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The Capability of Design in Government

School of Water, Energy and Environment

Centre for Competitive Creative Design, C4D

PhD
Academic Year: 2013- 2020

Supervisors:
Prof. Phil Longhurst,
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ABSTRACT

This research increases understanding of the scope and potential of design as resource in the context of government. Currently, there is limited knowledge and use of tangible and intangible dimensions of design in government and its potential remains unrealized. This despite designs established history of use, evidence to support its economic, social, environmental, and political value and encouragement from national and international bodies.

What design is and its capacity to contribute in government is explored in this research. Accomplished through seven phases of investigations, the design-in-government context is first established and then explored followed by an examination of what design is and does within this context.

A mixed methods approach was employed involving a critical assessment of both theoretical and empirical insights, including a scoping review, a focused review of literature, interviews with practitioners and primary and secondary observations of the design-in-government phenomena in practice. Interactions with stakeholders, academia and industry at international engagements informed the research process and evaluated study results incrementally over a 6-year period from 2013-2019.

Results reveal a dimensional and holistic perspective of design as capability in operation within a dynamic design-in-government system. Here the potential exists for all facets of design to impact all areas of government simultaneously. The establishment of the design-in-government conceptual framework and definition of design for this context are also significant outcomes from this study. Together they constitute constructs that contribute to the furtherance of the novel field of research and practice with implications for design education and the evolving design profession. Finally, the distinctive scoping review process from this research contributes to the theoretical advancement of the methodology.

Keywords: Design-in-Government, design, design capability, potential.

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Ecclesiastes 3:11 NIV

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LIST OF ABBREVIATIONS

APDIG	All Parliamentary Design and Innovation Group
CABE	Commission for Architecture and the Built Environment
CF	Conceptual Framework for Design-in-Government
DBA	Design Business Association
DC	Design Commission
DDC	Danish Design Centre
DeEP	Design in European Policies
DIAC	Design Industry Advisory Committee
DIG	Design-in-Government
DTI	The UK Department of Trade and Industry
FIP	Federal Identity Program
IT	Information Technology
KTA	Knowledge Transfer Agent
LSA	Life Cycle Assessment
NDP	National Design Policy
NEA	National Endowment for the Arts
NESTA	National Endowment for Science Technology and the Arts
SEE	Sharing Experience Europe
SME	Small and Medium Enterprises

1 INTRODUCTION

"Design matters profoundly to us all in innumerable ways and represents an area of huge, underutilized potential in life."

John Heskett, 2005

1.1 Overview

This chapter presents the background and need for the research. Framing the wider study, the research question, aims, and objectives are presented. Finally, the chapter concludes with an outline of the thesis and a summary of chapter contents from which to orient the reader.

1.2 Background

This research explores a somewhat novel phenomenon however, the place for design in government is not a new positioning; rather it has become established over a long history of its application. In fact, since biblical times, the accurate use of design was of concern to God himself: "Every part of the plan, [David told Solomon], was given to me in writing from the hand of the Lord. He will see to it that all the work related to the Temple of the Lord is finished correctly" (1 Chronicles 28:19-20 NLT). Similarly, throughout time, empires, regimes, and diverse political administrations globally, designs strategic use has been of interest to all levels of government to achieve specific goals. Emperor Napoléon III used design as a political strategy commissioning the demolition and re-construction of Paris in 1853 creating aqueducts, sewers, fountains and among other things, widened avenues to bring light and air into the overcrowded, diseased, crime-laden city. Besides his socio-economic motivations, the straight avenues served as a significant, strategic military tool to aid in the deterrence of uprisings and to facilitate the movement of troops throughout the city (Heron de Villefosse, 1955). In the 20th Century, the post-World War II period saw the establishment of national design promotion bodies and strategic initiatives in

numerous countries worldwide including Germany, Canada, South Korea, Finland, Denmark and Great Britain (Woodham, 2010) to facilitate the use of specific dimensions of design towards government initiatives. This more recent epoch helps to position this specific research investigation as the interest in design use has become more widespread. An opportunity space now exists for greater interdisciplinary exploration and for the required necessary constructs for designs legitimized use in this context.

Personal interest in this topic sparked around the turn of the 21st Century when internal shifts within the design profession and external influences surrounding it became evident. This reinforced the need for design's place within government to become more formally established. Although design enjoyed a somewhat covert history within the context of government, the increased need for and support of design use by government was becoming of growing interest globally. Based in Canada, where at that time, the adoption of a National Design Policy was being lobbied through the Design Exchange (DX), Canada's National Design Museum, the rhetoric surrounding designs, "indispensable role in fostering economic growth and cultural vitality (The Ontario Business Report, 2011)" was being proclaimed for all to hear. Despite best efforts, not everyone heard, but for those who did, before the mandate of the design promotion body's strategic focus shifted shortly afterwards, the directives of the national design policy proposal remained. Among them, the need to "undertake a report to quantify design's contribution to Canada (and its potential contribution) (The Ontario Business Report, 2011) (Swann, 2010)."

As a practicing Interior Architect, Design Educator, Academic Chair and former Political Scientist, the interdisciplinary context was an intriguing. This sparked a quest to embark upon a series of related investigations through to this present post-graduate research endeavour. Personal experience in practice evidenced not only design's quantitative contributions to business and the economy but also qualitatively to its impact on individual human life, social concerns, cultural identity, national security, the system of government and the environment, to name a few. This broad perspective of design capacity was not a widely

understood one. The gap of understanding regarding design's potential for application became of increasing significance to me. The more answers were searched for from within practice and amongst contemporaries, the more it was realized that the opportunity space within this area of knowledge was pronounced. As a design professional at the time, engaging with government from the bottom up, the barriers this lack of understanding of design's scope truly created for the design profession became profoundly obvious. Unsuccessfully trying to secure procurement bids (for seemingly un-design related concerns) because of the misalignment of knowledge between myself and government practitioners regarding what design is and does and how it relates to the focus of the bid, my insights soon evolved into a motivated inquiry to bring about understanding to the public sector. It became evident that my frustration was a reality equally experienced and acknowledged by the design industry, design researchers, and design support and promotion bodies in other countries (APDIG, 2013a). In a report for the UK's Associate Parliamentary Design and Innovation Group (APDIG), the policy advisor for the UK's Design Council concurs noting the necessity for change:

> *Greater awareness of the potential of design for government may help to inform procurement decisions but there is a long way to go both in improving understanding of where design can be of use and streamlining procurement across the public sector. (APDIG, 2013a)*

In response to my own experience, I quickly realized that a top-down approach to create systemic change though new knowledge generation, was necessary. Through the experience of conducting this research however, its wider and more profound implications on the design profession as a whole, design education, design research, the system of government at all levels, third sector bodies, and intergovernmental organizations concerned with the collectively addressing complex global issues, quickly became evident.

1.3 Need

With the reality of our volatile world becoming more ubiquitous, evidenced through pervasive, manifold crisis, the need for governments to look for strategic,

innovative, and viable solutions outside of traditional organizational and problem-solving frameworks has become essential (Mowat Centre, 2012). Nationally and internationally in our recent history, public health, economic uncertainty, crime, poverty, social injustice, and terrorism plague government agendas. Landmark initiatives such as the World Health Organization's Pandemic Declaration (2020), the Brundtland Report (1997) and the Earth Charter (2000), have underscored the need for coordinated intergovernmental efforts to tackle mutual and complex global challenges that affect us all. A story not only about globalization, but equally about people and society (Design for Public Good, 2013). In our contemporary context the complexity of these and other concerns has made way for design (in all its tangible and intangible manifestations) to demonstrate its strength as an agile, human-centred, multi-faceted tool for use by governments.

Countries and regions around the world including Argentina, Australia, Botswana, Brazil, Chile, Germany, Greece, Ireland, Israel, Qatar, South Africa, South Korea, Venezuela the European Union and the United Kingdom to name a few, have become increasingly aware of design's tactical ability to positively impact areas of government and political agendas nationally and internationally (SEE, 2014). Consequently, policy makers in these and other countries and regions have created or are in the process of developing or implementing design-enabling initiatives. The modes of integrating design into government are diverse from country to country, including national design policies (NDP), design innovation policies, innovation labs, specialized design firms and other related strategies all with the aim of directly or indirectly reinforcing designs capabilities at various levels in government or through its policy cycle (DeEP, 2012; SEE, 2010,2012,2013, 2014, 2015). There exists no one standardized approach to integration, rather benchmarking between countries is used to glean best practices as to the most suitable integration strategy. Regardless of how design is implemented, desirable in its application are strong integrative strategies at any level of government that can benefit multiple sectors (Vinodrai, 2009) Internationally, however, where design is utilized, its comprehensiveness of use within and throughout government is inconsistent (SEE, 2015). Driving an interest in the use of design by governments is the growing evidence supporting

its utility and value in the public sector context. Over the past 10 to 15 years, extensive theoretical and empirical studies have emerged creating the evidence base of designs relevance and impact in both public and private sectors. This has been instrumental in legitimatizing design's significance in economic ((Vinodrai, 2009); (Porter, 1998); (Department of Trade and Industry, 2005)) (Cox, 2005; Heskett, 2008), social (Hillgren, *et al*. 2012, (Heskett, 2002); (Farson, 2008)), and environmental contexts (Fry, 2009, 2011; Fry, Dilnot and Stewart, 2015; Government Digital Service (GDS), 2017). Yet, despite government interest and the evidence to support design's use and value, design remains an underutilized resource.

Barriers to Design Use

The Commission of the European Communities report: *Design as a Driver for User-Centred Innovation (*2009) concludes that "the lack of understanding about the nature of design and its potential" is the main barrier to its use by government in Europe. They add that "the broad nature of design makes it difficult to grasp (ibid)." Coupled with the reality that the extent of a country's understanding of design determines the extent to which design is used (Whicher, Cawood and Walters, 2012; Mortati, 2015), the need for clarity is vital and foundational to any efforts aimed at implementing design as resource in this interdisciplinary context. To date, no mechanism exists to bridge this gap of knowledge.

Other barriers include the novelty of concepts related to the emerging field of design such as strategic design and design-driven innovation. This in addition to the lack of a common definition of design in a political context (European Commission., 2009) also hinders its use. The literature also identifies that the multifarious and inconsistent nature of the emerging design-in-government landscape void of common metrics, language and constructs as contributing to confusion (APDIG, 2009) and thereby hindering its use. Additionally, the range of diverse strategic integration mechanisms available for use, multiple meanings of design, its pervasive aesthetic paradigm, and inconsistent design industry classifications from country to country is also shown to breed confusion amongst users within and between countries. Table 1-1 summarizes key literature related

to associated issues surround the need for the research. These needs represent related gaps in the research.

Table 1-1 Summary of issues related to the primary research gap

Concerns	Gap	Reference
Need		"Design is an underutilized, misunderstood and undervalued resource by government" European Commission, 2009; All Party Parliamentary Design and Innovation Group, 2013, Thenint, 2008
		"As design policies become more widespread, research into these issues [design policy capability] could well make a useful contribution to design and innovation policy understanding and enactment in the future." (Hobday et al, 2011).
Issue/ gap	"A lack of understanding of design's nature and potential"	"Barriers to better use of design… the lack of understanding about the nature of design and its potential. This is partly due to the novelty of concepts such as strategic design and design-driven innovation, but also to the lack of a common definition. (European Commission 2009)."
Related Barriers	Unclear interdisciplinary boundaries /classification and necessary constructs	Barriers in the political and institutional framework for Design: Design is a broad, multi-faceted concept with unclear boundaries. The broad nature of design is an advantage in many instances, but it does not aid communication with policy makers as there Is no clear understanding of what the design field encompasses (E.C., 2009)."
	Lack of common definition	"We need to be somewhat more precise about what is, and what is not, "design". We need to place a boundary around it.. (Moultrie, 2013)."
	Unclear identification of the design field in this context	"Although the importance of design as a strategic tool in government is well established, no theoretical framework exists to identify the various strategic modes and to assess their impact (Heskett, 1999). "
	Confusing language and related terminology.	There is confusion surrounding relevant terminology (Field notes, Author)

	Design's capabilities? Where do they originate?	There is a lack of clarity about what the capabilities of design are and where they originate. (Content analysis based on Moultrie, 2009)

1.4 Limits

Within Government, Bason (2010) identifies pre-existing internal barriers which equally represent obstacles in terms of facilitating change towards possible integrative design use. Among them, "the political context, the lack of regular market competition and multiple lines, limited ability to make and shape long-term strategy and hierarchical and bureaucratic organizational structures (Bason, 2012) (see also Osborne and Brown, 2005; Bason, 2012; Van Wart, 2012)". These impediments from within government represent limits to this research as this investigation focuses on design related influences contributing to its underutilization by government.

At the core of related sub-issues related to the underutilization of design as a resource, whether internally or externally driven, lies the foundational requirement for accurate information about what design is and does within this context. Ackoff (1989) notes that concerning knowledge acquisition towards its application, data, information, knowledge, and understanding are fundamental components of both gathering and learning on the continuum. This is independent from wisdom which involves doing; an activity which requires judgement related to value towards the objective. Herein lies another limit of this research which aims only to facilitate understanding by exploring and providing accurate information about the knowledge of design in this context. This knowledge is recognized as a precursor to but not a determinant of its application.

1.5 Aims, Objectives, Research Question

As such, this thesis seeks to explore the question:

"**What is the capability of design in government?"**

The aims of the study are to:

1. Identify the capability of design within the context of government, and to analyse and synthesize these findings in order to,
2. Develop an appropriate tool to communicate this information to government.

To address the research question and aims, the following 7 objectives were rationalized and met through an informed, iterative process. Table 1-2 charts both a summarized and detailed list of the objectives. These include to:

Table 1-2 Objectives

OBJECTIVES	
Summarized	**Detailed**
Examine and Define What Design is as Capability	1.Examine evidence that shows "what design is" as capability through a systematic review of literature. Synthesize this information into a written definition of design for use in this context.
Establish the Design-in-Government Context	2. Map the interdisciplinary area of Design-in-Government including related literature, evidence, and key concepts. Based on this information, to construct a conceptual framework (CF) in graphic and written form. To document, in written form, the need for the research and list gaps in the existing literature.
Explore the Design-in-Government Context	3.Report on the development of the CF through insights gained on its components based on an embedded three-month engagement with related stakeholders.
Investigate What Design Does within the Context of Government	4.Map "what design does" in the context of government according to identified themes from the 30 secondary case studies and the CF.
Evaluation of study results through industry engagements	5.Report on the model's concept, context, and content considerations from studies one two and three, based on feedback from international research and practice-based audiences.
Prototype the Design-in-Government Model	6.Prototype the Design-in-Government Model through a visual synthesis of cumulative study evidence.
Evaluate the Design-in-Government Model	7. Report the evaluation of the model's utility as a communication tool from presentations and discussions with related stakeholders.

The research aims and objectives contribute to both the theoretical and the practical need for design as practice to clearly articulate itself within various fields of integration as it continues to evolve. It also supports the intellectual pursuit towards the recognition of design research as an academic discipline. The research outcomes, discussed in Chapter 10, demonstrate the transferability of knowledge across other fields in terms of data, theory and practice.

1.6 Thesis Organization

The thesis is organized into a series of 10 chapters representing both process and product towards achieving the research aims and ultimately answering the research question. As shown in Table 1-3, Chapters 2 to 9 make up the body of investigations towards this end. The investigations are organized into a series of seven tasks (Figure 1-1) that reflect an iterative process of engaging with the subject matter as well as industry stakeholders and thought leaders at over 40 academic and practice engagements from 2013 – 2019. During this time period there was a proliferation of evidence being generated worldwide to which the researcher was privileged to access.

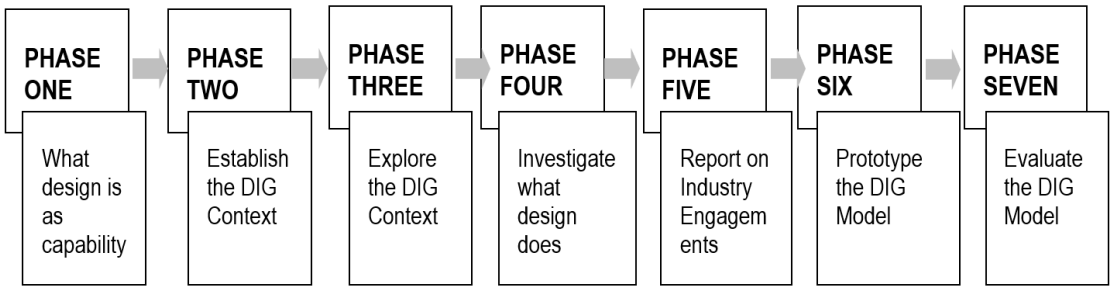


Figure 1-1 Phases of the research investigation

Table 1-3 Thesis Organization

CH	PHASE OF INVESTIGATION	OBJECTIVE/TASK	METHOD Data Collection	Data Analysis
1	INTRODUCTION	Discuss the background and need for the research. Introduce the RQ, Aims and Objectives		
2	ONE	Examine and Define What Design is as Capability	Focused Review of Literature on the Area of Design	Systematic Approach
3	METHODOLOGY	Present the research design and rationalized selection of methods for data collection and analysis		
4	TWO	Establish the Design-in-Government Context	Scoping Review of Literature on the Area of Design-in-Government	Systematic Approach
5	THREE	Explore the Design-in-Government Context	3 Month Exploratory Case Study (ECS) within a design-in-government research-practice	CF for Design-in-Government
6	FOUR	Investigate What Design Does within the context of Government	Secondary Case Studies	Thematic Analysis
7	FIVE	Evaluation of Study Results as Model Components through Industry Engagements	Industry Engagements	Researcher Reflection
8	SIX	Prototype the Design-in-Government Model	Prototyping of synthesized research evidence	Researcher Reflection
9	SEVEN	Evaluate the Design-in-Government Model	Evaluation of the Model through Interviews and Questionnaires with Stakeholders	Content Analysis
10	DISCUSSION + CONCLUSION	Discuss how the research question was answered through objectives. Present Contributions to Knowledge		

Framing the thesis, Chapters 1 and 10 presents the introduction, discussion and concluding sections, respectively. Finally, Chapter 3 outlines the thesis methodology comprised of strategic objectives alongside reasoned research methods. A detailed description of the content contained in each chapter is summarized in Section 1. 7 of this chapter.

1.7 Thesis Overview by Chapter

Chapter 1 – INTRODUCTION

This chapter presents the background and need for the research. The research question, aims and objectives are presented, and the thesis outline is summarized.

Chapter 2 – DESIGN AS CAPABILITY: A Literature Review

Chapter 2 examines what design is as capability within the context of government. This is done as a series of research activities within this chapter. First a focused review of literature is conducted, looking at the term design in order to clarify meaning and identify what the individual capabilities are for use as resource to government. This is followed by a look at the term's capability as well as the concept of design capability as it is presented in the literature to inform the gap knowledge that the research aims to fill. The synthesized data from this study puts forth a proposed definition of design for use in this context.

Chapter 3 - METHODOLOGY

This chapter discusses the research design. In it, the research approach, and rationalized selection of appropriate methods are presented and are explained and justified within the context of the research question. Finally, key phases of the research investigation are outlined, and the methods used for each phase to collect analyse and triangulate the data are explained.

Chapter 4 – ESTABLISHING THE DESIGN-IN-GOVERNMENT CONTEXT: A Scoping Review of Literature

Since the term *design* is context specific, the goal of chapter 4 is to establish the interdisciplinary research context in order to better understand how design operates therein. The research investigation focuses on a scoping review of literature to identify the related literature and explore the field from a theoretical perspective.

As part of the task, the research scope is framed, given a collective name and the field, its related literature and evidence are and mapped therein based on common themes emerging from the literature. The findings also capture the nature of the research area as including its thematic, conceptual, operational, philosophical, and thematic dimensions. The synthesis of findings is modelled into a conceptual framework (CF). The framework acts as both the context and as an analytical tool for the wider research study.

Chapter 5 – EXPLORING THE DESIGN-IN-GOVERNMENT CONTEXT: An Exploratory Case Study

Chapter 5 continues to explore the Design-in-Government context here from a practical perspective through a 3-month full time engagement within a design-in-government research practice with related stakeholders**.** The objective of this chapter is to report on the dimensions of the design-in-government phenomenon based on empirical insights.

The engagement involved actively participating in a range of in design-in-government activities and industry events throughout Europe during the placement. Observations, document reviews of in-house publications and organizational documents and unstructured interviews with staff and clients from 11 European countries, informed the spontaneous data collection. The findings validate and modify the dimensional insights of the conceptual framework which was used as an analytical device for this study.

Chapter 6 – WHAT DESIGN DOES IN THE CONTEXT OF GOVERNMENT: A Thematic Analysis of Secondary Case Studies

The notion of design as capability requires an understanding of its application, hence, this chapter is tasked with examining “what design does” within the context of government.

The interpretative study examines 30 international case studies of targeted design use in government and tracks them according to thematic codes derived inductively from the case studies and deductively from the conceptual framework for design-in-government. The detailed findings from the study on ‘what design is’ from Chapter 2 are included as part of the CF.

The investigation identifies gaps between the intended use of design from each case study, versus actual areas of impact and effectiveness within government. The results reveal that all dimensions of design have the potential to operate in all areas of government simultaneously. To date this perspective has not been identified. As such this holistic point of view represents the primary contribution to knowledge from this study. Through these findings design’s capability and potential reach is revealed answering the primary research question.

Chapter 7 – EVALUATION OF STUDY RESULTS THROUGH STAKEHOLDER ENGAGEMENTS

This chapter reports on the incremental evaluation of study results from Phases 1-4 of the research through an iterative process of engaging with the subject matter, industry stakeholders and thought leaders at 6 international academic and practice engagements from 2013 – 2019. The process informed the research direction as well as the development of the design-in-government model. In terms of the model development, the evaluation criteria involved the model’s components of concept, context, content, and communication elements. Summaries of each paper/poster presented in terms of what was discussed and tested are included as well as the researcher’s reflection on what was learnt from the feedback given and how it was used in the successive phase of the research.

Also informing the researchers reflections were insights on the emerging phenomena gleaned from attendance at and interactions with thought leaders at 43 international industry events during the same time period. Relevant reflections are also noted in this chapter.

Chapter 8 – PROTOTYPING AND REFINING THE DESIGN-IN-GOVERNMENT MODEL

This chapter reports on the visual synthesis of cumulative study results from Phases 1-5 (Chapters 2 through 7) as part of the development of the design-in-government model. The task addresses the research aim concerned with formatting the study results for application to government and related stakeholders.

Chapter 9 – MODEL EVALUATION

This chapter reports on the evaluation of the design-in-government model to stakeholders.

The study addresses the utility of the prototyped model as an appropriate communication tool to the target audience. Targeted interviews were conducted, and questionnaires administered to practitioners spanning design, government, design knowledge transfer and design education. These results form the basis of recommendations toward future modifications to the model and suggest its wider implication and benefit to multiple audience

Chapter 10 – DISCUSSION AND CONCLUSION

This chapter presents conclusions of the research. It commences with an illustration of how the research findings from the Seven Phases of investigations directly addressed the research question, aims and objectives. Section 10.2 highlights contributions to knowledge and the transferability of concepts to wider contexts. The value and limitations of the research are discussed in Section 10.3 providing a deeper understanding of the capability of design within the context of government based on insights gained through the research findings. This section also puts forth the authors reflections on strengths and limitations of the research

process. The chapter concludes with considerations for future research based on the study outcomes.

1.8 Chapter Summary

This research investigation sheds light on the scope of what design is and what design has the potential to do within the context of government. From this regard, it serves to create a holistic context that is inclusive of all existing and future research, evidence, terminology, and operations within this domain that demonstrate is capacity and application.

This knowledge is fundamental to design's strategic application within and between governments at all levels globally. It addresses current barriers to its underutilization and lack of consideration as a viable tool to comprehensively tackle complex global challenges.

The proceeding chapters put forth an iterative investigation respectful and responsive to the emerging phenomenon and to the experiences and knowledge of its varied participants. At the same time the research is mindful of the academic rigor necessary to support its theoretical validity. It highlights the reflective posture of the researcher with respect to the collection and analysis of data, the cumulative nature of the findings and the importance of engaging with stakeholders, industry and thought leaders throughout the process to evaluate findings.

The research begins with the clarification of fundamental terminology and concepts, exploring the landscape of interdisciplinarity and ends with insight into opportunities for the transferability of same into other contexts.

2 DESIGN AS CAPABILITY

"There are a spectrum of capabilities covered by the term 'design'."

Heskett, 2005

2.1 Overview

This chapter examines what *design* is as capability within the context of government. The study helps to provide a clearer understanding of the definition of design and its scope in terms of its potential to contribute within this context. The task also serves to provide a base of understanding of this and related core concepts. The study represents Phase One of the research process (Figure 2-1).

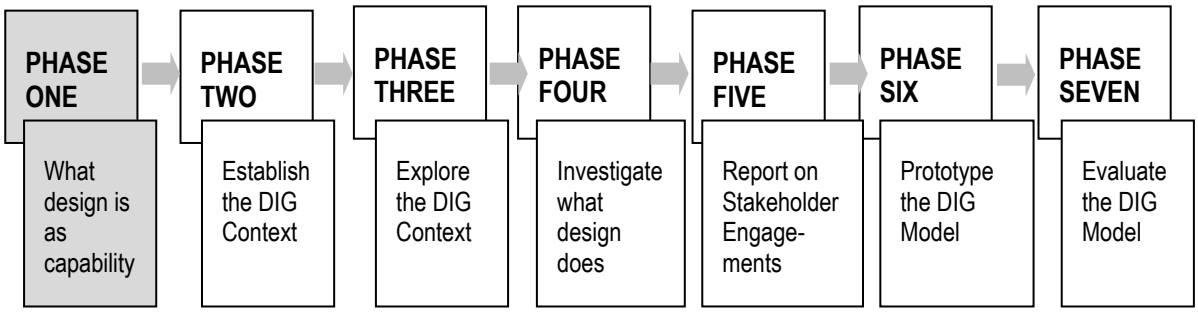


Figure 2-1 Phases of the research investigation. Phase One highlighted.

