager	1 hour 30 min	Domark Software	Office.	
(24)	Musican	1 hour 15 min	Domark Software	Music Studio	
(25)	Artist	1 hour 20	Rocket Software (pseudonym)	Work Place	
(26)	Programmer	1 hour 50 min	Domark Software	Work Place	
(27)	Programmer / Designer	1 hour 15 min	Vivid Image	Work Place	
(28)	Artist / Designer	2 hours 20 min	Funny Soft (pseudonym)	Office	
(29)	Play Tester	35 min	Funny Soft (pseudonym)	Office	
(30)	Programmer / Designer	(1) 2 hours 30 min (2) 30 min (3) 15 min on video	Rocket Software (pseudonym)	Office	
(31)	Artist	1 hour 30 min	Rocket Software (pseudonym)	Office	
(32)	Programmer	(1) 1 hour 30 min (2) 30 min on video	Domark Software	Work Place	