The study is carried out as a series of activities. First to contextualize the concept of *design*, the terms *capability* and *government* are examined to clarify meaning. The concept of *design capability* is then explored in the literature to identify the range of perspectives and their specific limits in order to orient the study. The task also highlights the gap and opportunity space for this research. Finally, through a focused review of literature relating to the theory and practice of *design,* the term *design* is explored according to its various meanings as noun and verb to understand its identity and scope as capability within this context. The chapter concludes with an analysis synthesis of results culminating in a charting of findings and based on this a working definition of *design* in the context of government. From this perspective, contributions to the wider research, practice, policy, and theory are presented in the final section of this chapter.

2.2 Context

The study proposes a theoretical approach to classifying and defining what design is within the context of government. This is opposed to the predominant design industry classification frameworks put in place by most governments. The literature puts forth that the primary design and government relationship requires classification metrics which are quantifiable revealing the priority towards solely, design's economic contributions to government. Metrics includes for example inputs such as the number of designers, the size of the design industry and their economic impact (Moultrie and Livesey, 2009). The myriad of challenges associated with this approach makes it an all but impossible task to measure design comparatively between countries. As Moultrie (2009) highlights, "identifying which disciplines are included and excluded from classifications is a challenge especially when looking for common metrics between countries (Moultrie 2009). For example, design disciplines within the creative industries may not be classified the same way from county to country or may exist as a subset of another sector all together.

> *"Few nations actively collect design-related data as part of their national statistics. In most nations, design itself tends to fall between different government bodies. Some aspects of design are encompassed in government departments related to culture, media, and the arts. Other aspects of design fall under the department responsible for industry, technology, or innovation. In either case, specific statistics on design are rarely collected, and when they are, they are not collected with clear definitional precision. The reason for this is self-evident, as most broad definitions of design span the entire spectrum from the creation of new technology through to the generation of individual works using craft skills (ibid)."*

Dr. Nick de Leon in his article, "Design: an essential tool for government" echoes this challenge identifying that design is often subsumed within the rich spectrum of enterprises that make up the creatives services sector. "From antique dealers to software publishing, it becomes almost impossible to distinguish design's

impact from the other 90% of industries that make up this sector (APDIG, 2013)." The limits of this current approach used to classify design across government is apparent.

A high-level paradigm for this study allows us to interpret design as capability in broad terms in terms of industry, the specifics of which can be interpreted within local, regional, or national contexts. Hence the need for definitional precision is not required in this sense. Designs existence as a professional sector, field industry including its services allows us to understand only a dimension of its existence which is separate from its manifestations.

This is an important point to identify as there have been specific design disciplines actively involved in the government context globally, skewing the association between the design industry and government to be seemingly concerned solely with fields such as service design, user-centered design and graphic design for example. The more generalized classification in this study allows for a broader understanding of designs existence and therefore its application.

The evolution of and understanding design's identity, can be attributed to the contributions of generations of practitioners, great thinkers and theorists who explored its existence from within its parameters and also dared to see beyond the limitations of the imposing traditional industry 'practice' paradigm and its predominant aesthetic existence. From these musings the various dimensions that comprise what and *how* (Kimbell, 2013) of design's existence are revealed. This discourse surrounding *what design is* therefore is not a new one having its identity revealed through various critical investigations of its' etymology and its' attributes which have in turn identified and created interdisciplinary links to domains such as science (Simon, 1969), business and management (Dunne & Martin, 2006; Martin, 2009; Boland & Collopy, 2004a; (Borja de Mozota, 2003). It is in this context that the design-in-government area of research is explored, stepping back to explore the theoretical foundation that undergirds designs past, present, and future capability within the context of government.

To identify the scope of what design is, the approach to this study allows for the contextualization of design from within the broadened perspective. The metrics

being used are related to “what design is” as it exists beyond the limits of industry delineations. By extension, this approach also allows the examination of *what design does* beyond its economic contributions. To capture an understanding of design’s full potential, the *how* of design’s existence (Kimbell,2013) will be explored as part of the wider research in Chapter 6.

2.3 Challenges

Both the academic and practical field of the study of design in interdisciplinary contexts have been challenged to “seek to explore the ways in which design in any discipline area is produced, understood, and used (APDIG, 2014).”

The fundamental challenge associated with the nature of the subject matter and its literature primarily surrounds complexities in core terminology relevant to the theory and practice domains related to this research. Specifically, this includes the terms *design, capability,* and *government*, along with the concept of *design as capability*.

Most theorists agree that *design* is a challenging word to define. The term “*design”* is a broad, multifaceted and complex word with a context that is unspecified (Heskett, 2005; European Commission, 2009) making the task of exploring design and it’s role is a challenging one (Heskett, 2005). However, the task of facilitating understanding of design is an important and necessary component of design research. It bridges the divide between understanding and misunderstanding (Dilnot in Heskett, 2017), not only here within the area of government but by association, for the related fields and its stakeholders who engage in this emergent interdisciplinary space. Design historian and economist, John Heskett, for example, devoted much of his career to bringing about an understanding of what design is in the interdisciplinary context of economics. This was done as a pre-requisite to discussing how design can be regarded as a value generator to government. The challenge of the endeavour was the subject of many of his writings.

Within the context of government, researchers and industry practitioners engaging with the term *“design”* in this context have expressed challenges in not

having a common reference point with respect to the word (and related terms) when engaging in communications and appropriating its use strategically (Whicher, Cooper, EC, APDIG). Many have articulated the requirement for a clear understanding of “what design is” in this context (de Leon, 2013; Whicher, 2015; Zitkus *et al.*, 2018) to bridge this gap.

Complicating matters, the misalignment of information, knowledge and communication occurs at local, regional, national, and international levels. As design use predominantly targets complex social, economic environmental and systemic issues, the implications are significant in terms of broader, intergovernmental issues. In addition to the complexities associated with the word, other factors contributing to its misinterpretation range from the prevailing aesthetic paradigm to the rapidly evolving design practice disciplines, the broad nature of the term, historical precedents of design use as well as predominant areas of design currently being used within government. Coupled with the use of the term in a multitude of unrelated professions, contexts and claims of its’ declaration to “change the world”, the criticality and complexity of the task is clear.

Defining *design* has become common practice within the field as one means of bridging this gap.

2.4 Considerations

When seeking to define design, Dilnot (1982) affirms that the nature of *design* equally and inherently consists of concepts.

> “Design as an entity is constructed from words-as-concepts which includes massive aphoristic and tacit contents that generate in their cognoscenti distinctive characteristic modes of structuring, experiencing, knowing, reasoning and operating.”

The notion of design as *resource,* possessing with it the *ability* to evoke change are two such concepts which underscores the character of design within this context. Such terms, extend beyond the often-tacit requirements of research to include the reality of ideas, concepts, experiences, and the like which reside as part of the definition of design

Dilnot (1982) also proposes that in interdisciplinary pursuits such as this, concepts are necessary adding the need to "construct a design vocabulary as a conceptual language to ground our arguments (Dilnot, 1982)."

> "Here it is crucial to understand the significance of concepts. Words are not merely so. That is, words - or at least some of them, keywords - do not merely describe things, rather they work to circumscribe the activities, which they appear only to describe or cover. Keywords are significant binding words in certain activities and their interpretation; they are significant, indicative words in certain forms of thought (Dilnot, 1982, referencing Raymond Williams,1975)."

In this investigation, key words help to anchor us in the novel and ambiguous landscape of design-in-government, helping to "bind" interpretations as they are uncovered or understood. The words *'capability'* and *'potential'* constitute part of the conceptual language of this new context.

Consistent with design's tacit and explicit existence, a full understanding of these and other related concepts requires both theoretical and practical exploration in order to understand meaning in this emerging context. This will be a focus of this study as well as the wider research.

2.5 Results

2.5.1 Capability, Design Capability and Government

The noun *capability,* in the English language, is complex in its etymology, having various dimensions of meaning. This creates opportunities for many interpretations which is the case with respect to this research and how the term is used within design-in-government literature. First, the dictionary identifies the use of the word *capability* to mean, *ability, potential* and *function.*

Ability refers to natural ability (the quality or state of being capable);

Potential: is the range of ability of doing or to do something; and

***Function*:** refers to a facility to carry out a particular set of operations; the capacity to be used, treated, or developed for a specific purpose: e.g., nuclear capability ("Capability", 2014). Table 2-1 summarizes these various meanings from five dictionary sources.

Table 2-1 A summary of dictionary definitions of the word *"capability"*

Summary of dictionary definitions of the word "capability" (noun).			
SOURCE	**DEFINITION**		
Bing Dictionary	1. **Ability**	**2. Potential**	3. **Other**
	Natural ability: the power or practical ability necessary for doing something	Range of ability: the potential ability of somebody or something to do something	**Function:** a facility to carry out a particular set of operations
Miriam Webster	The quality or state of being capable; also: ability	a feature or faculty capable of development: potentiality	The facility or potential for an indicated use or deployment
Oxford Dictionary	The power or ability to do something	Capability of doing/to do something	
Collins English Dictionary	the quality of being capable; ability	(Usually plural) a characteristic that may be developed; potential aptitude	the quality of being susceptible to the use or treatment indicated: the capability of a metal to be fused.
The American Heritage Dictionary of the English Language	The quality of being capable; ability.	A talent or ability that has potential for development or use. Often used in the plural: a student of great capabilities.	The capacity to be used, treated, or developed for a specific purpose: nuclear capability.

Design Capability

At the scoping stage of the research, the literature identifies references to all three interpretations when looking specifically at the term *"design capability"* (SEE 2010 - 2012; Raulik–Murphy and Cawood, 2010; DeEP, 2013; Moultrie et al, 2008; European Commission, 2009).

The uses of the term range from an individuals' ability to do something DeEP, 2014), to the capacity of human capital as indicators in the design services sector (Moultrie and Livesey, 2009) to the potential for design use by public and private sector. All interpretations of the capability, as ability, potential and function are included independently with reference to specific contexts and as latent (input), expressed (output) or as the range of capacity. All definitions in the literature are valid within their specific context. The varied uses of the term and range of interpretations in the literature are summarized in Table 2-2 .

Table 2-2 An analysis of the use of the term "*Design Capability"* in the literature

Reference	Context	Competencies	Applied definition in the literature	Dictionary use of the term
DeEP, 2013	Enterprise and Ecosystem Capabilities	Design Leadership, Design Management, and Design Execution	"The ability to integrate resources and competences to foster innovation "	Ability to integrate resources **- ABILITY**
Moultrie and Livesey, 2009	National competitiveness	The design services sector in a region	"The development of human capital relating to design, including design graduates, designers in the workforce and those working in the design sector "	"A talent or ability that has potential for development or use" **- ABILITY and FUNCTION**
SEE, 2012	Economic benefits		"The extent to which the private and public sectors use design"	To generate output ability – **OUTPUT ABILITY**
European Commission, 2009	User-Centered-ness	The role of design in open innovation	"The role of design capacity as a core capability for open innovation practices. Open innovators need more	"Range of ability: the potential ability of somebody or something to do something"

Reference	Context	Competencies	Applied definition in the literature	Dictionary use of the term
			developed design capabilities,	- **POTENTIAL**

Another conclusion from the analysis of literature is how the various understandings and uses of the same term within the context of design, provide a basis for confusion. This is especially compounding since, along with the core nuances inherent in the word *capability* itself, the context of the use of it within the term *design capability*, varies, and the reference to specific competences of design varies.

These aspects when paired with the complexities of the concept of design, complicate the communication objective necessary for a unified field of practice.

Several researchers have identified similar challenges within the context of design and government. They offer novel approaches to overcome such barriers. First, the idea of looking for commonalities amongst the diversity as a way forward (Buchanan, 1998; Moultrie, 2013; Heskett, 2017). Another approach is to reframe the boundaries so that together the data sources can “tell a more complete story (Moultrie, 2013).” Both options were considered with respect to this study.

However, since this research seeks to examine the capability of design within government, it relates primarily to the definition of capability as potential as well as its’ root “capacity” – the range of ability of something to impact something or more specifically, the range of ability of design to impact government (Figure 2-2). Hence, the definition includes both input and output dimensions of the term. This range of ability therefore encompasses all interpretations of design as capability identified in the literature. As such, it provides a baseline reference for the range of interpretations of design as capability in the literature.

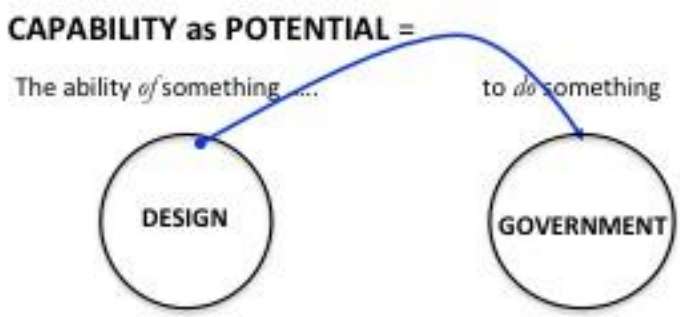


Figure 2-2 Analysis of capability as potential in the literature. Source, Author

Capability in this research is therefore being interpreted to mean potential. A term which spans both the input and output dimensions of what design is, does or can do. This notion represents a commonality that encompasses the diversity that exists within the terms.

The view of design capability as potential is the first step in affirming longstanding claims made by design researcher and practitioners of design's heroic capacity to, among other things, solve critical global problems and potentially save the world.

A framework within which to consolidate and document the range of evidence regarding designs ability (*input)* and impact in government (*output/outcomes*) provides a platform from which to do so while creating a general understanding of design capacity in the context of government.

Heskett's (2005) proud proclamation that "design matters profoundly to us all in innumerable ways and represents an area of huge, underutilized potential", supports this charge.

Government

Consistent with the broad perspective taken toward the concept of *design capability*, the high-level perspective of the research allows for the term *government* to be taken in the same regard. In its general sense the term refers to, the system of government. The view allows for the consideration of a universal

and unifying reference to government that extends beyond regional, national, international, and cultural boundaries and that relates equally to service delivery, policymaking, and governance. The consideration allows the holistic perspective of government to be viewed alongside the holistic perspective of design. Within this broad classification, all literature relating to design as well as its potential impact in all areas of government can be considered and categorized.

The classification of government according to a generalized framework is a strategy utilized in many pan-government interventions adopted by organizations such as the United Nations. Strategies such as connected government and enterprise architecture (Saha, 2010), identify and utilize ordered commonalties of countries as foundational baselines of metrics to facilitate efficiencies internally, externally and inter-governmentally. Typically, these frameworks include the distinction of government to include the categorizations of economic, social, environmental, and systemic dimensions.

Similarly, design-in-government literature refers to government in this way generally according to economic, social, environmental, cultural, systemic, and political streams of design's impact. The whole of government framing also implies that the system of government includes not only various levels and divisions (departments) but also the functions of policy making, service delivery, techniques, instruments and methods of governance as well as the system of operations (Bason, 2014).

2.5.2 Design

The etymology of the word *design* identifies it as being both a noun (English from Latin origin) and a verb (French from Italian) (Oxford, Miriam Webster *"Design"* 2013). This places design as a thing (object) as well as an activity (action or thought).

The duality of design's make-up as object and action/thought reveals its tangible and intangible manifestations. This is a critical and foundational element in understanding not only its nature, but also its potential within interdisciplinary contexts. Hence, the notion of potentiality/ability spans the divide between

design's tangible and intangible manifestations. As design encompasses both tacit and explicit dimensions, this consideration is a valid supposition. It is within this ambiguous gap that the full possibilities of potential as a concept can be explored within the context of design-in-government.

Tangible and Intangible Expressions

As identified, historically the reality of design is rooted in its identity as 'object'. The traditionalist view of design as a tangible, aesthetic expression is a difficult one to move away from; its limited perspective already established within government (Kimbell, 2013). Design's operation from this paradigm has existed over centuries within many government agendas. Woodham (2010) catalogues the many such demonstrations including "the visual and material power of the architecture and design of the Roman Empire, the British Empire, Fascist Italy, and Third Reich Germany. Other manifestations include the establishment of the French Royal Manufactories of the Gobelins (tapestry and furniture) and of Sevres (pottery) under Louis XIV and Louis XV respectively." Here design was regarded as physical objects for aesthetic, cultural, economic or political value.

Canada's Federal Identity Program 1970 (FIP) displayed another aesthetic regard. The FIP, a graphic design policy, was developed to create a standardized and clear identity of activities to be executed by 125 different organizations of the Government of Canada. A similar Federal Graphics Improvement Program in the United States, 1972-1981, reviewed and revamped the graphic design policies of over 45 government agencies. Both initiatives demonstrated the view and use of design as a visual communication tool by government.

From a more objective perspective however, design can equally be perceived as a generalized activity driven by its theory and application, as opposed to a singularly, prescribed administration of skill. This broad view facilitates interdisciplinary exploration. Scientist Herbert Simon explored such objective frameworks. His interdisciplinary paradigm, boldly unearthed design's aesthetic roots by proclaiming design to mean, "any course of action aimed at changing existing situations into preferred ones (Simon, 1969)." Here, peering beyond design's traditional concrete and aesthetic identity, Simon was able to view

design more holistically, describing it as being an *agent of change* and interpreting it as being *comprised of the intellectual activity conducive to social or economic thought leadership*. Simon proposes that,

> *Everyone designs who devises courses of action aimed at changing existing situations into preferred ones. The intellectual activity that produces material artefacts is no different fundamentally from the one that prescribes remedies for a sick patient or the one that devises a new sales plan for a company or a social welfare policy for a state (Simon, 1981 in Heskett, 2009).*

Simons broad perspective of design interprets it as being an element to facilitate change and comprising of the intellectual activity conducive to social or economic thought leadership or as Kimbell (2009) describes, as "a rational set of procedures in response to a defined problem." Heskett adds that, as a thought process, design is transcendent in nature, "underpinning all kinds of professional activities (Heskett, 2008)" such as medicine or business.

Simons' revelations, separating the act of designing from the designer and identifying and articulating its problem-solving nature, have become the theoretical foundation for further streams of interdisciplinary exploration related to design theory and practice in our recent history.

Similarly, Papanek's (1972) objective view presents design as a fundamental element of human life - "All men are designers. All that we do. Almost all the time, is design. For design is basic to all human activity."

Simon's revelations have become the theoretical foundation for further streams of interdisciplinary exploration related to design theory and practice in our recent time."

More traditionally, design is commonly understood to be a profession; the broadness of which brings confusion due to the various fields of practice therein. Dilnot, (1984) address the specificity of design as being a particular profession but further identifies it as being a class, phenomena or action (activity) not necessarily professional (a view echoing Simon's perspective). These additional

insights into the word design add dimension in terms of how design might be regarded in the context of government. It also sheds light on the potential for confusion surrounding common language amongst related stakeholders in this field as the term is multi-faceted and can relate to the various “classifications” of professionals within the field.

Buchanan’s (1992) work further examines ways of thinking about design not completely dissected from its roots as object but equally looking at design as profession and as an activity to solve complex or “wicked” problems (Rittel 1972; Rittel and Webber 1973). Although his research serves as an integral part of the “design methods” and “design thinking” movements, his orders of design provide a useful framework from which to examine the notion of capability from a broad perspective. As identified in the Scoping Review, Buchanan’s framework, acknowledges the nature and development of design as well as the influence of global history and culture as contributors to the progression of the profession. His theory, as described by Van Zyl and Sauthoff (2001) which “*originated as an exploration of pluralism, the changing world, and the changing role of design and the designer* (ibid.)” is intended to form part of the “history of the discipline of design thinking [as well] as the developmental career path of designers (Buchanan, 1998 in Van Zyl and Sauthoff, 2001).”

In his Matrix, depicting the *orders* of design (Table 2-3), Buchanan (1998) proposes the realm of design to exist in its simplest form, as **Communication**, involving *Signs and Words*; **Construction** relating to *Things*; **Strategic Planning**, relating to *Action* and **Strategic Integration** which involves *Thought* (Buchanan, 1998). The “orders” or “placements” as they exist from left to right represent from tangible (left) to intangible (right) dimensions of designs’ existence.

As a body of work relevant to this study, Buchannan’s framework provides opened opportunities for exploration into *what design is* that are not specific to any one design discipline embracing paradigms from antiquity through to present day from which to identify, classify and understand designs various manifestations.

Table 2-3 Buchanan's Matrix. Source: Buchanan, 1998

	Communication Signs & Words	**Construction** Things	**Strategic Planning** Action	**Systemic Integration** Thought
Inventing	Signs, Symbols & Images	→	→	→
Judging		Physical Objects	→	→
Deciding			Activities, Services & Processes	→
Evaluating				Systems, Environments, Ideas & Values

Design as Profession/ Practice/ Industry

The traditional and most widely adopted identification of what design is, is understood through the practice paradigm and classified as delineated disciplines. Here one can begin listing the various professions or branches of professionalized practice in existence in any particular country or jurisdiction however, the list of professions is not of consequence here simply the identification that design exists as such. The understanding is that all disciplines can in fact contribute to government initiatives. The recognition of design as industry by government is acknowledged through its listing of design as such within the country's industry classifications system.

Government classification systems function as the segmentation device through which design's identity and capability is formalized politically. Fundamental difficulties exist however, when comparing data on design between countries. Highlighted by Moultrie and Livesey (2009) in their study aimed at "measuring and comparing aspects of national competitiveness and economic performance" between 12 countries, industry classification varies significantly from country to country making it an all but impossible task to find common metrics for classifying professional design sectors on a global scale. Their International Design Scoreboard is a ranking, the first of its kind at a national level, charting design

capability. Their capability metrics are derived from a set of common indicators as enabling inputs into a National Design System. Of the indicators, capabilities are defined as: “the development of human capital relating to design, including design graduates, designers in the workforce and those working in the design sector (ibid).”

Outside of government classifications, each profession with its own definition of what design is in their specific context and use of the term *design* accordingly acknowledges or validates its existence as a field. For this study an assumption can, be made that all disciplines can contribute to government initiatives without the need to delineate by discipline. For, each discipline with its own definition of *what design is* in their specific context and use of the term *design* accordingly is valid.

Johansson and Woodilla (2013) describe design practice as that which includes practical skills and competence. Within the practice paradigm however, Kimbell distinguishes between *design-as-practice* and *design-in-practice*. Kimball’s research explores the dynamics of operational interdisciplinary interface, reporting on the dynamics of the design practice in situ. The author makes the distinction as a means of using them synergistically to replace design thinking. In making these distinctions, Kimbell signifies the need to expand how we conceive and classify design as both noun and verb so that it can better apply itself in a greater variance of design professions and clarify the cognitive confusions brought about by design thinking and its vague definitions in modern discourse and literature.

Kimbell describes design-as-practice as a ‘contextualizer’ that puts design practice within the understanding of being very deliberate and routinized. This is an idea that puts at the heart of the discourse, the artefacts of design and providing a thorough breakdown of the work that designers put into those artefacts. Kimbell uses design-as-practice to further explain and centralize design as accomplishment that credits and dissects designers’ contributions and the pragmatic processes of such.

Meanwhile, design-in-practice refers more to the idea of there being multiple designs (or outputs) as they emerge and manifest in practice. She uses design-in-practice to signify the capacity and versatility of design in its varying outcomes; but also, to identify the incomplete, ever-evolving nature of design in both its processes and outcomes (Kimbell, 2009).

The idea of extracting these concepts is for the purpose of addressing and resolving problematic issues surrounding researchers within design and management. Kimbell's objective in this discourse is to articulate the meaning and the value of what designers contribute within the realms of design and social science (Kimbell, 2009).

Providing further clarification of the distinction between design as profession and design as outcome, is theorist Clive Dilnot, in his 1983 study exploring the "social and political implications of design policy. The author introduces the concept of "the impasse in design understanding." The concept relates to the divide between the abstract mode of reasoning behind design activity that "does not reveal the richness of the design process or the design activity in any conceptual terms that can be used to justify design or to ground design policy decisions."

In many instances, and as noted with Kimbell (2009), design use in government is applied according to this regard, as profession or the concrete design activity associated with its professional delineation – that is to say the act of designing (Gertler and Vinodrai, 2006). An example would be government use of service design, interior design or graphic design services to achieve specific goals.

As a 'contextualizer', and in this regard, the practice paradigm is also seen as barrier to understanding what design is (Fry, 2009). Buchannan (1992) shares his views about the limits of this portal towards interdisciplinary exploration.

"No single definition of design, or branches of professionalized practice such as industrial or graphic design, adequately covers the diversity of ideas and methods gathered together under the label (Buchanan, 1992)."

As it applies to design policy, Dilnot (1982) draws attention to the abstracted elements of the profession and the need for its illumination. in this context, he notes, “explication is vital; the ‘resolution of design processes which are at present unclear’ is a primary task in constructing a design vocabulary; a conceptual language that can ground our arguments (Dilnot, 1982).“

Specifically, the author refers to design, its process, activity, ways of thinking, approaches to solving problems and evidence-based practices which are intrinsic parts of its identity.

Beyond Industry Distinctions: Character/ Nature/ Agency

From this perspective, adding to the confusion surrounding what design is, is the evolving profession with its new areas of practice and hybrid disciplines particularly over the past 50 years. Described as representative of “methodological shifts in design practice” (Di Russo, 2013) (Figure 2-3), these advancements have expanded the reality and perception of what design is in terms of highlighting its diverse theories, methods, approaches, processes, tools, and ways of thinking.

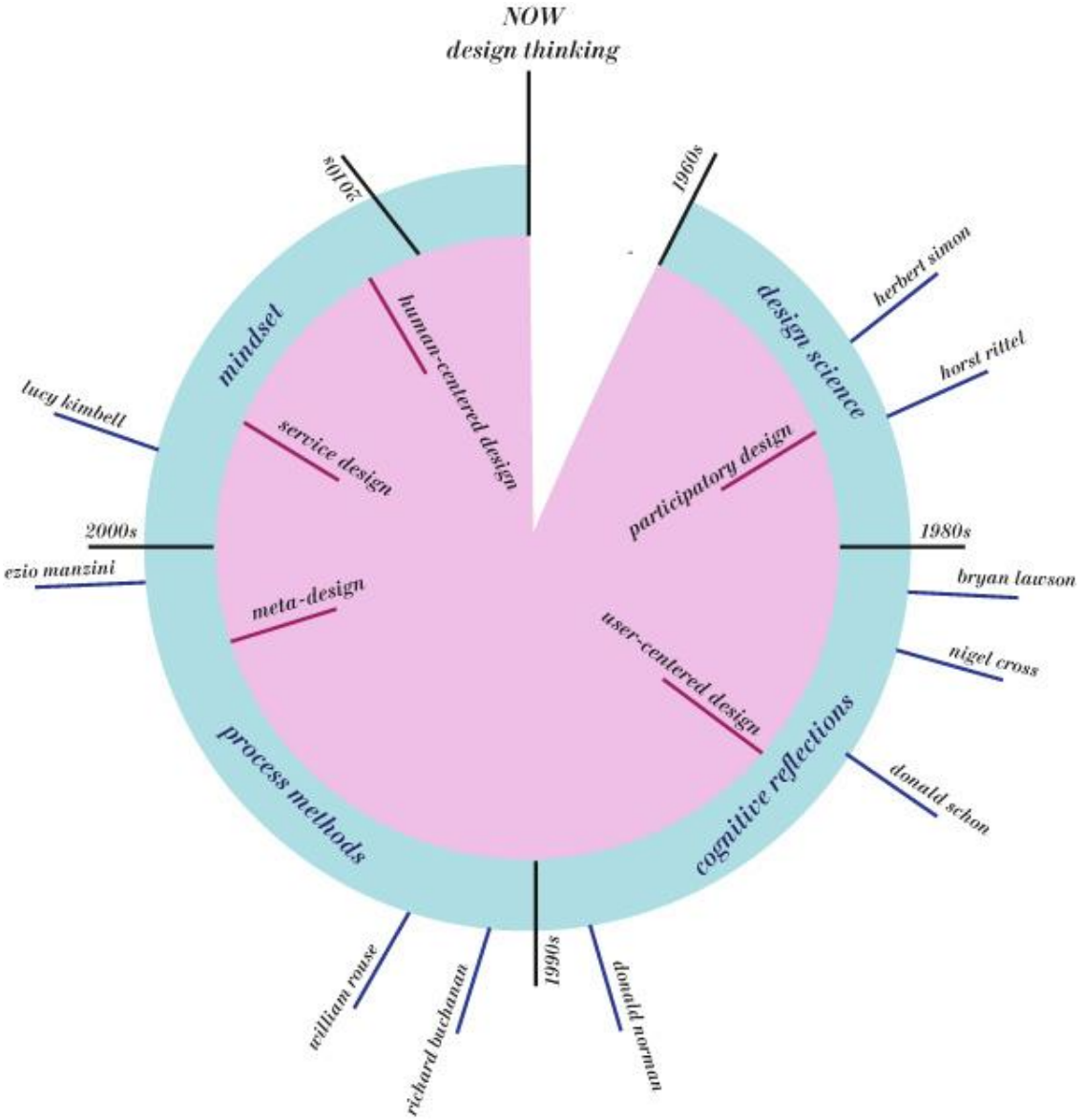


Figure 2-3 The Evolution of the Design Profession 1960s – 2010s Source: Di Russo, 2013

https://ithinkidesign.wordpress.com/2012/01/18/a-brief-history-of-design-thinking-the-theory-p1/

And as design in research and practice continues to evolve away from its disciplinary constructs of an emphasis on product or outcome to include these process, problem-solving, user-needs and human centeredness, coupled with drivers such as sustainability, technology, data driven innovation and evidence-based practices, new avenues have been made for these new approaches, schools of thought, interdisciplinary musings, and emerging disciplines. Others describe these emphases as *distinct qualities* or *attributes* of design

(Buchanan,1992; Fry, 2009; Swan, 2010) representing significant and very distinct points of view. Rapp, 2020 notes that these shifts are described as being movements away from the boundaries of design disciplines whose focus on being distinct from each other causes fragmentation, towards an new emphasis on characteristic commonalities such as usercenterdness, collaboration and problem-solving (Rapp, 2020) (Figure 2-4).



Figure 2-4 Contemporary shifts in the design profession

Fry (2009) describes these characteristic commonalities as theoretical streams representing elements of design's *'agency'* or *'character'*. As intangible dimensions, the author concurs that they become seen and understood, only when disciplinary enclosures are removed (Fry, 2009). Buchanan notes that when investigating the nature or character of design, both the tangible and intangible parts of design's identity need to be understood as parts of a whole. As such, design's agency is equally a dimension of its identity.

Overall, the contributions made by these such theorists were significant, influencing the expansion of the profession of design to include new domains of service including D*esign Management, Design Thinking, Design Research Participatory Design (PD), User Centered Design (UCD), Service Design (SD), Meta Design (MD) and Human Centered Design (HCD).* The theoretical perspectives and universal competencies associated with these new practice areas represent new ways of thinking independent of their design practice expressions equally reflected in a range of other disciplines. Design's integration

into government from this competence-based perspective is what Rapp (2020) claims is the way of the future.

The literature discusses design's nature or character as it relates to government according to the terms, Participatory, Collaborative, Human-Centered, User-Centered, Problem-solving – each, as described below represents paradigms associated with the methodological shifts.

Participatory as described by Stanford University defines "an approach to the assessment, design, and development of technological and organizational systems. The impetus of Participatory Design is to encourage the active involvement of potential or current end-users of a system in the design and decision-making processes. Participatory Design stretches across a wide range of perspectives, backgrounds, and areas of concern so there can be no single definition of Participatory Design. However, the history of Participatory Design clearly shows that it advocates and values the perspective, knowledge, skills and involvement of the end-user for designing a system that creates progressive opportunities for the employers, the employees and system designers." Stanford.edu

Collaborative is an alternative means of participatory design that takes into account, the role of passive users as co-operative designers. Like user-centered design, collaborative design refers to a process that values user experience and user feedback; taking into account the roles, ideas, and individuals from varying backgrounds that inform and influence the end product at hand (Di Russo, 2013).

Human centered design refers to a creative mindset approach that's meant to be collaborative and multidisciplinary in nature. In considering the development of methods for problem-solving, Rouse articulates the role of human-centered design as a means of humanizing the design process where humans' perspectives, abilities, and limitations are directly accounted for within the context of resolving societal issues for the purpose of holistic community development and the improvement of existing social systems (Rouse, 1991) (Di Russo, 2013).

Conceived by Donald Norman, **User-centered** design is a *designerly* approach that places the user at the forefront during the development process, where their experiences, their behaviours and their needs take predominance in determining the way the product is developed and its attributes. As an ideology, it values experience over efficiency where there's greater reliance on user feedback in all facets of the product or service and how it is made (Norman, 2005).

As a part of design's nature, **problem-solving** refers to the process of moving from problem identification to problem solution. Promoted by Buchanan in the 1990s, design as a problem-solving tool, departs from its notation as a science and instead, as an insight that engages "design thinking" in the problem-solving process, especially when resolving social issues with indeterminate cause or reason (Di Russo, 2013) (Buchanan, 1992). It is in this classification where the use of design is centered primarily around the problem or the prevailing issues at hand.

Table 2-4 summarizes the contemporary theoretical strings and their foundations. Examples of the application of these provide practical evidence of their existence and as ways of thinking and approaches within the context of government.

Table 2-4 Design's Nature Expressed in the Literature

Design's nature expressed in the literature		
Nature	**Description**	**Example/Reference**
Collaborative	An alternative to participatory design where users are redefined as being co-operative designers in a project's development.	Di Russo, 2013
Participatory	Design as an initiator for user participation (e.g., testing) during the development stages of a project, primarily for the purpose of optimizing and ensuring efficiency. Commonly associated with Interaction Design.	Plato's Republic* Di Russo, 2013

	Design that's based on optimizing efficiency and prioritizes user-testing.	
Human Centered	Design as a mindset approach focused on human empowerment within the context of social systems and community development. Design that's collaborative and multidisciplinary in nature.	Rousse, 1991
User-Centered	Design that values experience over efficiency where the user is at the forefront of the project's development. Design that's needs-based and prioritizes user-experience.	Schon, 1982
Problem-Solving	Design as an insight for professionals in dealing with "wicked problems".	Buchanan, 1992 Rittel, 1973

Design as Process and Approach

The design methods movement of the 1960's considered and explored the processes and methodologies that were part of what design is and how it operates. This provocation led to the identification and development of numerous concepts including the origins of *design thinking* (Di Russo, 2012, 2013; Woodham, 2010; Johansson and Woodilla, 2009; Ashkan, 2014) and prompted and challenged immerging ideologies of the time including those of Herbert Simon, Horst Rittel and Victor Papanek who tabled innovative ideologies that today bridge designs application into a government context.

For example, the exploration of the idea of design as process examined by many designers during this period influenced Ritter's (1960) identification of an alternative approach to the linear step-by-step model being adopted at the time.

In deciphering the common dilemmas in policy planning, Horst Rittel coined the term "wicked problem" as a means of describing the convoluted and overwhelming nature of the problems that are faced in policy-planning.

Frequently found within issues of social policy, the wicked problem can be defined as one that lacks a definitive answer or solution – one whose articulation is overly and overtly dependent on personal judgment or subjective claims – and therefore finds itself entangled as something incompatible with linear or scientific theory and methodology. Rittel goes on to describe these “wicked problems” as being associated with social, political, and economic issues whose variables and solutions are ambiguous, boundless, and exceedingly diverse due to the intricacies of modern society. He advances the argument that these kinds of problems are incompatible when being measured or understood through the linear approach, and hence should be dealt with differently in respect to their diverse and unique complexities (Rittel, 1973). This is where design comes in as Rittel’s first published report formulated the wicked problems approach to problem solving as it relates to the context of policy planning arguing that many of the problems that designers must solve are not linear but complex in nature, making it a compatible approach. Buchanan points out, that here, design thinking is to be considered with its theoretical peculiarity and practical universality as a means of examining and dissecting these “wicked problems” are indeterminate in nature (Buchanan, 1992). Similarly, as it relates to the policy process, Kimbell’s research proclaims a design-based approach as the next step in defining the policy-making process – a crucial transition, she notes, from the linear, scientific approach that government has favoured in the past in confronting “wicked problems” (Kimbell, 2016).

The recognition from many governments in our recent history of the universally complex nature of the issues they must consider has prompted an increase in the application of design as an appropriate problem-solving approach within government.

Various paradigms exist in the application of design approaches within government including human centered and user centered (EC, 2009) approaches. Sanders and Chan (2007) track the evolution of design-led approaches in design research. The survey offers a broad brush look at the range of emphases in the dynamics between user, problem and ‘designer’ proposing

the range of applications in a government context. The emphases reflect the identified spectrum of designs nature (participatory, human centered, user centered, collaborative), expressed through the contemporary methodological shifts in theory and practice.

Presented as a paradigmatic landscape, the approaches are mapped in Figure 2-5 to make sense of the numerous modes utilized in design research representing various philosophical mindsets. The landscape spans the expert verses participatory mindsets at opposing extremes in problem-solving. Each stratum employs differing tools reflecting focused ideologies. Participatory research, for example, attempts to "actively involve the people who are being served through design in the process to help ensure that the [outcome] meets their needs". This as opposed to an Expert Mindset, where (in this case) the designer-researcher sees the end user as subjects or "reactive informers" (ibid.) and the designer-researcher as subject matter expert (Figure 2-5). The map is also being used in this section to indicate the range of design approaches in operation and available as resource within the design-in-government context.

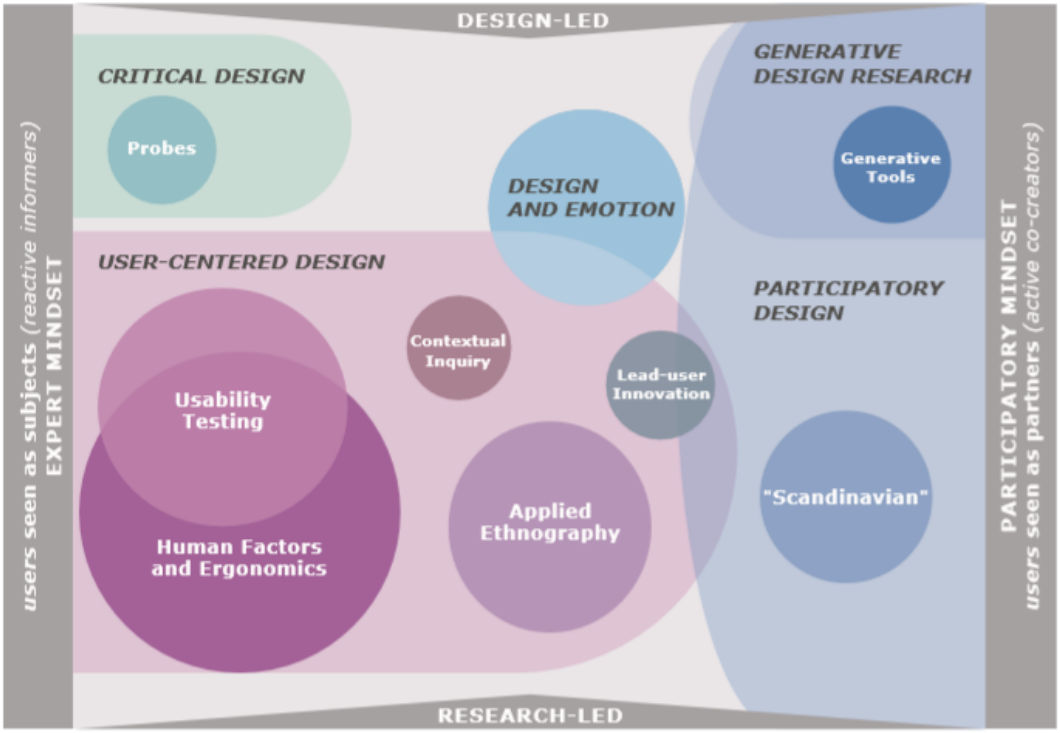


Figure 2-5 Emerging Trends in Design Research (Sanders and Chan, 2007)

Design as Ability (Thinking/Being)

In addition to its existence as approach, method, and process, and as identified primarily within "design-based scholarly literature and business media" (Ashkan, 2014, Johansson and Woodilla, 2013) *design* also exists as an ability that involves thinking and being (Buchanan, 1989). The evolution of Design Thinking as a concept can be traced historically within business, marketing and design contexts and is one which lacks a clear definition across those domains. In design-in-government practice, the ability exists both with and independent of the design professional and can be transferred to related stakeholders for use as resource.

Thinking

In their study in *Design thinking: Past, Present and Possible Futures,* Johansson and Woodilla (2013) categorize the core literature and related theoretical perspectives within two camps: *designerly Thinking* and *design thinking.* The authors, in their study, make a clear distinction between the two. '*Designerly thinking'* is concerned with the

> "Academic construction of the professional designer's practice (practical skills and competence) and theoretical reflections around how to interpret and characterize [the] non-verbal competence of the designers. *Designerly thinking* links theory and practice from a design perspective and is accordingly rooted in the academic field of design (ibid.)."

The other term, '*design thinking'*, relates to

> "The discourse where design practice and competence are used beyond the design context (including art and architecture), for and with people without a scholarly background in design, particularly in management. *'Design thinking'* then becomes a simplified version of '*designerly thinking'* or a way of describing a designer's methods that is integrated into an academic or practical management discourse (ibid.)"

The authors assert that within each categorization there exists distinct theoretical perspectives, described as sub-discourses. Each sector is identified as having clear roots and a substantial academic following referenced by foundational works as charted in Figure 2-6 (ibid). Table 2-5 presents the aptitude of design thinking through its diverse range of meanings, discourses, and applications as manifest in both practical and managerial contexts.

Table 2-5 Summary of theoretical perspectives in Design as Thinking. Adopted from Johansson and Woodilla, 2013

Design as Thinking: Theoretical Perspectives - Johansson and Woodilla, 2013			
Ability	Thinking	Designerly Thinking (Design Practice)	1. Design and designerly thinking as the creation of artefacts (Simon, 1969). 2. Design and designerly thinking as a reflexive practice (Schön, 1983). 3. Design and designerly thinking as a problem-solving activity (Buchanan, 1992 based on Rittel and Webber, 1973). 4. Design and designerly thinking as a way of reasoning/making sense of things (Lawson, 2006 [1980]; Cross, 2006, 2011). 5. Design and designerly thinking as creation of meaning (Krippendorff, 2006)
		Design Thinking (Management)	1. Design thinking as design company IDEO's way of working with design and innovation (Kelley, 2001, 2005; Brown, 2008, 2009). 2. Design thinking as a way to approach index-terminate organizational problems, and a necessary skill for practising managers (Dunne & Martin, 2006; Martin, 2009). 3. Design thinking as part of management theory (Boland & Collopy, 2004a).

Details of the sub discourses in Design as Thinking as classified by Johansson and Woodilla (2013) are described and summarized below (Figure 2-6). The thought leaders and their perspectives represent the theoretical foundations for not only design thinking but also for other dimensions of designs identity as revealed through their insights. Together they form the basis for key theoretical musings that established significant shifts in the evolution of the design profession and more specifically the way we think about what design is and its application and contribution within and beyond the discipline.

Designerly Thinking Sub-discourses:

Simon: Design and Designerly Thinking as the Creation of Artefacts

In this first sub-discourse, design and designerly thinking are placed within an objective framework, supported by cognitive theory and its application. Devised by Simon in 1969, he contends in this framework that design is all about creation and is purposed to encapsulate all conscious activity in the formation of artefacts, man-made tools designed to maintain or improve our cognitive capacity (Johansson-Skoldberg, Woodilla, Cetinkaya, 2013). He cites the creation of artefacts to be a natural phenomenon in the design process where its conditions and characteristics are liberally defined and transformed into preferred, oftentimes subjective thought. In pushing these cognitive theories, Simon is widely hailed as a creative mind behind design research as it came about.

He defines design in such a way of it acting as a catalyst in how conditions are defined and transformed - from what they were into what they are preferred to be (Simon, 1996). In the context of design practice, Simon stresses the means of distinguishing and comparing designerly thinking in the context of the present reality, and designerly thinking in respect to a new reality.

Schon: Design and Designerly Thinking as a Reflexive Practice

This second sub-discourse offers a perspective centered upon the application of designerly thinking within reflexive practice. This is a pragmatic theory contrived by Donald Schon in the 1980s that's centered on tacit knowledge and design-in-practice. In considering the role of design and designerly thinking, Schon

elaborates and emphasizes the relationship between creation and reflection-upon-the-creation within the design process for researchers and practitioners alike. Schon promotes this idea that design practice is meant to be reflective and reflexive in its unfolding and is an on-going process where self-awareness and critical thinking are essential when informing and improving design.

Buchanan: Design and Designerly Thinking as a Problem-Solving Activity

The third sub-discourse revolves around Buchanan's research, where he discusses the nature of the wicked problem and the creative role of design and designerly thinking as a problem-solving tool. From the vein of designerly thinking, Buchanan's theories promote a designerly perspective that's inclusive and in how we define and contextualize the problems faced by designers and professionals alike. In the realm of design practice, Buchanan promotes designerly thinking as a working hypothesis whose placements and components are continually being defined by all participants in the process of articulating the problem or problems at hand.

Lawson and Cross: Design and Designerly Thinking as a Practice-Based Activity and Way of Making Sense of Things

Lawson and Cross present an alternative sub-discourse associated with exploring and elucidating designerly ways of knowledge, thought, and labour. Their discourse is largely centered on uncovering and transmitting the cognitive processes of how designers think and turning them into practical examples that capture practical experiences. This is a discourse that's largely centered on the materialization of the design process based on practical examples.

Krippendorff: Design and Designerly Thinking as Creation of Meaning

In Krippendorff's discourse, design and designerly thinking is perceived as the definitive cornerstone in the creation of meaning - where meaning is at the heart of the design process. This perspective is a hermeneutic one where Krippendorff takes designerly thinking and uses it as a production tool where the meaning and the purpose of design and design work is articulated.

Within the managerial realm, design is addressed in the vein of design thinking as opposed to designerly thinking, where design thinking is purposed to apply design practice and design theory in other fields, most notably among business management. The three discourses encompassing design thinking encircle its role as a process, a skill, and a system.

Kelley and Brown

In this first discourse, design thinking was merely a concept conceived by Kelley and Brown, to which they packaged and defined as a process of which to think and work in a managerial context. This is a process that's defined to hold certain components and conditions that make design thinking more linear in structure.

They describe design thinking in their discourse as "a blend of methodologies, work culture and infrastructure" modified and re-contextualized to aid a greater audience, especially social innovators and those working in the business sector (Brown & Wyatt, 2007) (Johansson-Skoldberg, Woodilla, Cetinkaya, 2013). They were among the first to push the argument that a designerly approach could be employed amongst professionals to push creativity and innovation in their business: IDEO.

Dunne and Martin

Dunne and Martin present in this second discourse, the identification of design thinking as a teachable skill in management education that could be integrated within each step of the managerial approach in addressing wicked problems; from "generating ideas, predicting consequences, testing, and generalizing" organizational issues (Johansson-Skoldberg, Woodilla, Cetinkaya, 2013). This conception of design thinking as an educational toolkit and a flexible skill of creative and integrative thought in the modern-day business, was one that was favoured by professionals throughout a variance of fields and disciplines; including (but not limited to) legal practice management (Szabo, 2010), HR (Birchall-Spencer, 2010), library administration (Bell, 2008), and hospitals (Uehira & Kay, 2009) (Johansson-Skoldberg, Woodilla, Cetinkaya, 2013).

More specifically, with regards to Integrative Thinking, a term coined by Roger Martin (2007), the author and business leader regards the process as a means of constructively devising a solution that creatively draws from two opposing solutions to a problem. He attributes this way of thinking as the common thread behind peoples' success in the field of business. While not the only reason driving their success, he describes Integrative Thinking as a methodology predicated on thought as opposed to action, and thus plays a pivotal role in increasing one's odds of success in the business world. With an emphasis on the cognitive processes guiding leaders' decisions and addressing business problems, in his research Martin insists that action and execution cannot truly be successful if it's not met with Integrative Thinking. As a methodology, Integrative Thinking draws directly from what Martin calls the 'opposable mind', one which is used in considering the strengths of two ideas and creatively applying and/or infusing them into a new thinking model. It is this new strategy involving abductive reasoning (the approach that designers use to consider problems), that dictates the method of action in bringing this idea about. Beyond the world of business, Roger Martin reiterates in the cases of Martha Graham and George F. Kennan, the impact and the applicability of Integrative Thinking in the realms of history, politics, and the arts. It is in these accounts where Martin speaks to the versatility of this model and its astounding capacity to make a profound, fundamental impact on how we both see and approach the pressing global issues of today and tomorrow. He boldly claims that, "...integrative thinking can point us toward solutions not yet maintained to such profound problems as terrorism, global warming, and gross economic inequality (Martin, 2007)."

Martin identifies the Integrative Thinking as the key component of design thinking in business. Defining design-thinking in an interview, the pioneer describes the crossover of paradigms.

> To innovate, companies need to employ more of the characteristics of great design: a deep understanding of the customer or user, creative resolution of opposing goals and tensions, rapid and collaborative prototyping, and a continuous modification of ideas and solutions. That's design-thinking! It's about seeing possibility, about exploring problems

where solutions cannot be found in past experience or proven by data (May, 2009).

The revolutionary insights of Dunne and Martin have played a pivotal role in the widespread acceptance of the interdisciplinarity design thinking and its usefulness in varied contexts.

Boland and Collopy

In the third and final discourse, design thinking is understood as a mechanism in the management and organization of information, where the vocabulary boundaries between design and management are collapsed. As the founders of this discourse, Richard Boland and Frank Collopy associate design thinking with the 'design attitude', what they define as the "expectations and orientations one brings to a design project". The manipulation of design thinking as an attitude lends itself to its more cognitive characteristics, similar to the theoretically centered discourses presented by Roger Martin and Herbert Simon; where design and design thinking are centered around how we conceive and transform existing realities in different ways. But this new discourse centres on this idea of seeing design thinking as a compatible mechanism through which to open up new possibilities in the management sector and to integrate existing fields of thought as opposed to seeing design and management as separate entities.

Finally, Ashkan's (2014) discussion of the historical evolution of design thinking describes Johansson and Woodillia's (2009) distinction between academic and managerial discourses as 'waves' in the study of design thinking. The first wave, the academic or design discourse "is about understanding design*;* the managerial or business discourse (the second wave) relates to the creative process and innovation (Ashkan, 2014)."

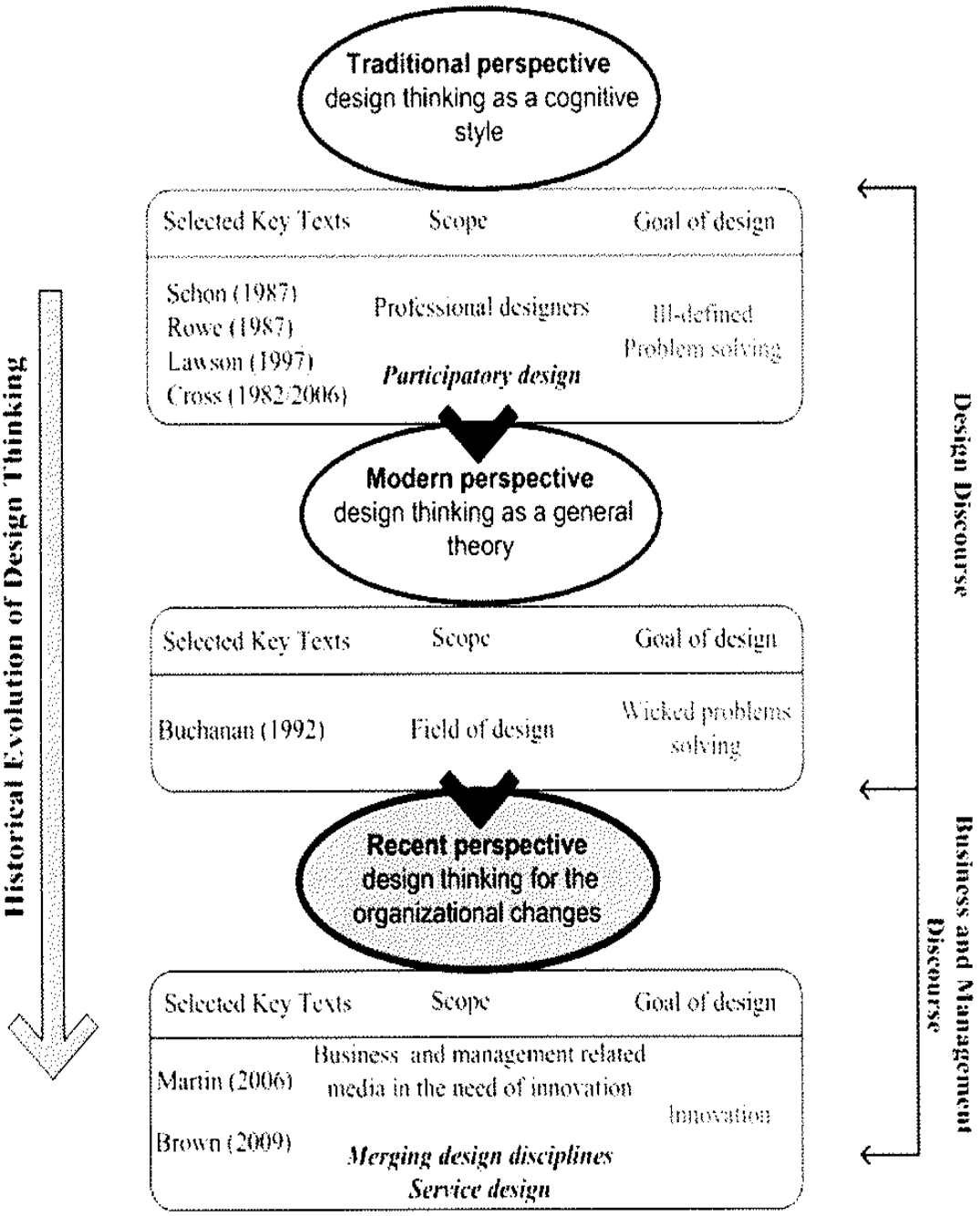


Figure 2-6 Illustration of the historical process of evolution of design thinking. Source: Ashkan, 2014.

Illustrated in Figure 2-6, Ashkan identifies the first wave design discourse alongside traditional and modern perspectives of design thinking as both a cognitive style and as a general theory. The former with the goal towards ill-defined problem solving and the latter concerned with solving wicked problems.

The second wave which began about 10 years ago, represents a recent perspective for organizational change with a goal towards innovation and includes a focus on service design which uses methods of user-centered design. The author notes that the common ground between these two discourses, in a majority of studies, is a focus on design process and approach prompting a move towards a broader meaning of the concept of design thinking to include both discourses (Ashkan, 2014).

The scope of theoretical perspectives identified within the design practice – management discourses within design as thinking represent the rigor, diversity and interdisciplinarity of its foundations and applications. Against this, claims of its mortality and challenges of its perception as a trend void of relevance and impact (Naussbaum) come up against evidence of its use and impact, here, in the context of government. The Design for Public Good Report which catalogues 12 case studies of the use of design and design thinking strategically in the public sector is one such evidence bank of design use and impact. All elements within the design as thinking discourse therefore are valid dimensions of design's identity within the design-in-government context whether manifested as a dimension of thought, theory or as a perspective for organizational change.

Creativity

Design has been declared as being "a structured creative process that provides a competitive tool for firms in all sectors (DTL, 2005; Cox, 2008)." The value of creativity has evolved as an integral component in the way we think, produce and interact in the economic, cultural and geographical realms of life (Florida, 2002). In deciphering the societal and economic transformations between the 1950s and the present, Richard Florida considers human creativity as serving as the foundation of such growth. He reiterates the prevalence of what he calls, the "creative impulse" and how that has continued to be valued and cultivated to such an extreme in modern society - to the point where creativity is considered a dire need in today's social and economic infrastructure.

In defining what he calls the *Creative Class* and its novel rise to power and prevalence, Florida essentially describes it as the focal point and the capital

engine of today's economy; a group of people who are responsible for the production and cultivation of "new ideas, new technologies, and new creative content (ibid)." This applies to a multitude of varying fields such as science, engineering, architecture, design, education, entertainment, music, and the arts. The rise of such a class is marked by societal and economic shifts according to Florida, one that favours "individuality, self-expression, and openness to difference" in social and economic contexts.

The identification of the *Creative Class* captures the variety of ways in which creativity has broken into and redefined the workings of our society and our economy as we understand it today. As noted by Sir George Cox in his UK review of Creativity in Business, "Creativity, properly employed, carefully evaluated, skilfully managed and soundly implemented, is a key to future business success – and to national prosperity (Cox, 2005)."

Both Canada and the UK herald the influence of the design industry as part of the creative sector. DIAC (2004), reports on the profile, expanse, and impact of the design sector in Ontario (Canada) as part of creative economy of the region.

> "Ontario has a large, urban-based design workforce of 40,050 designers working in six design disciplines. Toronto has the largest critical mass of designers in Canada and the third largest design workforce in North America with 25,645 designers working in the Greater Toronto Region. Ontario designers have a higher level of formal education than the general workforce and they work in almost every sector of the economy including manufacturing, retail, financial services, and the cultural industries (ibid)."

Similarly, in the UK, design's contribution as part of the country's creative economy is noted. "The creative sector, of which design is a key part, can also build national reputation and boost a nation's economic standing. In the UK, government research put the contribution of the creative industries to the economy at £76.9bn in 2013, representing growth of almost 10 per cent during the year, three times that of the wider economy (Relph-Knight, no date)."

Classifying this demographic and its potential for impact brings an awareness of and value to the changing face of diverse operations in general. Per Florida, what sets the creative class apart from others is that they are paid to use their minds,

whereas with the Working Class and the Service Class - they're paid to do routine work that's more physical and hands-on.

The Prevailing Aesthetic Paradigm

Challenging the etymological realities of the word design and its identity as profession, are our own tacit representations associated with the term that revert it back to the aesthetic paradigm most frequently associated with the concept. This reality brings to light the inert paradigmatic challenges associated with attempting to draw focus towards a more holistic view of what design truly is and does especially when paired with non-traditional contexts such as government.

In his own interdisciplinary investigation exploring the social and political implications of design policy, Dilnot (1982) notes these added complications discovered when the content of our reflection about what design is, is compared with the common-sense use of the term. Here, additional challenges and complexities embedded in design as a concept are revealed.

> This, [what we mean by design] requires us to compare this content i.e., that which we derive from reflection on how we 'naturally' or commonsensically use the terms, especially 'design', with that which reflection on what design is (or what design phenomena are, or what design does) gives us; to consider the gaps which appear between our tacit sense of 'design' as a complex, multiple activity 'what many feel, touch upon, but hardly articulate'; 'design' as a term which is a noun and a verb, and also one which denotes a form of representation, an activity, a practice, a product, etc., at one and the same time, and its public explications (which in turn react back on our tacit sense distorting it and modelling it to fit the explication)(Dilnot, 1982).

Design as Being

In addition to thinking, design as ability exists equally as *being*. Being is a term used here to describe the intuitive dimension of design ability. In this regard, the

individual may not necessarily be a practitioner but instinctively exhibit design ability. Gorb & Dumas (1987), describe this conceptual phenomenon as *silent design* where, “people who are not designers and are not aware that they are participating in design activity” participate in or contribute to design activities. (Gorb & Dumas, 1987 in Stevens, 2009).

Influenced by the theories of Cross, Buchanan and Schon who contributed new waves of thought exploring the cognitive aspects of design, the boundaries of thought, process and its implications were pushed and its implications within and outside of the profession expanded post 1980. Their reflections challenged notions of concepts like creativity leaving room for musings of its exclusivity to the design profession (Cross 2006, 2011) or as a tool to bridge professions (Papanek, 1972). Relating this to Johansson and Woodillia’s (2009) classification of design as thinking, here its ‘designerly’ existence as thought relates to the practice realm and its existence as ‘being’ to areas not necessarily associated to the practice of design.

2.6 Analysis

Within this study, the first point of stripping design to its essence was the initial prompting discovered through the theoretical musings from Simon (1973) through to Kimbell (2013); an objectives posturing allowing for the dissecting of design into its cognitive (Schön, 1983), methodological, operational (Kimbell, 2009) and conceptual (Simon, 1996) strands. The notion of design’s existence beyond disciplinary confines (Fry, 2009, Buchanan, 1992, Heskett, 2005) was a key perspective in order to understand its potential in interdisciplinary contexts. Highlighting the shifting landscape of the Liberal Arts as a contributing factor, Buchanan, like many of his contemporaries recognized design’s emergence in the twentieth century out of a pragmatic paradigm to more diverse views of practice that connect it with other disciplines and the common problems of daily life (Buchanan, 1992). As Fry (2009) heralds,

> This means having the ability to break through the contextually delimited ways that prevent the actual agency and world-shaping character of design being seen and understood. This means displacing the ‘design

community's' tendency to reduce design to the process, product and expression of a professional practice; the media's reduction of it to an aesthetic form; the art-world's comprehension of it via aesthetically inflected perceptions; and the predisposition of science and technology to view design as the specification and expression of organizational or material forms.

Heskett (2005) highlights that from this stripped-down point of view, the scale and extent of design's capacity can be understood and tested. Within the review, this vantage point allowed for the identification of specific categories of design's existence to become apparent. These segmentations were delineated according to the following terms including *Dimensions, Manifestations* (Buchanan, 1992), *Existence, and Essence/Agency* (Fry, 2009). Table 2-6 presents these categories of designs identity as observed in the literature. Descriptors are provided to distinguish between each segment.

Table 2-6 Categories of Design's Identity

Categories of Designs Identity	
Category	**Descriptor**
(Dictionary) **Definition**	Etymology
Dimensions	Dimensions of design and its outputs
Manifestations (Buchanan, 1992; Heskett, 2005)	Placements or broad categories of designs outputs
Existence	Collective reality, Entity "Mode of Existing" 'The state or fact of existing, being"
Essence, Agency (Fry, 2009)	Character, nature, qualities The intangible dimensions of design's being

Secondly, the philosophical, ideological, and methodological shifts towards design conceptually, over the last 50 years, created a historical overlay to the study. Manifestations include evolutionary changes to the practice and an emphasis on design's elements from within and outside of the profession as well

as the goal of its discourses from ill-defined problem solving (Schon, 1997; Rowe,1987; Lawson, 1997; Cross, 1982, 2006), to wicked problem solving (Buchanan, 1992) to innovation (Martin 2006; Brown, 2009) (in Ashkan, 2014).

The historical exploration was not necessarily chronological but according to the ideological insights that have been expanded upon over time. Heskett (2005) describes the nature of progression:

> "The history of design can be described more appropriately as a process of layering, in which new developments are added over time to what already exists. This layering, moreover, is not just a process of accumulation or aggregation, but a dynamic interaction in which each new innovative stage changes the role, significance, and function of what survives. Heskett, 2005)"

What has survived is an inward and outward facing profile of design (in practice, as practice) with specific emphases on elements of its identity expressed. This represents the scope of design as capacity. The sum of all its tangible and intangible parts in operation.

2.7 Synthesis

The findings from this study represent the elements of designs identity as uncovered in the literature. Table 2-7 summarizes the results according to the categories of design's existence (Table 2-6) both in practice and as practice. The charting clarifies the scope of design as capability available for use within the context of government. The broad categories allow for the placement of new, uncovered dimensions of design to be classified as the evolution of theoretical and practical changes emerge. The collective results address the research aim concerned with identifying *what design is* within the context of government. The summary also addresses the research question outlining an overview of design's capability within the context of government. The theoretical perspectives however require evidence of its application in practice. Chapters 5 and 6 will explore these insights from a practical perspective.

Table 2-7 What design is within the design-in-government context

What Design is:				
Element (Identifier)		**Description**		**Reference**
Definition	Identified as:	Noun Verb		Oxford Dictionary, Mariam Webster Dictionary
Dimensions	Exists as and produces outcomes that are:	Tangible Intangible		
Manifestations	Manifested as:	Communication (Signs and Words) Construction (Things) Strategic Planning (Action) Systemic Integration (Thought)		Buchanan (1989)
Existence	Exists as:	Professional Sector (Field, Industry, Service) Practice	Various Practices In Practice/As Practice (Kimbell)	Moultrie and Livesey (2008); Moultrie (2009)
		Abilities	Thinking	1. Design and designerly thinking as the creation of artefacts (Simon, 1969). 2. Design and designerly thinking as a reflexive practice (Schön, 1983). 3. Design and designerly thinking as a problem-solving activity (Buchanan, 1992 based on Rittel and Webber, 1973).

				4. Design and designerly thinking as a way of reasoning/making sense of things (Lawson, 2006 [1980]; Cross, 2006, 2011). 5. Design and designerly thinking as creation of meaning (Krippendorff, 2006).
			Being	
		Approach/Process		
Tools	Utilizes	Skills Tools, Methods, Approaches, Processes Knowledge / Theories		Author (Observation)
Outcomes	To produce outcomes that are	Tangible and Intangible		
Nature, Essence, Quality, Agency	Design by nature has the following qualities	Impactful		Buchanan (1995,1998)
		Human Centered		Donald Norman (2005)
		User centered		Donald Norman (2013)
		Problem-solving		Buchanan (19, Rittel and Webber (1973)
		Collaborative		
		Sustainable		Victor Papanek, Thakara

2.8 Chapter Summary

The “natural” requirement for simplified “public explications” of what design is in any context was acknowledged as both a need and a challenge for this study. A challenge faced by numerous design researchers, practicing within the design-in-government context (Cox, 2005; The Design Council, 2007; Commission of the European Communities, 2009; Moultrie, 2009; Raulik-Murphy, 2009; Chisolm, Mortati and Villari, 2013; DeEP, 2013; The Design Council *et al.*, 2013).

A Definition of Design as Capability

Based on a synthesis of the charted evidence, the following definition of design as capability within the context of government can be proposed:

> *Design exists in tangible and intangible dimensions as a resource to government. Within this context, design makes change through its process and outcomes manifested as signs and words, things, action and thought. Design exists as a field, ability and process, utilizing knowledge, skills and tools, producing tangible and intangible outputs that are impactful.*

Hence both the proposed definition of design for this context as well as the charted definition of design as capability fills gaps of knowledge from both theoretical and practical perspectives as well. In terms of the wider research the definition contextualizes core terminology for the reader, providing a clear direction from which the study is to proceed. Buchanan (2001) articulates the strategic purpose of such definitions.

> “Definitions serve strategic and tactical purposes in inquiry. They do not settle matters once and for all, as many people seem to believe they should. Instead, they allow an investigator or a group of individuals to clarify the direction of their work and move ahead.”

The identification of *what design is* within this context fills a number of gaps of knowledge within design theory and design practice and government policy.

1. It creates a wider view of design's identity as resource to government beyond the current government classification mechanisms.
2. It creates a common baseline of understanding of the scope of design as capability to government here currently there is confusion and misalignment of terminology
3. Where government-imposed design action plans, and other design-in-government reports are required, it eliminates the need for those researchers to first define what design is.
4. It creates a clearer articulation of the design industry (APDIG, 2013b).
5. It provides much needed constructs for industry (APDIG, 2014).

For this study, the identified capabilities exist within the context of government and as the design-in-government context remains is ill-defined (E.C.,2009), delineating the context would be beneficial to both this study and the theory and practice of design-in-government. This will be the focus of the study carried out in Chapter4.

Disseminating practical exemplars of what design is and does in practice within this context may also help to bridge the gap of understanding of what design is and does, normalizing the realities of design's identity in this context. This will be the focus of the study carried out in Chapter 6.

Finally, as transferable knowledge, the results from this study can benefit any industry or academic endeavour wishing to understand, articulate or employ a wholistic perspective or definition of design.

3 METHODOLOGY

"Method does not exhaust truth because understanding is never, as science tries to persuade us, an act that can be secured methodologically and verified objectively, but an experience that we must undergo. In this experience we not only understand the object we are confronting but also become better acquainted with ourselves because understanding always brings self-understanding, and therefore a certain circularity."

Gianni Vattimo on Gadamer in Dilnot, 2018

3.1 Overview

This chapter explains the logic of the research design. In it, the research approach, and rationalized selection of appropriate methods are presented, explained, and justified within the context of the research question. Key phases of the research investigation are outlined, and the methods used for each phase to collect analyse and triangulate the data are explained.

Armitage (2007) in his discourse on Mutual Research Designs, identifies a number of issues contributing to the development of a research design including "paradigm stance, strategy and method" (ibid.). These are influenced, he adds, "by three factors, the match between the problem and the approach, the experiences of the researcher and the audience (Creswell, 2003)." The development of the research design for this thesis is explained with these considerations in mind.

3.2 Approach

The overall research proceeds from a pragmatic paradigm paying particular attention to data derived from theory and practice streams as deemed necessary for the specific research audience of government policy developers and related stakeholders. In addition, the nature of research subject matter stemming from and rooted in design practice along with the need for theoretical underpinnings for its interdisciplinary placement within the practice of government, necessitated the dual viewpoints of theory and practice.

The pragmatic paradigm was initially selected for its ontological stance towards truth being aligned to what is useful and practical. From this position the core streams of research and practice running through this thesis are acknowledged as valid considerations in the rationale of the *why to* and *how to* of the research design.

In terms of the*se rationalizations*, the pragmatic paradigm supports a reflective, responsive approach towards the justified and reasoned selection of appropriate methods employed in this research. Throughout the study, attention was paid to engaging regularly with target audiences and related stakeholders to inform the direction of the research and validate incremental study results. Robson (2015) notes that the "practitioner-researcher synergy is beneficial [in that the] insights and role of a practitioner helps in the design, carrying out and analysis of useful and appropriate studies (Robson and McCartan, 2015)." Similarly, Dewey (1938) places attention on the value of human experience. This is regarded as a strength of this research. Specifically, from the perspective of the investigators' decisions on what to do, and how to do it as well as the validation of the experiences of the researcher, participants, and target audience.

The design practice background of the author therefore is also relevant and gives an advantage during the research process (Armitage, 2007). Robson (2015) notes, that the insights and role as a practitioner help in the design, carrying out and analysis of useful and appropriate studies [Robson and McCartan, 2015]. This reality has been evident throughout the research investigation. The researcher's background experience, insights, tacit and explicit knowledge, and processes of 'thinking and being' specific to the field of design are included as valid tools in the processes of data collection, analysis and visual synthesis as discussed in Section 3.4.5.

The value of the human experiences was also reflected in the selection of appropriate methods for the research. The use of an exploratory case study within a design research-practice (Chapter 5) and the thematic analysis of 30 secondary case studies illustrating the application of design within government (Chapter 6) not only validated the experiences of the stakeholders, but it also provided the

evidence to support design's use in this context. This evidence-based consideration was also an important and relevant emphasis for this research as it positions the content for effective application for use in a political context. Davies (2004) defines evidence-based policy as,

> "an approach that helps people make well-informed decisions about policies, programs and projects by putting the best available evidence from research at the heart of policy development and implementation (ibid*)*".

The author notes that evidence-based policy, *"*has become a major part of many governments' approaches to policy making and the machinery of government (ibid*)*".

The application of this responsive or informed approach as it relates to the overall research investigation is discussed in Section 3.4.5. In this regard and in his words, the philosopher John Dewey (1938) relates "Pragmatic" to,

> "The function of consequences as necessary tests of the validity of propositions, provided these consequences are operationally instituted and are such as to resolve the specific problem evoking the operations (Ibid)."

With this in mind, and as it relates to the research question, the validity of what design is, its application and the operational outworking of same are clearly of consequence in this research.

Finally, the roots of Pragmatism within the social sciences and its relationship to issues connected to empowerment, social justice, and politics of hope (Denzin, 2010) are of equal consideration to this research. These roots connect both to the primary application of this research towards a change in knowledge and understanding of design within this novel context, as well as the p~~oten~~tial effects of its application within government.

3.2.1 Considerations

Careful consideration was given to selecting an appropriate approach and methods that support the subject matter as well as the research question, aims and objectives. The research aims include to:

1. Identify the capability of design within the context of government and to,
2. Develop and evaluate a model that communicates this information to government and related stakeholders.

The tasks which echo the research objectives include to:

1. Examine and Define What Design is as Capability
2. Establish and Explore the Context of Design-in-Government
3. Investigate What Design Does within the context of Government and to,
4. Prototype and Evaluate the Design-in-Government Model

Due to the varied nature of the tasks associated with each research objective, the investigator required the freedom to select the most appropriate methods to achieve these objectives. The selection also required the reasoned, rationalised consideration of how to most appropriately achieve the research aims and objectives while providing the flexible structure within which an iterative investigation is able to be carried out.

The issue of flexibility facilitates the investigators freedom to discover the research design in a divergent convergent exploration. Within Dewey's (1925) philosophical stance on pragmatism lies this reality of freedom of inquiry; what Morgan (2014) describes as the "central moral value that Dewey advocates for" (ibid). It is this freedom of what and how to inquire as directed by the research objectives that rationalizes the choice of methods used in the overall study. As such a mixed methods approach was considered in order to:

- Provide greater validity through variation in data collection.
- Answer the research question from a number of perspectives.

- Ensure that there were no ‘gaps’ to the data/information collected.
- Ensure that pre-existing assumptions from the researcher were less likely.
- Provide the required information that one methodology cannot provide. (Tashakkori & Teddlie, 2003)

In considering suitable methods for data collection and analysis attention was also paid to the necessary balance between the requisite rigor, accessibility, and practice-based realism. Bischoff et al. (1989) stresses this consideration of methods that are accessible and rigorous, specifically, with regard to a focus on both theory and practice perspectives. Accessible and rigorous, in this sense means that the methods “must be readily available to anyone who seeks to adopt them, and rigorous in that they are systematically grounded in justifiable and coherent principles (Ibid.).”

The selection of methods which were rationalized alongside the objectives are shown in Table 3-1 and include a focused, systematic review of literature, a scoping review of design-in-government literature, an exploratory case study, a thematic analysis of secondary case studies, model refinement, and model evaluation through questionnaires and focused interviews. Along with a series of engagements with stakeholders occurring as the data was collected incrementally, (reported in Chapter 7), the methods collectively provided the necessary rigor and evidence base on which the research was validated in both theory and practice.

Table 3-1 outlines the rationalized methods selected for the research and their alignment with the research aims and objectives.

Table 3-1 Research Methods Aligned with Research Amis and Objectives

Research Methods Aligned with Research Aims and Objectives				
CH	**AIMS**	**OBJECTIVES / TASKS**	**METHODS**	
			Data Collection	**Data Analysis**
2	Identify the capability of design within the context of government	Examine and Define What Design is as Capability	Focused Review of Literature on the Area of Design	Systematic Approach
4		Establish the Design-in-Government Context	Scoping Review of Literature on the Area of Design-in-Government	Systematic Approach
5		Explore the Design-in-Government Context	3 Month Exploratory Case Study (ECS) within a design-in-government research-practice	CF for Design-in-Government
6		Investigate What Design Does within the context of Government	Secondary Case Studies	Thematic Analysis / CF for Design-in-Government
7	Develop and evaluate a model that communicates what decide is and does to government and related stakeholders	Evaluation of Study Results as Model Components through Industry Engagements	Industry Engagements	Researcher Reflection
8		Prototype the Design-in-Government Model	Prototyping of synthesized research evidence	Prototyping of synthesized research evidence
9		Evaluate the Design-in-Government Model	Evaluation of the Model through Interviews and Questionnaires with Stakeholders	Content Analysis

In addition, it is contended here that a mixed methods approach towards data collection and data analysis procedures is consistent with the Pragmatic approach (Jensen, 2012; Cresswell, 2013; Tashakkori and Teddie, 1998). Although Cresswell (2013) identifies that the choice of approach (qualitative, quantitative, and mixed methods), (Tashakkori and Teddie, 1998) is directly related to the paradigmatic stance taken by the researcher it's important to note that in strategizing this research process, the choice was driven primarily by its appropriateness to achieve the required tasks. Cresswell (2003) discusses the Mixed Methods association with both the pragmatic paradigm and the research question as opposed to other approaches.

> The quantitative approach tends to be associated with the post-positivistic paradigm, employs strategies of inquiry such as experimentation and survey and methods of data collection that are pre-determined measures resulting in numeric data. By contrast the qualitative approach tends to be associated with constructivist or the transformative-emancipatory paradigms, employs strategies such as the case study or narrative and uses methods or data collection such as the interview resulting in open ended data textual data. Thirdly is the mixed methods approach associated with the pragmatic paradigm and strategies that involve collecting data in a simultaneous or sequential manner using methods that are drawn from both quantitative and qualitative traditions in a fashion that best addresses the research question/s (Creswell 2003).

The three areas of superiority of the mixed methods approach as compared to mono-methods approaches strengthen the applicability of its use in the context of this research design. As Armitage (2007) discusses:

> Tashakkori and Teddlie (2003) note that there are three areas where a mixed method is superior to a mono-methods approach. Firstly, is the ability to answer research questions that other approaches cannot; mixed methods can answer simultaneously confirmatory and exploratory questions. Secondly, they provide stronger inferences through depth and breadth in answer to complex social phenomena. Thirdly they provide the

opportunity through divergent findings for an expression of differing viewpoints.

In this research, the mixed methods approach allows the examination of the research question “What is the Capability of Design in Government?” from a high-level perspective confirming and exploring what it is and is not theoretically and empirically. The question relates to a complex, emerging area of research and practice which deems the investigation exploratory in nature with the combined methods aiding in the ease of extrapolating connections from the data.

3.3 Research Strategy

Combining methods has additional benefits as discussed by Bryman (2004). In a study, they include:

> “The logic of triangulation, an ability to fill in the gaps left when using one dominant approach, the use of quantitative research to facilitate qualitative research and vice versa, combining static and processual features, gaining the perspective of the researcher and the researched, to address the issue of generality and to study different aspects of a phenomena.” (Bryman, 2004 in Armitage 2007)

Several of these benefits are seen in this research. The triangulation of methods combines the strengths of different methods to achieve specific objectives (Jensen, 2012). Other insights associated with triangulation, are the combined benefits including *Convergent Findings*, *Additional Coverage* and *Complementary Assistance*. The three are summarized in Figure 3-1 by Jensen (2012). The author outlines both the broad and specific benefits associated with using the Mixed Methods approach. Each is discussed below according to its application to this research.

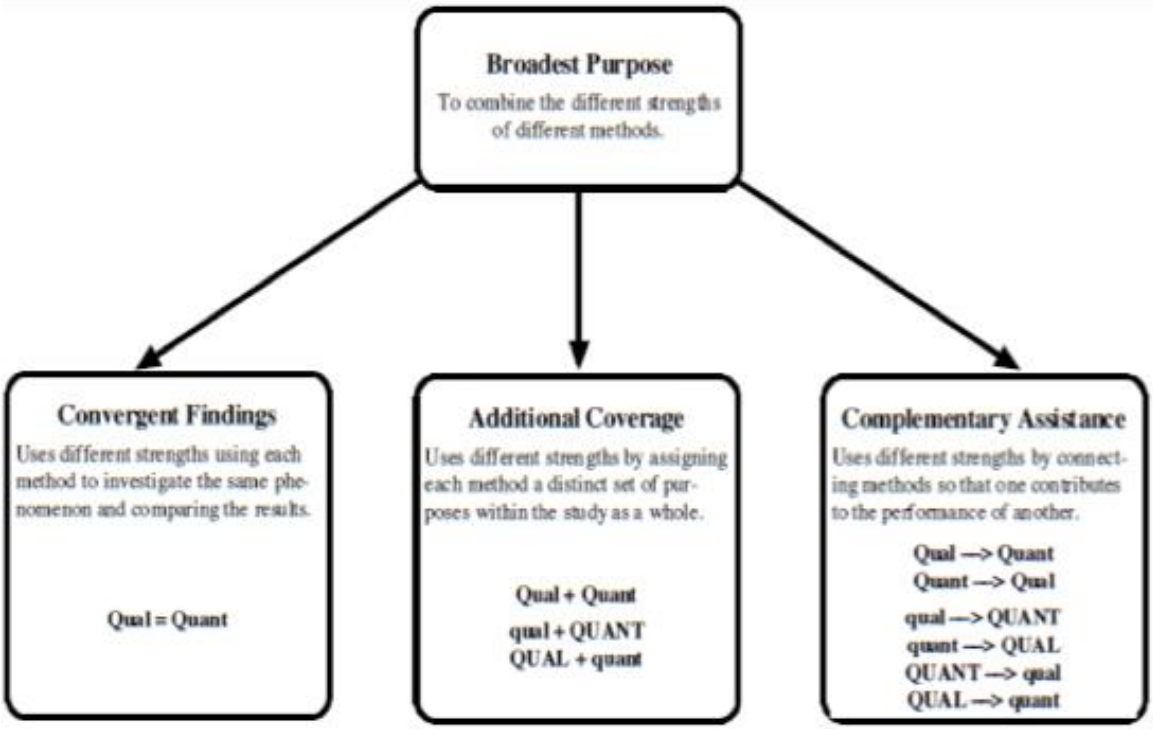


Figure 3-1 Benefits of a Mixed Methods approach (from Jensen, 2012)

In this research, a clearer perspective of the phenomena is gained from the use of one data collection method to define what design is theoretically, another to define its context, another to observe same in practice and a fourth to test all of these factors in operation. Table 3-1outlines the use of a range of methods according to specific chapters.

In Chapter 2 a focused review of literature is used to understand what design is followed by a Scoping Review in Chapter 4 to contextualize design into the area of government and map the field and its literature. 4 contextual themes were derived from the scoping review and modelled as a Conceptual Framework. The themes were then explored in practice through an Exploratory Case Study in Chapter 5. The themes, which included the area of design, were modified and/or validated and further insights of the design-in-government phenomena are discovered, this time from an empirical perspective. The modified conceptual framework along with its themes were then applied as analytical codes to a

thematic analysis of **24** international design-in-government case studies where the generalization of insights were examined (chapter 6).

Table 3-2 outlines the strengths of different methods. This is the general purpose of triangulation (Jensen, 2012). Each was chosen as the best means to achieve specific research objectives.

Table 3-2 Strengths of Selected Methods

Strengths of Selected Methods			
CH	**OBJECTIVES / TASKS**	**METHODS**	**STRENGTHS**
2	Examine and Define What Design is as Capability	Focused Review of Literature on the Area of Design	Seeks to systematically search for, appraise and synthesis research evidence, often adhering to guidelines on the conduct of a review
4	Establish the Design-in-Government Context	Scoping Review of Literature on the Area of Design-in-Government	Concerned with Contextualizing knowledge in terms of identifying the current state of understanding. (Anderson et al. 2008) Clarification of working definitions and conceptual boundaries of a topic area (NIHR) Outlines what is already known and identifies gaps in existing research (NIHR) An exploratory project that systemically maps relevant literature. (Enrich et al.,2002, Anderson et al., 2008) Typically used in new and emerging areas of research (Arksey and O'Malley, 2005)
5	Explore the Design-in-Government Context	3 Month Exploratory Case Study (ECS) within a design-in-government research-practice	Used to research a subject that has not yet been clearly defined. Helps to determine whether to proceed with a research idea and how to approach it. Flexible and dynamic Typically used in the social sciences

			https://classroom.synonym.com/advantages-exploratory-research-design-8525088.html
6	Investigate What Design Does within the context of Government	Secondary Case Studies	Ability to access and utilize many sources of data and information from credible international source as the field is rapidly evolving. Objectivity – no bias.
7	Evaluation of Study Results as Model Components through Industry Engagements	Stakeholder Engagement	Robson (2015) notes that the "practitioner-researcher synergy is beneficial [in that the] insights and role of a practitioner helps in the design, carrying out and analysis of useful and appropriate studies (Robson and McCartan, 2015)." Similarly, Dewey (1938) places attention on the value of human experience. Active involvement Easy detection of missing functionality Quick feedback
8	Prototype the Design-in-Government Model	Prototyping of Synthesized Research Evidence	Physical design is flexible and has scope for innovation. Simulates the real and future product The design's correctness can be tested before it comes into production. Design errors can be discovered.
9	Evaluate the Design-in-Government Model	Evaluation of the Model through Interviews and Questionnaires with Stakeholders	Identifying what components of an initiative work/do not work and why. Identifying areas that need improvement.

Jensen (2012) defines *Convergent Findings* to mean the use of varying methods to examine the same phenomena followed by a comparison of the results. In Chapter 2, the concept of What Design is was first examined theoretically through a review of literature. Based on these findings, the idea of What Design Does in government was examined in Chapter 5 through the investigation of 34 case studies of design in operation in government. Finally, both what design is and does were examined through an exploratory case study of design-in-government practice to observe its existence, nature and operations. The use of varying

methods allowed for the phenomena of design within this context to be examined both in theory and in practice. The comparison of the results considered through researcher insights through industry engagements and is discussed in Chapter 7. The Convergent findings allowed for a clearer understanding of the phenomena through the comparison of results from both theory and practice perspectives.

Additional Coverage benefits from the use of the strengths of different methods by assigning each method a distinct set of purposes within the study as a whole. Table 3-1outlines the methods selected for the research aligned with a specific research objective to answer the research question.

Complementary Assistance also uses the strengths of different methods however through their connection, the performance of one is enhanced by the other (Jensen, 2012). The findings from Phases 1 and 2 of the overall study were combined to create an analytical framework which acts as an analytical tool in the Phase 3 study. During the study, the framework was enhanced by further validating and in some cases refining the results established in the previous 2 studies. For example, the existence of design as being was identified in theory during Phase 1 (Chapter 2) and observed in practice by the researcher in Phase 2 (Chapter 4). Both were validated though the identification of its application in numerous practice case studies in Phase 3 (Chapter 5). The performance of each method is enhanced by each other.

Table 3-3 provides an overview of the study noting the phases of the research, and the methods used for each phase to collect, analyze, and triangulate the data.

Table 3-3 Study Overview

CH	PHASE OF INVESTIGATION	OBJECTIVE/TASK	METHOD	
			Data Collection	Data Analysis
1	INTRODUCTION	Discuss the background and need for the research. Introduce the RQ, Aims and Objectives		
2	ONE	Examine and Define What Design is as Capability	Focused Review of Literature on the Area of Design	Systematic Approach
3	METHODOLOGY	Present the research design and rationalized selection of methods for data collection and analysis		
4	TWO	Establish the Design-in-Government Context	Scoping Review of Literature on the Area of Design-in-Government	Systematic Approach
5	THREE	Explore the Design-in-Government Context	3 Month Exploratory Case Study (ECS) within a design-in-government research-practice	CF for Design-in-Government
6	FOUR	Investigate What Design Does within the context of Government	Secondary Case Studies	Thematic Analysis
7	FIVE	Evaluation of Study Results as Model Components through Industry Engagements	Industry Engagements	Researcher Reflection
8	SIX	Prototype the Design-in-Government Model	Prototyping of synthesized research evidence	Researcher Reflection
9	SEVEN	Evaluate the Design-in-Government Model	Evaluation of the Model through Interviews and Questionnaires with Stakeholders	Content Analysis

CH	PHASE OF INVESTIGATION	OBJECTIVE/TASK	METHOD	
			Data Collection	Data Analysis
10	DISCUSSION + CONCLUSION	Discuss how the research question was answered through objectives. Present Contributions to Knowledge		

3.3.1 Study Design

Armitage (2007) contends that along with paradigmatic stance and method, the research strategy defines the essential considerations of a research design.

The strategic approach considered the ease with which the study could be replicated, the requirement to consider the 7 research objectives and the need to interface with stakeholders throughout the process.

The finalized strategy involves a series of activities organized according to seven macro phases that achieve the research aims. Each phase aligns logically with the research objectives and involves a dimension of stakeholder engagement which occurred at the end of each phase during the research process. These engagements are consolidated and reported as Phase Five of the strategy.

The research design allowed for the research question to be contextualized, explored, and answered in Phases One through Four and for the Design-in-Government Model to be prototyped and evaluated during Phases Five through Seven. This was accomplished with the consideration of both theoretical and practical streams running throughout.

Figure 3-2 illustrates the study design in terms of the flow of the Phases of investigation from one method to the next. The flow facilitated the flexibility of stakeholder guidance, and researcher reflection implemented as part of the iterative process. This is shown by the vertical arrow on the right of the figure.

3.3.2 Researcher Reflection

Researcher reflection is a tool used throughout the entire research process to make sense of what was being seen and understood particularly as it relates to the information gleaned from direct and indirect interactions with stakeholders and industry. The concept of practitioner reflection was first introduced in the early theories of John Dewey (1933) based on his exploration of experience, interaction, and reflection. Influenced by Dewey's theories, Philosopher and Author Donald Schön (1983) later familiarized the concept of the Reflective Practitioner. Schön (1983) defines reflective practice as practice by which professionals become aware of their implicit knowledge base and learn from their experience. In his seminal book, The Reflective Practitioner, the author advocated the legitimacy of this kind of intuitive process towards understanding based on tacit knowledge.

Boud and Walker (1998) affirm that reflection is one of the key ideas and features of all aspects of learning from experience explaining that stepping back from the action permits critical reflection on a sequence of events. This was the experience in this research. The reflective process undertaken during and after stakeholder interactions and its application to the research process is discussed in section 3.4.5.

Chapter 3.4 discusses the methods used in each phase to collect, analyse, and triangulate the data.

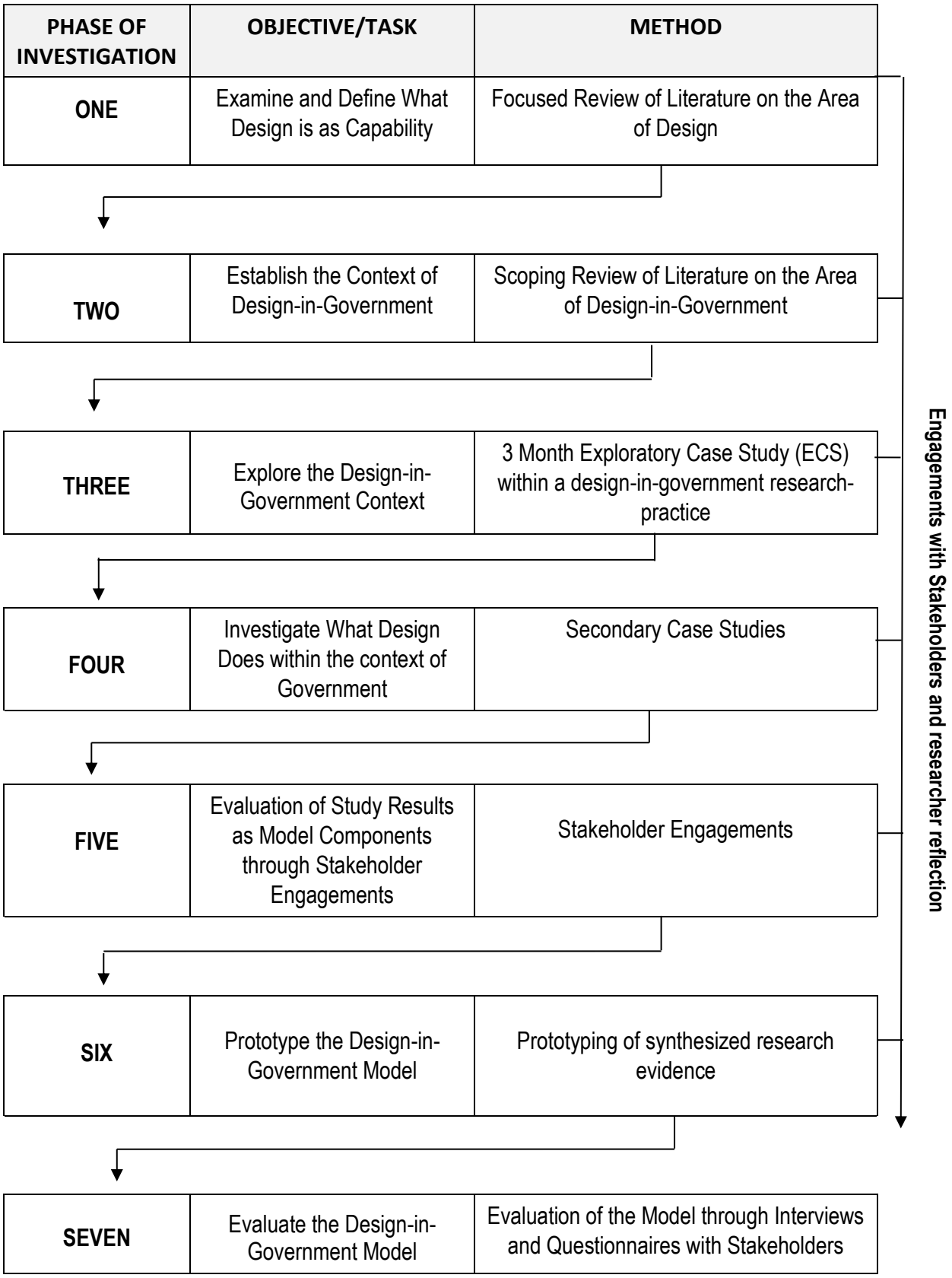


Figure 3-2 Study Design

3.4 Methods

PHASE ONE

Phase One is concerned with defining design as capability within the context of government.

3.4.1 Literature Review: What Design Is

As a starting point for the research, the concept of design as it exists as capability within the specific context of government needed to be clarified and defined to create a baseline of understanding for the successive studies to be understood. It was also a necessary step to answer the research question “What is the capability of design in government?”

Approach and Method

A systematic review of literature was selected as the appropriate method to explore the theoretical constructs of the area of design as it exists as capability in research and practice. The systematic approach was deemed necessary due to the nature of the research and its target audience. Hart (1998) notes, a systematic approach contributes the “appropriate breadth, depth, rigor and consistency, clarity and brevity, effective analysis and synthesis” necessary to inform government direction. Systematic reviews are also a valuable means of reviewing all evidence on a specific question and is a particularly effective tool which can summarize, appraise, and communicate the results and implications of otherwise unmanageable quantities of research (Pettigrew and Roberts, 2006).

The systematic approach towards searching and selecting literature was undertaken for both the focused review of literature (Chapter 2 – Phase One) and for the scoping review of literature (Chapter 4 – Phase Two) simultaneously. Details of this process cand be found in section 3.4.2 The latter was concerned with establishing the research context and collecting and mapping all the relevant literature according to revealed themes. This study represents a focused review of literature for the thematic area of design within that context (Table 3-4). Findings from the scoping review related specifically to the thematic area of

design as outlined in Table 3-4, served as a guide to the investigator for this study in terms of dimensions of design's identity to systematically explore as part of the focused review.

Table 3-4 Thematic area of *Design* – Scoping Review Summary of Findings

Thematic Heading	**DESIGN**
Operations (DiG System)	*Inputs*
Philosophical Consideration	*What Design is*

Descriptor	• General: design philosophy, history, theory, and criticism
	• Concerned with the spectrum of design as capability, resource including:
	  ○ The practice of design, the design industry, design as knowledge, skills abilities, process.
	  ○ Design's qualities: collaborative, impactful, human centered

Areas included	**General:** • Design Philosophy • Design History • Design Theory • Criticism • Etymology (Noun, verb, tangible, intangible)

	Design as Capability and Resource
	Design as practice, industry, knowledge, skills, abilities:
	• Practice disciplines
	  ○ AS PRACTICE vs. in practice – (Kimbell, 2016)
	  ○ IN PRACTICE (Kimbell, 2016) – Skills, knowledge etc.
	  ○ Sub Disciplines
	  ▪ Design research
	  ▪ Design Strategy
	  ▪ Design Management
	• Practice outputs (communication, object, action, thought) - Buchanan, 1998)
	• Industry (collective)
	• Design Value
	  ○ Economic (Heskett)
	  ○ Social (Dilnot – Social Design) Mindlab 2009, DOTT 07,
	  ○ Environmental (Fry 2008)
	  ○ Systemic (Bason, 2017, Kimbell, NESTA)
	Design's qualities:
	Collaborative, user-centered, human centered, impactful

Sub Questions	What is design? What is design in this context?

As shown in Table 3-4 the literature for this review is concerned with *what design is* as capability and as resource to government. The literature informing this area includes general theory foundational to the area of design including design

philosophy, history, theory and criticism as well as more contemporary literature theorizing dimensions of design, its identity and use within the context of government. Heskett's research into the economic value of design within government, and Bason's work on the social impact of public policy design, are two such examples of contemporary knowledge contributors. As a descriptor, the literature in this area is also concerned with the spectrum of design as resource or capability including design practice, industry, knowledge, skills, abilities, processes, outputs (Buchanan, 1998) as well as designs qualities such as human centeredness, collaboration and impact (Table 3-4).

Data Analysis

The process to analyse for this exploration is akin to Heskett's (2005) strategy used to navigate a similar task of defining design. In the midst of its confusing variables, the author notes that "discussions of design on a level that seeks a pattern in such confusion leads in two directions: first defining generic patterns of activity underlying the proliferation in order to establish some sort of structure and meaning; secondly, tracing these patterns through history to understand how and why the present confusion exists." To address the first point, the author strips design to its essence to uncover a definition. Secondly a historical process is traced to examine the evolution of the term as it relates to theory and practice. Heskett views this as a "dynamic interaction in which each new innovative [historical] stage changes the role, significance, and function of what survives."

Similar to Heskett's process, for this study, the CF helped to understand the nature and nuances of the diverse data as it was being reviewed according to the categories in the CF used as "generic patterns". This helped to define what design is a capability in this context. Secondly, the contemporary evolution of dimensions of design were traced to understand their theoretical and practice foundations. As such the CF is regarded as both an analytical tool used to make sense of the data and as a methodological tool used in the process to triangulate results from the scoping review (Chapter 4 – Phase Two).

The results in this study are presented as a descriptive narrative of the synthesized information available at the time of the investigation. The results are both charted according to categories in Table 3-4 and summarized into a definition of design specific to the context of government (Chapter 4 – Phase Two).

PHASE TWO

Phase Two is concerned with establishing the context for the research.

3.4.2 Scoping Review: The Design-in-Government Context

Purpose

It became evident during the Search stage of the literature review process that design exists in a multitude of contexts and its existence in the context of government had not been formally demarcated. This insight was also uncovered by the European Commission in their 2010 report on Design as a Driver of User-Centred Innovation. In the report, the absence of the contextualization of design was noted as a barrier experienced by government practitioners. An isolated regard of what design is in this specific context (outside of its other varied contexts) did not exist. Generally, the area spans the theoretical and practical domains of design and of government with influences from other fields including business management and economics. The lack of a clearly defined boundary (in terms of the research scope) became a necessary precursor in order to situate and examine the research question. Hence, a more appropriate type of review was required to assess and demarcate the parameters, size and scope of the research and its literature.

In examination of various types of reviews such as narrative reviews, meta-analysis, research synthesis and structured reviews, the purpose of the literature for this study was consistent with those found in a scoping review of literature.

The needs, specific to this research, defined both the unique purpose of the literature as well as the requirement for how literature would be used in the wider research. This includes:

- To define the scope of the field and its limits (Chapter 4 – Phase Two).
- To understand the nature of the field as a whole (general) and identify gaps (Chapter 4 – Phase Two).
- To understand (specifically) how the literature relates to the research Question (Chapter 2 – Phase One).

Hence the purpose of this review is primarily contextual in nature functioning as a necessary construct within which to understand and address the research question. As the context also relates to the wider evolving field of research and practice, its broader application and purpose is acknowledged. The two streams of relevance (to the research investigation and to design research and practice) are tracked in terms of application and contribution throughout this chapter.

Background

Also known as a scoping study, a scoping review is an emerging type of review, for which there is no universal definition (Levac et al. 2010). Although a range of authors put forth diverse options (Arksey and O'Malley, 2005) some commonalities can be seen. For example, that they typically "aim to map rapidly the key concepts underpinning a research area and the main sources and types of evidence available. [Also that they] can be undertaken as a stand-alone project in their own right, especially where an area is complex or has not been reviewed comprehensively before (Ibid.)." Based on the proposed definitions, the requirements for this research align with the subsumed statements of meaning from other authors. An example of compliance from this study is the need to map key concepts and emerging evidence from this interdisciplinary field while considering the issues of complexity and novelty which clearly characterizes the diverse discipline (Table 3-5).

Scoping reviews are typically undertaken to examine the extent, range and nature of a research activity, to determine the value of undertaking a full systematic review, to summarize and disseminate research findings and/or to identify research gaps in the existing literature (Arksey and O'malley, 2005). These are the strengths of this type of review and as such support the needs of this study, as well as the aims of the wider research. The implications of the outcomes for the wider fields of practice are equally significant.

> "These reviews provide a rigorous and transparent method for mapping areas of research. In a relatively short space of time (compared with full systematic review), reviewers are in a position to illustrate the field of interest in terms of the volume, nature and characteristic of the primary

> research. This analysis in turn makes it possible to identify the gaps in the evidence base, as well as summarizing and disseminating researching findings. By presenting the results in an accessible and summarized format, policy makers, practitioners and consumers are better placed to make effective use of the findings (ibid)."

A significant limit of scoping reviews is that they do not answer specific research questions. As such this review examines primarily the research scope, the necessary context from which to understand and examine the research question. A focused review of literature is carried out in the wider research study to specifically investigate the research question (Chapter 2 – Phase One).

An additional limit is that scoping reviews do not formally appraise the quality of evidence in the literature neither do they address the issue of synthesis of evidence. Instead, as mentioned, they map and describe the available research. This was the case for this research. The results of the study are presented as a mapping of the field and its literature according to the revealed themes (Chapter 4.3.2). The nature of the field is also examined and discussed according to core issues related to the context.

As mentioned at the outset of this chapter, the review process itself was an evolutionary one marked by a progressive journey of exploring, reasoning, and reflecting upon the field (its history as well as its contemporary unfolding developments), its available literature, the nature of the literature, its absence of defined parameters and the requirement for design's contextualization.

Due to the novelty of the design-in-government context and the requirement for foundational theoretical constructs, this review is also being tracked as a methodological process alongside the evolving scoping review methodological practices as demonstrated in other fields. A summary of the contributions of knowledge according to method based on the insights from this study is presented and discussed in Chapter 10.

Levac et al (2010) identify that there is no universal purpose of scoping studies. The author instead charts a survey of definitions and purposes of scoping studies

from other authors in diverse fields to gain insights into similarities in the ethos as a means of advancing the methodology ibid.

A summary of the purpose of this review charted parallel to the survey by Levac et al (2010) highlights similarities in intent. (Table 3-5 researcher's proposed purpose charted in bold text). Generally, as the survey identifies, the endeavour implies an exploratory focus to contextualize the current state of knowledge (research and non-research material), usually through mapping to bring greater clarity of a field of evidence or topic. Also noted is that the exercise of reviewing generates additional related results including key concepts, theories, sources of evidence, common themes, and gaps in the research (ibid).

Table 3-5 Definitions and Purposes of scoping studies (Levac et al, 2010, adapted)

Authors	Definition	Purpose(s)
Ehrich *et al.* (2002)	None provided.	'The purpose of a scoping exercise is both to map a wide range of literature, and to envisage where gaps and innovative approaches may lie"' [[11] p. 28].
Arksey and O'Malley (2005)	'Aim to map rapidly the key concepts underpinning a research area and the main sources and types of evidence available' [[14] p. 194], as cited in [6]	1. To examine the extent, range, and nature of research activity. 2. To determine the value for undertaking a full systematic review. 3. To summarize and disseminate research findings. 4. To identify research gaps in the existing literature. [[6] p. 21]
Anderson *et al.* (2008)	'Scoping studies are concerned with contextualizing knowledge in terms of identifying the current state of understanding; identifying the sorts of things we know and do not know; and then setting this within policy and practice contexts' [2]	1. Literature mapping: 'is a map of the relevant literature. These vary in scope from general accounts of the literature to studies that are just short of systematic reviews. Literature scoping studies often also involve the syntheses of findings from different types of study.' 2. Conceptual mapping: 'a scoping study designed to establish how a particular term is used in what literature, by whom and for what purpose.' 3. Policy mapping: 'a scoping study designed to identify the main documents and statements from government agencies and professional bodies that have a bearing on the nature of practice in that area." 4. Stakeholder consultation: 'Do[es] not constitute scoping studies in their own right, but they do have an important part to play in scoping studies concerned with the identification of research priorities, in helping to target research questions, and in validating the outcomes of scoping studies through peer-review' [2].
Grant *et al.* (2009)	'Preliminary assessment of potential size and scope of research literature.' [[4] p.95]	'Aims to identify the nature and extent of research evidence (usually including ongoing research' [[4] p.95].
Davis *et al.* (2009)	'Scoping involves the synthesis and analysis of a wide range of research and non-research material to provide greater conceptual clarity about a specific topic or field of evidence' [[1] p.1386].	'We propose that a common synthesising construct emerges to explain the purpose of scoping, namely that of 'reconnaissance'. It is generally synonymous with a preliminarily investigation in which information is systematically gathered and examined in order to establish strengths and weakness and guide in which ever context, future decision-making' [[1] p. 1396].
National Institute for Health Research (NIHR) Service Delivery and Organisation Research and Development Programme (SDO)	None provided.	1.'Clarification of working definitions and conceptual boundaries of a topic area, developed in the form of systematic overview (narrative review) of the literature but specifically excluding a systematic review, to determine a frame of reference; 2. Outline what is already known and identify gaps in existing research, and; 4. Conceptual analysis may include the 'mapping' of existing empirical evidence to describe and interpret issues that will inform further research and development opportunities.' [[1] p. 1387]
Canadian Institutes of Health Research http://www.cihr-irsc.ca	'Scoping reviews are exploratory projects that systematically map the literature available on a topic, identifying the key concepts, theories, sources of evidence, and gaps in the research. They are often preliminary to full syntheses, undertaken when feasibility is a concern – either because the potentially relevant literature is thought to be especially vast and diverse (varying by method, theoretical orientation or discipline) or there is suspicion that not enough literature exists. These entail the systematic selection, collection and summarization of existing knowledge in a broad thematic area for the purpose of identifying where there is sufficient evidence to conduct a full synthesis or where insufficient evidence exists and further primary research is necessary.' [15]	None provided.
Geraghty, 2020	None provided	To explore and define the research scope, identify its related literature, knowledge gaps and determine the areas requiring further investigation.

Approach

The interdisciplinary context of this research required a consideration to approach the study from a means familiar to the target audience of government policymakers. Hence, a systematic approach was taken towards the review. Primarily because of the influence of the evidence-based agenda on research relating to policy and practice (Davies *et al*., 2000; Oakley, 2002; Davies, 2004; Nutley *et al*., 2007). Petticrew and Roberts (2008) note the importance of robust evidence to inform policy.

> "Politicians and policymakers are increasingly interested in evidence-based decision making. They are under pressure to look to research for solutions to policy problems, and to justify programs by reference to the knowledge base. For policymakers, systematic reviews may provide robust, reliable summaries of the most reliable evidence: a valuable backdrop of evidence on which decisions about policies can draw". (ibid)

Davies (2004) defines evidence-based policy as "an approach that helps people make well-informed decisions about policies, programs and projects by putting the best available evidence from research at the heart of policy development and implementation". Davies also notes that evidence-based policy "has become a major part of many governments' approaches to policy making and the machinery of government (Davies, 2004)." The evidence-based context, therefore, is an important consideration for this research as it positions the content for effective application for use in a political context.

The approach facilitates the rigor necessary for its extended application to the wider context beyond policy implications to include areas of governance and service delivery as well as the social sector, design practice and design education. The systematic approach towards mapping results is also a defining characteristic in visualizing collated data which is a requirement in scoping reviews facilitating the communication of data to the target audience.

The exploratory nature of the review is reflected in the iterative processes undergone as part of the investigation of the research scope. As such, the

methodological approach was directly informed by the incremental outcomes of evidence.

Search Strategy

As is required for systematic reviews the process was recorded to ensure that the outcome was accountable, replicable, sustainable, and credible. As a starting point to frame the process, a rationalized review task was structured according to 5 phases, each with a specific purpose in order to achieve elements of the chapter objective ((Arksey and O'Malley, 2005))A summary of each phase, its related purpose and task is shown below in (Table 3-6)

Table 3-6 Scoping review phases and tasks

Scoping Review Phases and Tasks (Arksey and O'Malley, 2005)			
Scoping Review Phases		**Purpose**	**Task**
1	**Scoping investigation (Initial scope)**	Identify the parameters of the research scope	To explore the novel area of research and gather insights from which to direct other phases of the review investigation
2	**Search and Charting of Data**	Clarify themes as headings and order their placements. Group relevant literature accordingly.	To sift, search through literature in more detail. To organize the diverse, varied literature and concepts according to themed headings.
3	**Review of Literature and identification of knowledge gaps**	Discover related insights and preliminary gaps	To review available knowledge within the area of design-in-government according to general headings in order to gain sight of the bigger picture within which the research resides. Obtain search terms Explore the need for the research
4	**Collating, summarizing, and reporting the results**	Consolidate results to direct the study	Map results in chart form in terms of the concepts, context, and content for the domain of design-in-government.
5	**Stakeholder Engagement**	Validate review outcomes Direct the study	Identify gaps not considered Obtain an empirical perspective

The sequence of tasks were then numbered according to the order of the actual undertaking carried out by the investigator (Table 3-7). Noted are the streams of reviews of literature, the identification of gaps and interactions with stakeholders that occurred as part of Phases 1 and 2.

Table 3-7 Summary of Scoping Review Phases and Tasks (Author)

PHASE	TASK
1. The Scoping Investigation	Perform an initial search based on identified scoping questions in order to explore the research scope and identify its parameters.
The Review Phase and Identification of Knowledge Gaps	Review literature to discover related insights and preliminary gaps.
Stakeholder Engagement	Consult with stakeholders throughout the scoping process to validate review outcomes, direct study, identify gaps not considered and obtain an imperial perspective.
2. The Search Phase	Perform database search, sift and search through literature in more detail, perform reference searches. Identify conceptual themes. Isolate and group relevant literature according to themes.
The Review Phase and Identification of Knowledge Gaps	Review literature to discover related insights and preliminary gaps.
Stakeholder Engagement	Consult with stakeholders throughout the scoping process to validate review outcomes, direct study, identify gaps not considered and obtain an imperial perspective.
3. Collating, summarizing, and reporting the results	Map results in chart form in terms of the concepts, context, and content for the domain of design-in-government.
Stakeholder Engagement	Consult with stakeholders throughout the scoping process to validate review outcomes, direct study, identify gaps not considered and obtain an imperial perspective.

To systemize the process for thoroughness, a search process as outlined by Booth *et al.,* (2012) was referenced (Table 3-8) to identify a range of possible steps to consider as part of the search strategy for Phases 1 and 2. Papaioannou *et al* (2009) notes that for policy related research, "systematic searching of social science literature requires a range of search techniques including citation searching, reference list checking and contact with experts." All three of these techniques were applied during various stages of the search process as the review warranted.

Table 3-8 The sequenced search process adapted from Booth et al, 2012

SCOPING REVIEW PHASES	STEPS	DESCRIPTION
Conducted during 1. The Scoping Investigation Phase	Initial search of the literature: scoping search	- Search for existing reviews and familiarize yourself with the basics and volume of literature by a scoping search on select skill bases - Determine which databases are to be included in the full search - Identify key search terms for each database - Develop and document a search strategy
Conducted during 2. The Search Phase	Conduct Detailed Search	- Search all databases using the identified search terms and the key search principles: free-text terms and tools, thesaurus terms, operators, and limits. - Conduct a search for unpublished or grey literature search - Consider the appropriateness of a methodological filter - Ensure if search is modified, this is documented
	Bibliography Search	- Search the reference lists and biographies of all papers in additional studies - Identify any key citations and conduct citation searches - Consider hand searching of relevant journals
	Verification	- Check indexing of any relevant papers that have apparently been missed by search strategies - Revise search strategies if necessary - Consider contact with experts to determine if all relevant papers have been retrieved
	Documentation	- Record details such as the sources searched, search strategies used, and number of references found for each source / method of searching

The search steps, as outlined by Booth et al. (2012) are therefore not prescriptive but rather a checklist of possible interventions that were available to the researcher during the review process.

It is important to note that the goal of the scoping study methodology was to produce in-depth and broad results representing all relevant literature regardless of study design (Arksey and O'Malley, 2005). The sifting and resifting of the literature driven by broad questions (such as, *what is design and what is capability?),* allowed for a better understanding of the nature of the literature being explored and as such the flow of activities unfolded accordingly. Hence, the sequencing of review activities reflected an iterative rather than a linear process as illustrated in Figure 3-3.

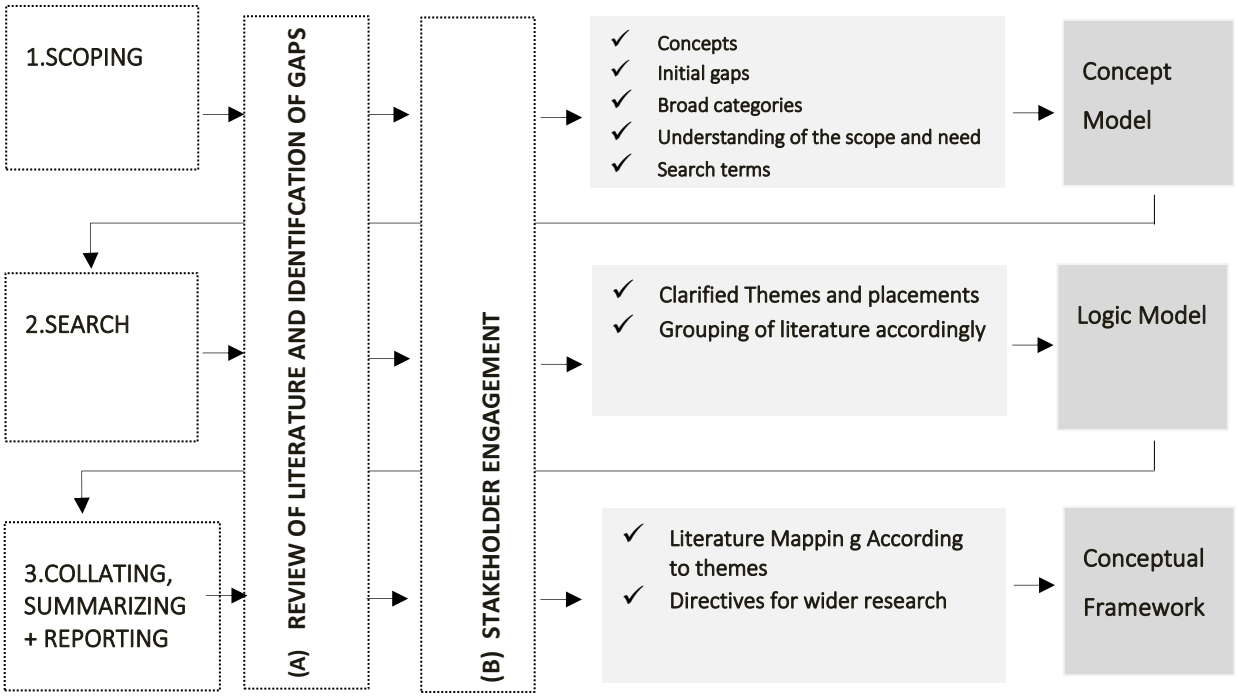


Figure 3-3 Scoping Review Activity Sequencing, Source, Author

The sequence of review phases is characterized by a review of retrieved literature and stakeholder interactions at each stage of the process (shown vertically as items (A) and (B) in the activity sequencing (Figure 3-3).

The experience reflected a divergent and convergent approach to the investigation. The Scoping Phase represented a general look into the undefined, emerging field where the literature was reviewed in a broad way to understand the lay of the land and initial gaps were identified. Based on that literature, keywords, authors and search terms were found which directed the successive Search Phase. As more detailed literature was retrieved, a review of same followed to gain further insight and clarify concepts, themes, ideas, theories, and perceptions that were identified in the previous phase.

To make sense of the vast amounts of retrieved data a summary of the scoping and search outcomes are detailed below according to Phases 1 and 2 of the activity sequencing. This is followed by a summary of the review of literature according to relevant topics which together give an overview of the key emphases of the research scope. Section 2.5 presents the documentation of the review results. As both the scoping review methodology and the review findings are of concern, the cumulative results represent both process and product of the study.

Outcomes

The Scoping Phase

Based on the investigators background and reflections on the current emphasis occurring within the design and government context, national design policy was the starting point for the scoping search in order to understand the research landscape, key authors, and the nature of the literature.

Due to the novel nature of the phenomenon, a traditional search using primarily electronic academic databases was determined to be unsuitable at this initial stage.

Both the research topic, *"Design Capability in Government"* and research question *"What is the Capability of Design in* Government" were too abstract for use as scoping questions at this stage of the investigation.

Instead, the fundamental questions identified early in the scoping process, namely, regarding: What is design? What is government? What does capability

mean in this context? As well as questions surrounding design policies in various countries, were explored (Table 3-9).

Table 3-9 Scoping Questions

Scoping Questions (within the context of design within government)	
Topic:	Design Capability in Government
Research Question:	What is the capability of design in government?
Initial Scoping Questions:	What is Design? (within this context) What is Government? (within this context) What is Capability? (within this context) "National Design Policy", "Design Policy"
Key Words	Design, Government

Internet search engines, dictionaries, thesauruses, grey literature, and some databases (where reports referenced specific articles and publications) were used as tools in the initial data mining phase to scope utilizing the scoping topic questions and key words. An *'Internet Search Profile'* was developed to guide the search more systematically. (Appendix A)

Based on this initial scope, vast amounts of diverse literature were identified. This was partially due to the broad nature of the word design, government, and numerous uses of similar terminology with diverse meaning.

It was also noted that the nature of literature in the areas of design and government is primarily practice literature and policy literature respectively. The primary formats of this literature are reports, conference literature and articles from design journals, official publications from governments, research and design promotion groups and books. In addition, due to the novelty of the emerging subject matter, industry-related conferences with an interest in or related to design in the context of government (including the terms public sector, public

policy and politics) also netted web formatted data (articles, blogs, archived interviews, webinars, conference proceedings) on the topic.

The field, though specialized, revealed a diverse range of implementation strategies being used throughout the world to integrate design within the system of government. These range from design policy, design innovation, design promotion, design support and various overt strategies such as procurement as well as covert strategies such as design thinking. There are a number of key reports, research groups and researchers who have produced significant works that frame the discourse for design in the context of government globally. As part of the scoping process, the literature was briefly sifted, searched through in more detail and organized. This process was useful in order to classify the vast amount of preliminary data into broad categories of related content including:

1. Design and Design Capability
2. Design Policy
3. Government
4. Communication Frameworks

Table 3-10 shows the classification and distribution categories of the diverse literature according to type during the scoping phase.

Table 3-10 Broad categories of literature classification – Scoping Phase

DESIGN / CAPABILITY	DESIGN POLICY / IMPLEMENTATION	GOVERNMENT
Design and Creative Industries	Current Situation	Framework - System
Design and Innovation	History (20 YEARS)	Process of Policy Reform
Design and SME's	History and Rationale	Policy Cycle
Design: Professional Organizations	Planning	Misc.
Conferences	National design systems	**COMMUNICATION**

DESIGN / CAPABILITY	DESIGN POLICY / IMPLEMENTATION	GOVERNMENT
IP and other issues	National design competitiveness	*Systems and Frameworks:*
Development	Assessment	WSD
Definitions	Countries:	Enterprise Architecture
References	UK / Europe	
Research	Canada	
Theory and frameworks	Us	
Methodologies	Finland	
Design Principles	Other Nordic countries	
Thinking	Australia NZ	
Management	Brazil	
Effectiveness/ impact/value	Singapore and Japan	
And society	Developing Countries	
And development	Other – India, Turkey,	
	EU	
	UK	
	SEE, DeEP, Design Council, DMI,	
	DRIVERS:	

From sifting through the results, a list of key words, authors, research groups, books, articles, journals, reports, publications, related conferences, historical dates, and related subject matter vernacular were noted.

Evident as well were the varied and vast amounts of related literature in areas such as business management and economics referencing the socio-economic influence of design and its value. A broad range of related design fields involved and their strengths and foci, such as user centered design, industrial design and design thinking were also uncovered. The requirement to exclude design literature that fell outside of the government related context or those whose

content did not relate to the notion of the capacity of that specific dimension of design, was also identified through the reviewing of abstracts. Inclusion criteria emerged also from comparing retrieved documents to the nature of the literature already retrieved. Included were all fields of design and as well as the creative industries, literature relating to design competencies (e.g., problem-solving, inductive reasoning, collaboration), design impact in the private sector, issues surrounding design policy, the system of government, policy reform and ways of communicating results to government both individually and as a collective. Excluded was literature referencing design as an action as it relates to unrelated contexts such as electrical engineering.

The scoping phase also identified complexities in the dictionary definitions of the words, *design,* and *capability*.

Finally, from skimming through these sources, focusing and re-focusing the literature through a review of references, key words and terms were noted to inform the subsequent detailed Search phase.

The Search Phase

Following the Scoping Phase, the retrieved literature was skimmed through focusing and refocusing through a review of references, an analysis of interim results, researcher reflections from discussions with stakeholders as well as conference insights. Consequently, a clearer understanding of the research landscape was obtained, areas requiring focused investigation were identified and a more informed list of key search terms was noted to direct the search.

Hence, the purpose of this phase, is to further understand the research in terms of its context, content therein, concepts, theory, and communication objectives. The targeted objectives identified in the previous phase, being addressed during this phase are summarized in Table 3-11.

Table 3-11 Targeted Objectives for the Search Phase coming out of the Scoping Investigation

Targeted Objectives for the Search Phase coming out of the Scoping Investigation	
Category of Results	**Objectives**
Context	Clarify thematic headings
	Develop Conceptual framework for DIG
Content	Review literature in more detail and organize under related thematic headings
Communication	Identify an appropriate communication tool to develop
	Identify suitable ways of visually communicating imbedded concepts

According to the search protocol, the search task includes bibliographic searching, verification and documentation as reported in the section which follows.

Database Search

Prior to performing a database search the broad categories ordering the diverse literature retrieved from the scoping phase was referenced (Table 3-10).

The reframing of the broad headings into more generalized conceptual headings evolved through the preliminary reading of the literature, reflections from interactions with stakeholders and the identification of general patterns and correlations emerging out of the preliminary analysis of the literature during this and the previous phase (Table 3-12). For example, within the thematic area of *communication*, was literature relating to two key areas. First communication tools, methods, and other "*ways*" of communicating related to design and the transfer of the knowledge of design. Second was literature relating to in communicating results to government. The area of *design knowledge transfer* was constructed as it relates directly to the architecture of the design-in-government context, housing literature concerned with communicating design

knowledge towards government. A description of the content in each thematic area is provided in Table 3-12).

Table 3-12 Modified Thematic Areas with the Design-in-Government Context

Modified Thematic Areas with the Design-in-Government Context	
CONCEPTUAL AREAS (General)	**DESCRIPTION**
Design	Profession (services), abilities, tools, history, philosophy, theory...
Knowledge transfer	Related theory, Process, agents, universities, research groups, labs, design research, reports…
Design in Government Initiatives (strategies)	National Design Policies (NDP), regional design policies, innovation policy/programs, support programs, agents, enthusiasts, labs, etc. / Canada, UK, EU, Finland, Denmark, Australia, New Zealand, Brazil, Singapore, South Korea, Developing countries.
Government (system)	Policy system, economic, social, environmental, systemic…
Design value / impact	Economic, social, environmental, systemic impact…

The refined thematic areas now include, all literature relating to ***design*** (as it relates to government); literature relating to the ***transfer of knowledge*** from the domain of design towards government; the various ***design-in-government strategies*** (of which national design policies is one such strategy); the system of ***government*** (and its various segmentations) and finally; literature concerning ***design value/impact as it relates to the government system***. The mapping and distribution of the literature accordingly was useful to inform the next stage of the search strategy (Booth et. al., 2012).

Following this organization, a more detailed database search was undertaken. Key words, related terms and synonyms were entered as per the scoping outcomes including: '*National Design Policy* (NDP)', '*Design Capability'*, '*Design-in-Government'*, and '*Design and Innovation*'.

SCOPUS was used as the primary search tool because of its range covering all areas of social science, science and technology and its flexibility allowing for customized searches. Additional databases as noted, were used subsequently, to mine reference lists, design journals and current reports (Table 3-13).

Table 3-13 Search Options

Search Options			
TOOL		**IN**	**PUBLICATION**
Database	Scopus	Article, abstract, keyword	Refereed journal, journal article, conference paper
	Google Google Scholar	Keywords, subject, author	Reports, design journals
	2nd generation databases	Subject	Reports
Other	Conferences	Keywords, subject, journal, author	Conference papers, author-supplied abstracts, reports

A hierarchy of literature was applied during this stage as follows:

Journal Articles (Peer reviewed journals, journals with high star ratings and government and practice journals identified in the scoping phase, were considered first)
Reviews
Research Reports and Official Government publications
Conference literature
Books

However, since the findings from the scoping phase identified the nature of the literature in this field being primarily research/practice based, conference literature and books were given special consideration especially if written by authors identified in the key journal publications.

Quality screening

The search process scanned through various categories of literature systematically, employing key words and terms, using the abovementioned tools in Table 3-13 and following similar steps as outlined in the search process table (Table 3-8).

"*National design policy**" with no restrictions, resulted in a total number of 15 retrieved document results, of which 11 were journals, 4 conference proceedings. The results were filtered to the relevant key words: Design Policy (4), Design (3), Industry (3), design strategy (2) and narrowed further by journal ranking or impact factor (high star rating, high impact factor). Abstracts were reviewed and 5 documents relevant to the research were selected. Full text sifts were then performed and considered based on critical appraisal of the content as well as the applicability of the content. These issues of internal and external validity helped to determine the quality and generalizability of possible literature to be used.

During the full text sifts, the following process of selecting appropriate literature was considered (Table 3-14).

Table 3-14 The process of selecting appropriate literature, adapted from Booth et al. 2012

Title sift	
	Exclude articles that are not relevant based on title
Abstract sift of articles included at title	
	Exclude articles that are not relevant based on abstract

Full text sift of articles included at title	
	Exclude articles that are not relevant based on full text and document reasons why they do not meet inclusion criteria
Included articles for review	

Where database searches netted a considerable number of results, for example in the area of ‘design capability’ (no restrictions) which netted results primarily in the information technology field, selections were limited to those containing relevant key words in title or abstract and narrowed by author referenced in other similar papers or by relevance to the subject matter at hand. The process followed convergent and divergent patterns. The outcomes using this technique were minimal due to the newness of the field of research. The information was checked against the literature netted during the scoping (see below) and summarized. Terminology that was common was also noted.

Bibliography Search, Verification and Documentation

As part of the search process (Table 3-8), bibliographical searches, and verification and documentation of results were carried out to complete the search procedure.

From the literature netted during the scoping phase, internet and grey literature revealed numerous reports and journal articles related to ‘national design policy’ initiatives and similar activities in diverse countries. A general examination of this literature and related bibliographical references netted a preliminary list of authors, research groups, promotion groups, books, articles, journals, reports, historical dates, related countries, and subject matter vernacular that were of particular significance. It was observed that much of the literature was published in related in sub-fields of design including design theory, design research, design education, design management, service design, user-centered design, and by design practitioners such as IDEO, and research consortiums as part of specialized initiatives. The outcomes were cross-referenced with those from the

Scopus searches and documented under themed headings identified in the Search phase. (Appendix B)

From this list, the types of authors (e.g., research groups, design firms, design promotion agencies) and related named organizations were noted. A preliminary list of types of stakeholders associated with this field was also drafted (Table 3-15).

Table 3-15 Related Stakeholder Groups

Stakeholder Group	Description	
Design	Industry/ Practice	Design Practitioners, Design Industry delineated groups
	Knowledge Transfer	Design research groups (Researchers), Universities (tertiary education), Labs, Professional Organizations and Associations, Design Support/Promotion groups, Activists
Government	All levels, all countries, all sectors	Policymakers, program managers, Funding Bodies, Procurement Officers
Public Service Delivery		Public Service employees, Non-profit groups, Charities
Education		Design Education, Business Management, Political Science/Public Policy, Economics, Sustainably, Sociology, Technology ….
Private Sector/Industry		Used as a point of reference to observe and illustrate the various dimensions of design in use and areas of documented impact.

Finally, since the nature of much of the literature was current and emerging, a technique deemed appropriate for the search was to consult with experts in the topic area (Booth, 2012). The authors' personal industry contacts as well as the names of key authors from the scoping search formed the outline of a feasible contact list to be developed and detailed as the research progressed.

Results from the search phase extracted through the sifting and scanning of the literature are recorded in Chapter 4.

Analysis

As noted, scoping reviews do not formally appraise the quality of evidence in the literature neither do they address the issue of synthesis of evidence. Instead, they map and describe the available research. Hence, the analysis of data for this study involves the mapping of the results and the presentation of same "in a summarized format (Arksey and O'malley, 2005)." The mapping of results is charted in Chapter 4.4 according to the themes uncovered during the Search Phase. The nature of the field is also examined and discussed according to core issues related to the context including philosophical, operational, and conceptual insights. These results along with the themes are summarized and presented as a Conceptual Framework for Design-in-Government in both written and visual form (chapter 4.5). Together they represent the analysis of results. The benefits are highlighted by Arksey and O'malley (2005).

> "This analysis in turn makes it possible to identify the gaps in the evidence base, as well as summarizing and disseminating researching findings. By presenting the results in an accessible and summarized format, policy makers, practitioners and consumers are better placed to make effective use of the findings (ibid)."

Summary and Implications

The strengths of the scoping review methodology supported the needs of this study and the aims of the wider research. The collated results provided the contextualization of the thematic area of design, the area of focus within which the research question can be answered (Table 3-16). This directed the need for a more focused review of literature in this specific area which was carried out in Chapter 2. The mapping which provided a theoretical snapshot of the emerging field, directed the researcher in terms of what to look for in practice as part of the exploratory case study in Chapter 5. The finalized framework also functioned as

the analytical codes for the analysis of secondary case studies in Chapter 6 of the research.

Table 3-16 The Conceptual Framework for Design-in-Government (CF) (Visualization) – Area of Design circled in red.

THE DESIGN-IN-GOVERNMENT (DIG) CONCEPTUAL FRAMEWORK				
Thematic Heading	**DESIGN**	**DESIGN KNOWLEDGE TRANSFER**	**DESIGN-IN-GOVERNMENT MECHANISMS**	**Areas of GOVERNMENT Impact**
Operations (DIG System)	Inputs	Inputs	Outputs (Activities + Participants)	Outcomes (Short, Medium, Long term impact)
Philosophical Considerations	What Design is	What Design is + What Design Does + Communicating What Design is and Does	What Design Does	
Concepts	potentiality, resource, capacity, and impact			

Finally, the outcomes more broadly also have significant implications for both theory and practice. As a methodology, this study in its approach has demonstrated conformance to the fundamentals of a scoping review methodological protocol. The documented process explored in this study therefore helps to further advance the wider, evolving scoping review methodology and as such contributes to its theoretical evolution. These contributions are discussed in Chapter 10 of the wider research.

PHASE THREE

Phase Three is concerned with exploring the Design-in-Government context.

3.4.3 Exploratory Case Study

This study is concerned with gaining insights into the novel, diverse and complex design-in-government context from a first-hand perspective. With the nature of the field being an emergent one, engaging directly with practitioners in situ was a critical way to understand the phenomena and knowledge of the phenomena is fundamental to understanding what design is and how it functions within this context.

Method

Case study was deemed the most effective way to obtain primary data about design in this context, from an immersive, first-hand experience. The authors' diverse practice background provided a base line point of reference with traditional industry practices. Maxwell (2012) describes this type of study as providing the investigator, "with an understanding of the meaning that these things, actions and events have for the people who are involved in them, and the perspectives that inform their actions." In this regard, an exploratory case study provides the opportunity to view the field from both high level and low-level perspectives providing key insights related to the contextualization of design within government.

Yin (2014) reasons that case study is an appropriate method to consider when there is a requirement for an "extensive and in-depth description of a complex social phenomenon (Yin, 2014)." The logic, he continues helps to distinguish it from other research methods including *experiments* (where a phenomenon is deliberately divorced from its context), a *history* (which does not address contemporary events), and *surveys* (which are limited in being able to investigate context) (Yin, 2009).

Several researchers present various categories of case studies. McDonough and McDonough (1997) discuss interpretive versus evaluative case studies, Stake

(1995) classifies three: the intrinsic, the instrumental and the collective, and Yin (1984) distinguishes between exploratory, explanatory and descriptive categories of case studies. All are used for very specific purposes in their own right. For this study the exploratory case study was utilized as a means to "explore the phenomenon in the data which serves as a point of interest to the researcher" (Zainal, 2007). Zainal (ibid) also includes that it is often a tool used early in the research to "help prepare a framework for the study". For this study, the Conceptual Framework for Design-in-Government (CF), a key outcome from Phases One and Two of the research is the primary framework being finalized. Consistent with the pragmatic paradigm, this study adds practical insights to these findings. In this regard, the study also functions as way of validating or modifying the results from both the literature and scoping reviews.

The CF functions as a tool for both the collection and analysis of data for the study. In terms of data collection, the CF, its primary themes, operations philosophical considerations and concepts guides the researcher as to what to look for and consider. Results from the examination of the thematic area of design, explored in Phase One of the research, which are also included as part of the CF, are also observed from a practical perspective in this study.

As an analytical tool, through the lens of the CF the investigator is able to make sense of and contextualize what is being observed. Coral and Bokelmann (2017) note that although no formal definition for analytical frameworks exists, "its efficacy in empirical research offering several opportunities for the organization of research" is acknowledged. The resulting report including modifications and refinements to the CF charted at the end of Chapter 5 represents both process and product of the analysis and synthesis of evidence from the case study both in written and visual form.

Although case study is a widely used method with strengths, issues of validity and reliability are often challenged. The CF, in addition to its role to guide data collection and analysis, also helps to ensure external validity in the study design (Yin, 2009). Robson (2011) notes that external validity is one test commonly used to "establish the quality of empirical social research." The quality of the

research design was considered with this in mind. Yin's tactics to address issues of *construct validity, internal validity, external validity and reliability,* were referenced in this study (Table 3-5). These tactics, proposed for application throughout the case study process, are cross-referenced to the different phases of research when the tactic occurs.

Table 3-5 Case Study Tactics for Four Design Tests Source: (Yin, 2009)

Tests	Case Study Tactic	Phase of Research in which Tactic occurs
Construct Validity	Use of Multiple Sources of Evidence	Data Collection
	Establish Chain of Evidence	Data Collection
	Have Key Informants Review Draft Case Study Report	Composition
Internal Validity	Do Pattern Matching	Data Analysis
	Do Explanation Building	Data Analysis
	Address Rival Explanations	Data Analysis
	Use Logic Models	Data Analysis
External Validity	Use Theory in Single Case Studies	Research Design
	Use Replication Logic in Multiple Cases	Research Design
Reliability	Use Case Study Protocol	Data Collection
	Develop Case Study Database	Data Collection

All tactics were considered in this study, with the exception of internal validity which is not a concern in exploratory case studies (Yin, 2009).

In the area of construct validity, multiple sources of evidence were used for data collection. These included unstructured interviews, direct observation, participant observation and reviews of organizational documents (archival analysis). External validity was assured through the use of theory in the research design, specifically outcomes from the scoping review of literature used as "theoretical propositions to guide data collection and analysis" (Yin, 2009:18). Here the use of the CF to guide the data collection and analysis helps to ensure external

validity in the study design by informing the kind of information to collect that is revenant to the overall study.

The 20+ year reputation of the case study organization engaging with the design-in-government phenomena globally as well as encounters that the investigator experienced with the wider international community through them, provided a broad vantage point from which to observe the field. Further, the theoretical insights which frame this study are drawn from a wider international context making much of this evidence a means by which to support, illuminate and modify existing data.

Finally, to ensure reliability, a case study protocol in the form of research notes was catalogued to document the procedure followed (APPENDIX F). Although for this case study there were ethical issues of non-disclosure (See APPENDIX J), every attempt was made to include the above procedures protecting against threats to validity by checking field notes against published organizational documents.

Procedure

The approach to the study proceeded as follows:

1. The researcher used the data collection opportunities to evaluate the developed conceptual framework.
2. Recognising the dimensions of the framework, the researcher talked with practitioners, observed practice documents, participated in design-in-government activities to 'test' evidence of these dimensions in practice. i.e., are they relevant, all-encompassing and were there any omissions. Omissions or redundant dimensions would have demonstrated the need to adapt/re-develop the framework
3. The experience showed that all the dimensions of the framework were relevant with no redundancy or omissions.
4. From this, the studies that follow helped further refine the definition of the dimensions.

Figure 3-4 illustrates the flow of the procedure.

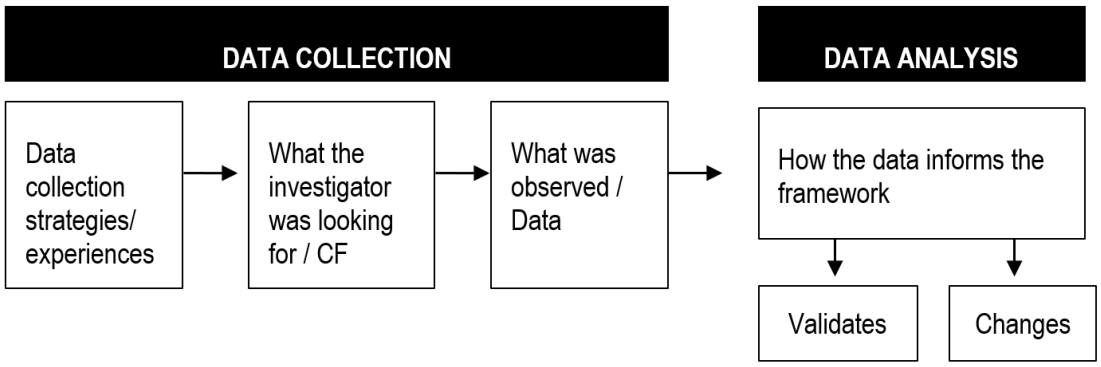


Figure 3-4 The flow of the data collection and analysis procedure

Data Collection

The research question driving the investigation was *what is the capability of design in government?* To understand design, it's capability as well as the design-in-government context, the investigator was situated within a design research-practice for three consecutive months full time, from 9am-5pm daily, to observe its operations. As noted, issues of confidentiality, non-disclosure and ethics, needed to be considered, therefore contributing participants related to this study have been anonymized. The established and recognized organization is housed in a UK university engaging in knowledge generation and transmission to government practitioners primarily throughout the European Union but additionally in Singapore, Brazil, Canada, Mexico and other countries by way of the distribution of their annual policy related publications and through their design consultancy services. Their unique and dynamic positioning within the design industry, design research, and public and private sectors, provided numerous and varied data collection opportunities.

In addition to engaging in the organization's day to day activities, the investigator was involved in 4 key policy team initiatives:

- Preparing case studies for the organization's on-line case study library.
- Supporting the policy team in the organization and implementation of an industry-academia conference with consortia partners in Finland.

- Supporting the policy team in their attendance and presentation of the impact of their research to International Design Policy practitioners in Brussels.
- Aiding in research on Innovation Labs around the world.

Data collection occurred through direct observations of the organization and its activities (DO), participant observation (PO) of its staff, the policy teams' consortia members, government officials engaging with the organization (at their workshops, meetings etc.), reviews of organizational documents (REV) (archival analysis) and informal unstructured interviews (UI) with staff from their 8 research-practice divisions and their research partners from 11 European countries, government officials and others from the public and private sector engaging with the organization. Table 3-17 provides a summary, description, and numbers of data collection activities.

Table 3-17 Summary of data collection strategies and details of experiences

Code	Data Collection Strategy	Description	Details of the experiences
DO	direct observation	of the organization and its activities	Physical environment, organizational structure, projects, project development, management and implementation, staff engagement.
PO	participant observation	of staff of its staff, the policy teams' consortia members, government officials engaging with the organization (at their workshops, meetings etc.),	• 25 staff members from 8 design teams including 3 senior directors • 3 workshops delivered to policymakers and programme managers across Europe on the themes of design policy, design support, service design, social design, and design management. • 2 presentations to enhance the understanding of design among innovation audiences including

Code	Data Collection Strategy	Description	Details of the experiences
			policymakers and SME managers.
REV	reviews of the organization's documents	Research papers, reports, policy updates and case studies about programs and policies on design, innovation, and related subjects such as competitiveness, sustainability, R&D, entrepreneurship, and socio-economic development.	• 8 research papers relating to design policy and design innovation in government were reviewed • 9 Reports "examining trends in design policies and programmes. Collating good practices and methods in design for the public sector. Outlining policy recommendations on design policy, design support, service design, social design, and design management." Organizational publications reviewed included: • 5 bulletins containing research, case studies, policy updates and resources from around the world. • 44 case studies on design and innovation policies and programmes to encourage the exchange of good practices between regions.
UI	unstructured interviews	informal unstructured interviews with staff from their 8 research-practice divisions and their research partners from 11 European countries, government officials and others from the public and private sector engaging with the organization.	Informal interviews with 2 directors, 4 department heads, 11 staff members. Discussions with 18 research partners (including staff members) from 11 European countries 2 Government officials

Code	Data Collection Strategy	Description	Details of the experiences
REF	investigator reflections	Understood according to categories /dimensions of the conceptual framework	Captured as notes, photographs, graphics.

The data collection experiences noted in Table 3-17 were carried out during the 3-month period of the placement in most cases when opportunities were presented.

Observations

In addition to the organization's daily activities, observations of the physical environment in terms of how the project teams were organized physically in the space, communal spaces that facilitated collaboration, and the visual communication of work was of interest. Also, how the organization was organized, the nature of project work, how teams were organized and managed and how staff members worked together was noted.

The opportunities that were presented to the investigator to engage with varied stakeholders through this case study opportunity was extensive. Participant observations of staff, the policy teams' consortia members, and government officials engaging with the organization were carried out at 8 department and company meetings (3), during daily work activities, 4 team building activities, 3 workshops and 2 industry / stakeholder presentations hosted by the organization. The conferences and industry/stakeholder presentations covered various industries including design management, design research, public policy, social innovation, service design, design education and design practice. A list of specific conferences and dates attended are attached as APPENDIX E.

To comply with confidentiality and non-disclosure parameters for this research, anonymous ID Codes were given to each organizational type represented (

Table 3-18). These codes will be used for referencing qualitative information in the report of results in Chapter 5.

Table 3-18 Related Stakeholder Groups and Assigned Codes

Stakeholder Group	Description		ID CODE
Design	Industry/ Practice	Design Practitioners, Design Industry delineated groups	DP
	Knowledge Transfer	Design research groups (Researchers), Universities (tertiary education), Labs, Professional Organizations and Associations Design Support/Promotion groups, Activists	DKT
Government	All levels, all countries, all sectors	Policymakers, program managers, Funding Bodies, Procurement Officers	GOV
Public Service Delivery		Public Service employees, Non-profit groups, Charities	PUB
Education		Design Education, Business Management, Political Science/Public Policy, Economics, Sustainably, Sociology, Technology ….	EDU
Private Sector/Industry			PRIV
Other		Not disclosed	O

Document Review

Organizational publications including research papers, reports, policy updates and case studies about programs and policies on design, innovation, and related subjects such as competitiveness, sustainability, R&D, entrepreneurship, and socio-economic development were included as part of the document review (Table 3-17). All were reviewed with the dimensions of the CF in mind.

Unstructured Interviews

informal unstructured interviews occurred during daily interactions with staff from their 8 research-practice divisions and their research partners from 11 European countries, government officials and others from the public and private sector engaging with the organization. This involved: Informal interviews with 2 directors, 4 department heads, 11 staff members. Discussions with 18 research partners (including staff members) and 2 Government officials (Table 3-17).

Investigator Reflections

As it is with the nature of many exploratory studies in social science research, immediate recording during data collection events was not possible. Instead, investigator reflections in the form of notes were captured. These reflections played an important role in the analysis of what was being seen, read, heard, daily as it related to the design-in-government context Figure 3-5 shows a sample of investigator's notes from a workshop on Design innovation Policy in Brussels.

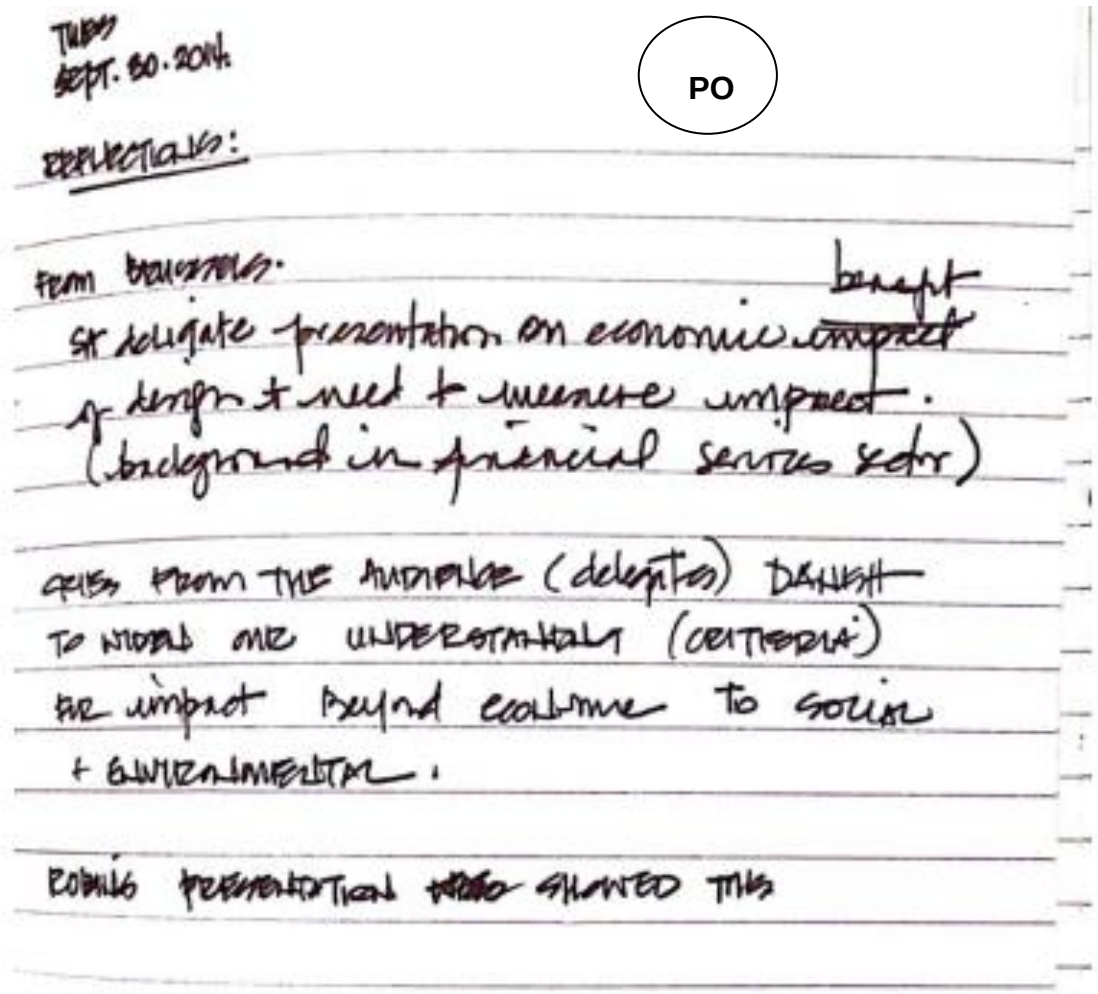


Figure 3-5 Sample of researcher reflections from workshop on Design Innovation Policy, Belgium September 2014.

Codes were later added to the notes to tag the data collection strategy employed to gather the evidence and where necessary the related stakeholder group.

Referencing the CF during data collection process facilitated the understanding of what as being observed according to the framework's categories. Table 3-19 summarizes the methods used and the results of using those methods.

Table 3-19 Summary of methods used and the results of using these methods

METHOD	RESULTS OF USING THE SELECTED METHODS
direct observation of the organization and its activities	• An understanding of the operational elements of a design-research practice functioning within the design-in-government context. • An understanding of the relationship between the thematic areas • Verification of the dynamics of interdisciplinary engagement • An understanding of the role that each thematic area plays as part of the design-in-government system of operations in term of *inputs, outputs,* and *outcomes*.
participant observation of staff of its staff, the policy teams' consortia members, government officials engaging with the organization (at their workshops, meetings etc.)	• Identification and verification of the various dimensions that design exists as capacity and its diverse applications. • Identification of a holistic view of design as it operates in government. It includes thematic, philosophical, operational, and conceptual elements.
document review	Identification and verification of the various dimensions that design exists as capacity and its diverse applications.
unstructured interviews informal unstructured interviews with staff from their 8 research-practice divisions and their research partners from 11 European countries, government officials and others from the public and private sector engaging with the organization	• An understanding of the operational elements of a design-research practice functioning within the design-in-government context. • An understanding of the relationship between the thematic areas • Verification of the dynamics of interdisciplinary engagement • An understanding of the role that each thematic area plays as part of the design-in-government system of operations in term of *inputs, outputs,* and *outcomes*.
investigator reflections	Analysis and classification of data according to dimensions of the conceptual framework

Data Analysis

The conceptual framework and its principles (Table 3-20) were used as a tool to understand, organize, and analyze the observed information. Through the lens of the design-in-government framework, observations are rationalized, according to its 2 core streams which provide

1. A holistic view of design as it operates in government. It includes thematic, philosophical, operational, and conceptual elements; and
2. Identifies the various dimensions that design exists as capacity and its diverse applications.

Table 3-20 charts the principles of the CF referenced during the data collection and analysis.

Table 3-20 The Conceptual Framework for Design-in-Government (CF) (Principles) (Source, Author)

CF for Design-in-Government (DIG) Principles: (Source, Author)			
1	**A holistic view of design as it operates in government. It includes thematic, philosophical, operational, and conceptual elements.**		
	A	**Thematic (Structural)**	Includes thematic areas of *Design, Design Knowledge Transfer, Design-in-Government Modes of implementation*, and areas of *Government* impact. (Source, Author)
	B	**Philosophical:**	Involves areas of design meaning involving *What Design Is, What Design Does*, and *Communicating What Design is and Does.* (Dilnot, 1982, 2018; Moholy-Nagy, 1991; Love, 2002)
	C	**Operational**	Identifies **i)** the placement of themes, **ii)** relationships between them, **iii)** reflects dynamics of interdisciplinary engagement (Barry, Born and Weszkalnys, 2008; Kimbell, 2016)**, iv)** Identifies the role each area plays as part of the design-in-government system of operations in term of *inputs, outputs* and *outcomes*. (Source, Author) (Malvido *et al.*, 2008; Moultrie, 2009; Moultrie and Livesey, 2009)
	D	**Conceptual**	Reflects embedded concepts of *capacity, potentiality* and *impact* consistently echoed throughout design-in-government literature. (The Design Council *et al.*, 2013)
2	**Identifies the various dimensions that design exists as capacity and its diverse applications.** (Buchanan, 2001; Quartz + Co., 2011; The Design Council *et al.*, 2013; SEE Platform, 2015)		

The visualisation of the CF in Table 3-21 functioned as a high-level tool to understand the interactions between the thematic areas and in terms of its application to the study, as a way to understand the dynamic elements of the design in government context, the field of practice and the causal relationships between inputs, outputs, and outcomes in the context.

Table 3-21 The Conceptual Framework for Design-in-Government (CF) (Visualization) (Source, Author)

SUMMMARY OF DATA COLLECTION OPPORTUNITEIS ACCORDING TO THE CF				
Thematic Heading	**DESIGN**	**DESIGN KNOWLEDGE TRANSFER**	**DESIGN-IN-GOVERNMENT MECHANISMS**	**Areas of GOVERNMENT Impact**
Operations (DIG System)	Inputs	Inputs	Outputs (Activities + Participants)	Outcomes (Short, Medium, Long term impact)
Philosophical Considerations	What Design is	What Design is + What Design Does + Communicating What Design is and Does	What Design Does	
Concepts	potentiality, resource, capacity, and impact			

The study results reported in Chapter 5 refined the CF by either validating or changing its dimensions.

Report Format

Direction was sought to inform the organization of the report writing with its vast and diverse content. Lincoln and Guba (1985) recommend a structured approach to formatting case study writing to interject “order into qualitative field research reports” (Robson, 2012). The arrangement is comprised of a two-part report that should include the following considerations:

Part 1:

A. An explanation of the focus of the case study (e.g. Problem, issue, policy option, topic of evaluation)
B. A description of the context or setting in which the enquiry took place, and with which it was concerned,
C. A description and analysis of the data obtained, and
D. A discussion of the outcomes of the enquiry.

This is followed by:

Part 2: a methodological appendix containing a description of:

E. The credentials of the investigator (s), to include training and experience together with a statement about the methodological predispositions and any biases toward the problem or setting,
F. The methods employed, and the nature of the design as finally implemented, and the methods used to enhance and assess trustworthiness.

The structuring was adapted in the writing up of the results with relevant elements considered. The contents are organized as follows:

	Description	**Location**
A	Focus of the Study	Chapter 5
B	Description of Context	Chapter 5
C	Data Collection and Analysis	Chapter 5
D	Discussion of outcomes of the enquiry	Chapter 5
E	Curriculum Vitae (CV) noting the credentials of the investigator	Appendix H
F	Methodological Discussion	Chapter 3.4

Although the report content is presented as a narrative along these lines, the analysis of evidence and conclusions feeds into all thematic streams of the conceptual framework, including the philosophical considerations of *what design is, does* and *design communication.* As such the findings are organized according to the conceptual framework content areas including its thematic headings, operations, philosophical considerations, and concepts. As the results also provide insight into the findings of Chapters 2 and 4, the modifications and validations to the conceptual framework in response to these learnings (Maxwell, 2012) are presented at the end of Chapter 5 as part of the summary. The finalized conceptual framework serves as an analytical tool for the subsequent study in Chapter 6.

PHASE FOUR

3.4.4 Secondary Case Study

This study examines ‘what design does’ in the context of government. The study represents Phase Four of the thesis investigation. The endeavour aids in creating an understanding of the various dimensions of design in use and their application towards various areas of government. Through the study’s findings design’s capability and potential reach is revealed answering the primary research question.

The interpretative study examines 30 international case studies of targeted design use in government and tracks them according to thematic codes derived inductively from the case studies and deductively from the conceptual framework for design-in-government (CF). Analysed are the strategic details of each study alongside the dimensions of design used, the knowledge transfer process, the modes used to implement design into government and the areas of government impact. The investigation identifies gaps between the intended use of design versus actual areas of impact and effectiveness within government. The results reveal that all dimensions of design have the potential to operate in all areas of government simultaneously. To date this perspective has not been identified. As such this holistic point of view represents the primary contribution to knowledge from this study. Through these findings design’s capability and potential reach is revealed answering the primary research question.

The enquiry in its execution also aids in identifying, modifying, validating, and consolidating theoretical and empirical findings from earlier stages of the research (Chapters 2-5). The refinement of these results together with the findings from this study, presents an informed high-level perspective of the design-in-government context, a more focused view of its component parts, and a grasping of the dynamics of the DIG system through the mapping of the flow of design activity trough to government. This application of the CF demonstrates its utility as an analytic tool to understand, assess and build the emerging area of

research and practice. As a product, the CF contributes to knowledge in these areas.

Finally, the findings from this chapter feed into the development of a model being developed as part of the wider research in Chapter 7.

Purpose

Design's Strategic Use

Tracking what design does though its use helps to gain an accurate view of its potential for impact within government. Without this information, government practitioners are not equipped to use design as a strategic resource. Design theorist Terrance Love (2007) advocates careful dynamic modelling of the systems and sub-systems as a way of" investing to improve design-related outcomes in specific sectors to shape its outcomes." Case studies are a tool used widely in design research to capture concreate exemplars of design use thereby creating a base of evidence for practitioners. The convention has been adopted in design-in-government research and practice (for example in the UK Design for Europe Initiative, SEE Platform Library, The UK's Design Council, and the IIDA resource bank, not only validating design use and impact but also creating best-practices from which design-in-government practitioners globally can reference and learn from. Case study documentation typically focuses on highlighting the intended areas of impact for which the area of design was projected. The endeavour often gives weight to a preferred dimension of design, (such as graphic design, design thinking, user-centered design, or service design for example), as well as a preferred targeted trajectory within government (such as economic impact). From this perspective, the selection criteria for both the dimension of design to be used as well as its intended use are compromised favouring a subjective approach towards its selection and a prescriptive approach towards its application. This instead of an informed strategic approach of the range of areas of design as capability in consideration of the range of possible strategic targets that government may have. Indeed, many published case studies imply and in most cases report the additional dimensions of design used

and additional areas of impact observed. These “unofficial” results shroud the reality of design’s reach and impact in this context.

The prescriptive perspective towards design’s application is seen in *Design for Public Good* (2013), a Pan European report looking at various levels of the use of design thinking in government. The report advocates a move towards the optimal Design for Policy. At this Step 3 of the hierarchy, design thinking is used by policymakers to meet specific, one of, needs including, prototyping, obtaining an overview of a system and a way of fostering collaboration from within and outside of the discipline (The Design Council *et al.*, 2013). Here at the most mature level of design use, the approach fosters a one of application.

Other factors contributing to inconsistent views of design’s use and potential for impact include but are not limited to:

1. the lack of understanding of design’s identity (EC, 2009),
2. the study originator or target audience for the data.

   Studies involving designs strategic use are at times initiated by bodies not related to design or reflect one particular design discipline and as such the narrative does not communicate the depth or scope of dimensions actually used. Additionally, the recognition or regard of the intangible impact or value of design is absent.

3. the study measures (qualitative vs. quantitative).

   This refers to how design is typically measured in the literature. Typically, in design-in-government research this is quantitatively. Study measures looking to quantify design outputs or impact, focus on capabilities which can be measured as such. Design as thought (method, approach, capacity) is more difficult to quantify than design as object for example. This paradigm limits the areas of design as capacity being used as well as the perception of its value within government.

4. The study targets

Similarly, the “trajectories” of focus towards government determines which dimensions of design are used and how they are used. For example, from governments perspective influences such as global competitiveness, and austerity may utilize tangible design dimensions such as product. Social issues, systemic flaws may focus more on design as thought or strategy. Once again, the one-to-one perspective limits the holistic possibilities for strategic intervention.

These factors contribute to a fractured perspective of *what design does* specifically as seen through the case study lens.

An Interpretive Approach

Notwithstanding these concerns, secondary case studies was selected as the most appropriate method for this study due to its familiarity as a convention in design-in-government research. An interpretive approach was applied in this examination to critically utilize the studies as a tool to better understand the phenomena and its impact. The aim of making meaning of specific experiences to gain a qualitative understanding a phenomenon is inherently an interpretive practice.

The accessibility to databases of studies was an additional rationale in considering the use of secondary case studies. This facilitated the execution of the investigation and allowed for the future replicability of the study. The use of existing case studies also allowed for a universal perspective to be reflected in the study in terms of geographic diversity and to illustrate the range of design dimensions being used in various ways. These considerations aid in the generalizability of the results across various levels of government internationally.

The diverse selection of case studies required an analytical approach able to facilitate communication between the various methods used amongst them. Thematic analysis is described as “a *translator* for those speaking the languages of qualitative and quantitative analysis, enabling researchers who use different

research methods to communicate with each other Boyatzis (1998) in Nowell et al, 2017).

It is a flexible approach primarily used to “identify, analyze, organize, describe, and report themes found within a dataset (Braun & Clarke, 2006).”

Boyatzis (1998) describes how the qualitative information is encoded, the nature of themes and the different ways they might be identified.

This may be a list of themes; a complex model with themes, indicator and qualifications that are casually related; or something in between these two forms. A theme is a pattern found in the information that at the minimum describes and organizes possible observations or at the maximum interprets aspects of the phenomenon. A theme may be identified at the manifest level (directly observable in the information) or at the latent level (underlying the phenomenon). The themes may be initially generated inductively from raw information or generally deductively from theory and prior research.

The flexibility of thematic analysis lies in what Nowell et al (2017) describe as its theoretical freedom allowing it to be modified for the needs of many studies, providing a rich and detailed, yet complex account of data (Braun & Clarke, 2006; King, 2004). This flexibility provided the latitude for a wide range of studies to be considered.

The authors note that this flexibility can also lead to inconsistencies and lack of coherence when developing themes derived from the research data (Nowell et al, 2017). To guard against this, the use of descriptors was included as part of a coding index developed for guidance and to enforce clear explicit (Boyatzis,1998), epistemological positions from which to reference appropriate classifications for the data (Table 3-22).

For example, the descriptive code ‘*type of design used’* refers to traditional design service sectors (practice domains including interior design, graphic design, industrial design) as well as emerging domains including (service design and design thinking). The code ‘*Design outcome’* includes that which was produced/developed as a goal in the case study including (object/product, service, environment, tool, brand (logo), system, approach, etc.).

Table 3-22 Coding Index: Descriptive Themes Source: Author

Descriptive Themes	Qualifications, Exclusions, Examples, other Descriptors
Case Study	Name of study
Brief Description	What was the problem? What did they do? What was the impact?
Source	Link
Website	
Country/City	
Time Scale	Beginning and end date of initiative
Initiated by	E.g., Public/Private Sector/NGO
Policy Context	i.e., is it part of a larger policy agenda e.g., Innovation.
Implemented by	e.g., Design firm, government, not-for-profit *(establish categories?)*
Funded by	e.g., EU grant, private funding – name of funder
Public Service Sector	
Targeted impact (sector/*area*)	*(General)* e.g.., Social, Economic, Environmental,
Targeted impact (*cause*)	*(Specific) e*.g., Poverty, health care
Type of Design used (declared)	e.g., Service Design, Graphic Design, Interior Design, Product Design, (*design service sector)* Design thinking
Design output	e.g., Object/product, service, environment, environment, tool, brand (logo) system, approach
Actual Impact	

Inductively, the process of reading and re-reading the case studies generated more refined labels as headings/categories and descriptors on the coding index (Rice & Ezzy, 1999). It also helped to determine what each theme (as codes) concerns and examples to eliminate possible confusion when looking for the theme (Boyatzis, 1998). The document was inspired by case study data extraction templates reviewed by the investigator during document analysis as part of the previous exploratory case study.

The final selection of themes describing the content of the case studies was labelled as *descriptive codes* (Table 3-23).

Table 3-23 Descriptive Codes

DESCRIPTION OF CASE STUDIES																
No.	Case Study	Brief Description	Source	Website	Country/City/Multi	Time Scale	Initiated By	Policy Context	Implemented By	Funded By	Public Service Sector	Targetted Impact (Sector)	Targetted Impact (Cause)	Type of Design Used (Declared)	Design Output	Actual Impact

Table 3-24 Analytical Codes

DESIGN (what design is in the context of government)												DESIGN-IN-GOVERNMENT INITIATIVES									GOVERNMENT						
INPUTS												OUTPUTS (Activities/Participants)									OUTCOMES (short, medium, long term)						
Outcomes Are:		Manifested As:				Exists as:				Utilizes:					Level of Government	Activities:				Participants					Economic	Social	Environmental	Systemic	Cultural	Political	Other
Tangible	Intangible	Signs-Word	Things	Actions	Thought		Ability		Other	Skills	Tools	Knowledge	Other			Step Pass			Other	Individuals	Advocates	Labs	Firms	Other							

Analytical themes were generated from the conceptual framework for design in government. These themes formed the a priori headings to be used as part of the analysis as well as the theoretical underpinnings for the study. The themes represented the scope of design's dimensions, modes of implementation and areas of government impact. These were referred to as *analytical codes* for this study (Table 3-24).

The themes as "codes" were organized into a coding table comprised of two sections, the *descriptive* side (right) and the *analytical* side (left) (Thomas and Harden, 2007). The coding table was formatted as a matrix in Excel. The spreadsheet layout facilitated the mapping of information as it was being extracted during the analysis.

The next section discusses the procedure for data collection.

Case Study Selection

A random selection of case studies were retrieved from available digital library catalogues of organizations/groups engaged in design-in-government initiatives. Particular attention was paid to organizations identified in the literature review phase whom governments or the design-in-government community have accepted as valid contributors of evidence showing design impact. These organizations have demonstrated rigor in their publications and/or are led by thought leaders who have extensive knowledge of the field. At the time of this study a number of case studies were being catalogued by a variety of research groups under the Design for Europe banner. This functioned as the primary repository from which studies were accessed. Other sources used are listed on Table 3-25.

Table 3-25 Case study sources

SEE Platform http://www.seeplatform.eu/	a consortium of II European partners, operating as part of the European Commission's European Design Innovation Initiative from 2012 and 2015. Their goal was to "engage with government to integrate design into innovation policies and programs".
Design for Europe	a consortium of design organisations, universities and business support organisations from across the European Union with global reach. Operating from January 2014 to December 2016
The Design Commission http://www.policyconnect.org.uk/apdig/design-commission	The Design Commission is the in-depth research arm of the All-Party Parliamentary Design & Innovation Group. It is an industry-led body, which conducts high level research aimed at driving thinking around design policy in the UK.
Valuing Design http://valuingdesign.org/	An Arts and Humanities Research Council (AHRC) project aimed at mapping design impact and value in public and 3rd sector organisations.The project ran from April 2014 to October 2014 generating research insights derived from six case studies.
IDEO https://www.ideo.com/	IDEO is a design innovation consultancy firm founded in 1991 with offices globally. Projects span a variety of design disciplines and are formatted as case studies, catalogued on line.

A list brief list of inclusionary and exclusionary criteria was created based on a case study exclusionary checklist referenced as part of the exploratory case study (Table 3-26).

Table 3-26 Inclusionary criteria for case studies

Inclusionary criteria for case studies	
Criteria	**Description**
Geographic diversity	Country of origin or implementation
Design input utilized	Tangible or intangible dimension of design used
Impact is clear	The impact of design is clearly shown.

According to the criteria, an initial scanning of each case study was conducted to obtain a selection that represented geographic variety, the use of a range of

design inputs (interiors, graphic, design thinking, service design, industrial design etc.) and the demonstration of some level of design impact, explicitly or implicitly. These were usually identified through first-hand quotes from participants who observed the related and sometimes latent areas of impact. These were documented on the matrix accordingly as direct quotes.

Some of the exclusions included case studies documenting new innovations/programs that have yet to be implemented, duplicate case studies, write-ups on design awards, and emerging design programs partnering with industry or government.

Stages of Data Coding

The final selection of appropriate case studies after the exclusions totalled 60. The case studies were reviewed and due to limited time, 30 were coded. The strategy of data coding was structured, involving several stages including:

1. A review of the case studies according to the predetermined categories/themes on the coding index.
2. Relevant data was highlighted either on a digital or hard copy of the case study and then transcribed on to the electronic coding matrix.
3. The case studies were re-read for information that was not clearly evident on first screening.
4. Where necessary the additional information as descriptive text was added to the spreadsheet.

An example of the data extraction is shown on Table 3-27. Fereday and Muir-Cochrane's (2006) study on thematic analysis as a social science method shines light on the analytical process during this activity. "The process of paraphrasing or summarizing each piece of data enters information 'into your unconscious as well as consciously processing the information' (Boyatzis, 1998). This process involves reading, listening to, and summarizing the raw data." The coding of 30 studies in this way allowed for clear patterns in the data to be observed and understood as such the number of studies was deemed to be adequate.

Table 3-27 Transcribed descriptive code data

Case Study	Brief Description	Source	Website	Country/City/Multi	Time Scale	Initiated By	Policy Context	Implemented By	Funded By	Public Service Sector	Targetted Impact (Sector)	Targetted Impact (Cause)	Type of Design Used (Declared)	Design Output	Actual Impact
Hospitable Hospice	Within the context of end-of–life care; hospices are an essential service for patients and families. The nature of the service has given it a negative image in society at a stage of life, which possibly requires the highest level of dignity, compassion and care. Increasing ageing populations and complex service challenges prompted the need to 'rethink the way end-of-life care is delivered and experienced'. With the goal of re-designing the hospice service experience, Fuelfor in collaboration with project partners Assisi Hospice, Dover Park Hospice and St Joseph's Home and Hospice set out to address this social issue in Singapore, but its findings and recommendations are clearly universally relevant	www.straatstarters.be, www.pantopicon.be, www.studiodott	http://www.fuelfor.net/#!projects-1/cbn5	Singapore	2013	Not for Profit	None	Design Firm: Fuelfor	LIEN Foundation & ACM Foundation	/	Social	Health Care/End of Life Care	ervice Design/ Interior Design	Environment, Brand, Service	
How Businesses Can Help Create Sustainable Solutions to Europe's Refugee Crisis	Note: Article/commentary on the potential use of design for social impact	http://www.designforeurope.eu/	http://www.designforeurope.eu/news-opinion/how-business-can-help-create-sustainable-solutions-europe-s-refugee-crisis												
Social Inclusion of Seniors in Urban Centres	"Individuals with adequate social relationships have a 50% greater likelihood of survival compared to those with poor or insufficient social relationships." The goal of this project was to prevent social isolation and improve quality of life in the senior population. The project aim was to make the involvement of the elderly in their local service centre more active, engaging and personally rewarding. By making seniors aware of existing services and thereby establishing social connections, the direct impact on quality of life will affect lontg-ter health and happiness in the seior population.	www.namahn.com, yellowwindow.be	p://daaproject.eu/projects/antwerp/englis	Antwerp, Belgium	2013-2014	Public SectorCare Company Antwer, DAA and Design Flanders	Design-led Innovation	Design Firms: Namahn, Yellow Window	Design Flanders, Care Company Antwerp, DAA, INTERREG IVC program	Public Social Services	Social	Healthcare	Service Design	Service	social, behavioural, quality of life, inceased life expectancy.
4 Tuesdays on Eco-Design	The '4 Tuesdays on Eco-design' are four-day seminars which aim to raise awareness of eco-design amongst designers and project managers, introducing them to eco-design and the main tools for eco-designing products.	http://www.seeplatform.eu/casestudies/4%20Tuesdays%20on%20Eco-design	bercegeay@centredudesign.fr	France	2005-2007	Public/Individual	Innovation	The Design Centre Rhone-Alps, working with a PhD student in eco-design.	Regional Government and the French Ministry of Industry		Environmental	Knowledge transfer	Eco-Design	Approach	Environmental, Innovation,

The investigation identified gaps between the intended use of design versus actual areas of impact and effectiveness within government. The results reveal that all dimensions of design have the potential to operate in all areas of government simultaneously. To date this perspective has not been identified. As such this holistic point of view represents the primary contribution to knowledge from this study. Through these findings design's capability and potential reach is revealed answering the primary research question.

PHASE FIVE

3.4.5 Stakeholder Engagements

This phase of the research reports on the incremental evaluation of study results from Phases One through Four of the research through an iterative process of engaging with stakeholders, industry and thought leaders.

During the time of data collection for this research there was a proliferation of new knowledge globally being generated by teams of researchers, practitioners and other stakeholders involved in the emerging phenomenon. This was partially due to initiatives such as the European Union's commitment to and investment in accelerating the uptake of design into innovation policy and similar interests in design policy, value and resource from design support and promotion bodies in Canada, the USA, Brazil, Singapore, and Australia. The dissemination of knowledge resulted numerous academic and industry conferences and other related opportunities to engage with stakeholders and researchers between 2013 and 2019.

Method

Armitage (2007) stresses the importance of considering the experiences of the researcher and the target audience in research. During this period the investigator presented at 6 international academic and industry conferences (

Table 3-28). The decision to engage with stakeholders proved to be a practical way of evaluating and validating study results incrementally as the findings emerged and identify gaps in the research not apparent to the investigator. The conferences spanned the fields of design management, design practice, politics and policy, social innovation, design in innovation policy, and design research. Delegates from different levels of government, academia, management, and design practice provided rich input from varying perspectives.

Table 3-28 charts the conference presentations.

Table 3-28 Conference Presentations / Stakeholder Engagements

Ch	Phase of the Investigation	Stakeholder Engagement
2	ONE	2014 WIRAD Symposium (Wales)
4	TWO	2013 DMI ADMC (Cambridge, UK)
5	THREE	2015 Design Principles and Practices (Chicago)
6	THREE	2015 Policy and Politics Conference (Bristol, UK)
6	FOUR	2016 DMI ADMC (Boston)
8	SEVEN	2018 World Design Summit (Montreal)

In addition, the investigator was able to engage with the subject matter reflectively by attending 43 workshops, lectures, round table discussions, industry conferences and symposiums related to the emerging field during the same time period (Appendix E). Including the 6 stakeholder engagements, these industry events were attended in 8 cities representing 5 countries. International delegates from Australia, New Zealand, Singapore, Japan, South Korea, Denmark, Finland, Sweden, Norway, 27 European Union member states, Canada, USA, Brazil, Mexico were engaged with.

Engaging with stakeholders also furnished the researchers' reflections by providing knowledge and insights of the unfolding phenomena in some cases as the information was being made available. Finally, the experience also helped to inform the research direction. Robson (2015) notes that the "practitioner-researcher synergy is beneficial [in that the] insights and role of a practitioner helps in the design, carrying out and analysis of useful and appropriate studies (Robson and McCartan, 2015)."

Approach

The written and visualized results generated during Phases One to Four of the study, correspond to specific categories of data relevant to the overall study. These categories represent the nature of the data collected during each Phase of investigation. As outlined in Table 3-29, these include results related to the

research context, the content therein, related concepts and finally the communication of results.

Table 3-29 Nature of the data collected relevant to the research objectives

Phase	Research Objective/Task	Nature of the Data Collected
ONE	Examine and Define What Design is as Capability	Content
TWO	Establish the Context of Design-in-Government	Context
THREE	Explore the Design-in-Government Context	Context
FOUR	Investigate What Design Does within the Context of Government	Content
FIVE	Evaluation of Study Results as Model Components through Stakeholder Engagements	Communication of Results
SIX	Prototype the Design-in-Government Model	Communication of Results
SEVEN	Evaluate the Design-in-Government Model	Communication of Results

The categories of results represent the totality of the investigations in answering the research question and addressing the research aims.

Table 3-30 highlights descriptors for each category.

Table 3-30 Categories of Results and Descriptors

Category	Description
Context	relating to the design-in-government scope/framing
Concepts	relating to the ideas imbedded within the DIG context
Content	referring to the specific information/knowledge within the DIG framing as organized under themed headings.
Communication	relating to communication goals, objectives, tools specific to the DIG Context.

The goal of each conference presentation was to test the results from that particular Phase of the investigation. Hence the category of results relates to the goal for each interaction. Table 3-31 charts the 6 primary stakeholder engagements where study results were presented alongside the phases of the investigation and relevant evaluation criteria that was the primary goal of each engagement.

Table 3-31 Evaluation Criteria alongside Phases of the Investigation and Stakeholder Engagements

Ch	Phase of the Investigation	Evaluation Criteria	Stakeholder Engagement
2	One	Content	2014 WIRAD Symposium (Wales)
4	Two	Concepts	2013 DMI ADMC (Cambridge, UK)
5	Three	Concepts, Content, Context	2015 Design Principles and Practices (Chicago)
6	Four	Context, Concepts	2015 Policy and Politics Conference (Bristol, UK)
2-6	One-Four	Content	2016 DMI ADMC (Boston)
2-6	One-Four	Concepts, Content, Context	2018 World Design Summit (Montreal)
9	Seven	Utility of the Model	Questionnaires + Interviews with 6 Stakeholders

Analysis

Key learnings and feedback from all engagements fed into the evaluation and analysis of results and also raised considerations related to the development of the design-in-government model from the practitioners who would in fact be using it.

As the researcher presented results to stakeholders, academics and thought leaders, and attended related knowledge sharing experiences and workshops with industry, feedback and insights were recorded manually through notetaking (

Figure 3-6) either during or after the engagement.

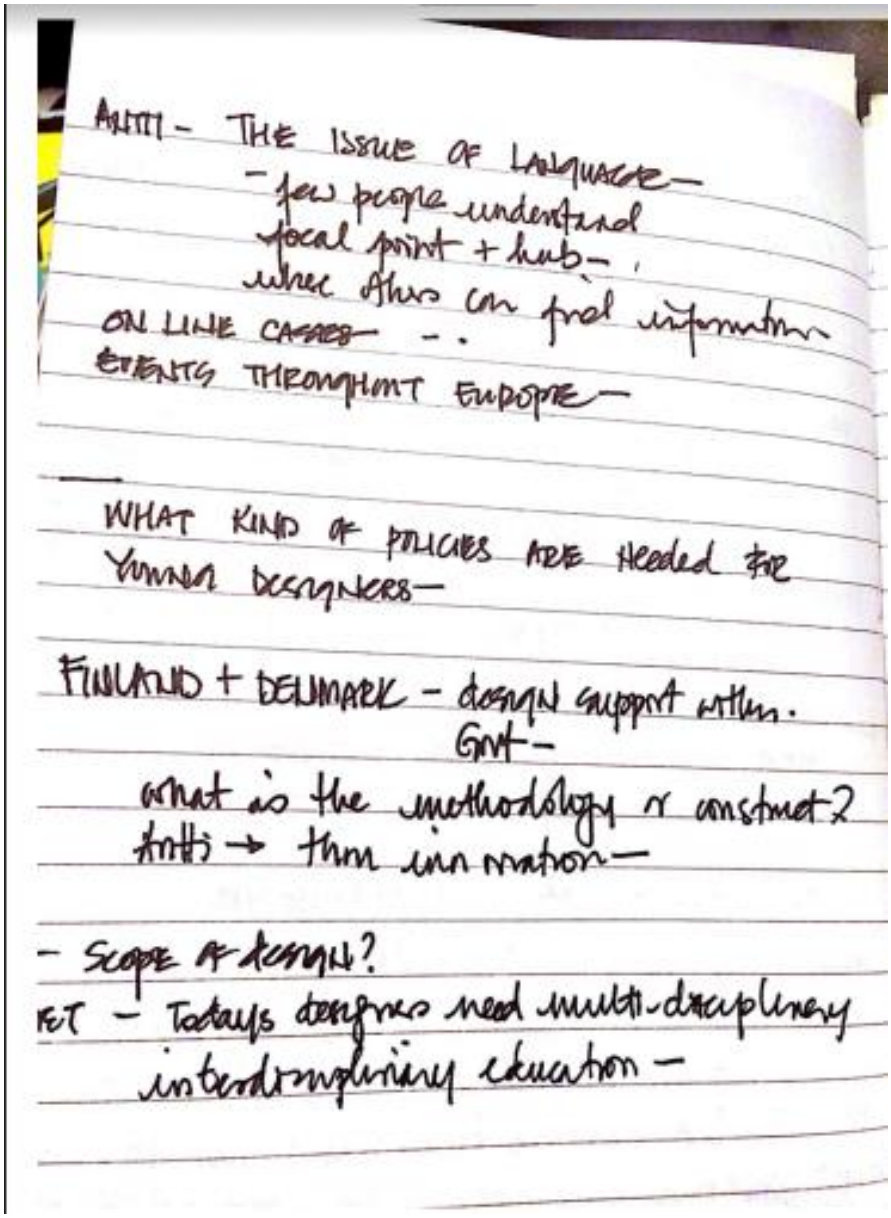


Figure 3-6 Example of notes taken during conference feedback.

The results were rationalized according to the categories of results as evaluation criteria. For example, does this information relate to the research context, content about what design is and does or does it inform clarification about the concepts relevant to this research, or the communication of results? Outside of these categories, some research feedback served to inform the research direction.

Schön (1983) distinguishes between reflection that occurs during an event and after an event as “reflection in action” and “reflection on action”. Reflection in action relates to reflecting on behaviour as it happens as opposed to reflection

on action, which is to reflect after the event, including to review, analyze and evaluate the situation.

The term “knowing in action” is also introduced by Schön to describe tacit knowledge. The author explains the concept as a reflection on “the stuff at hand” (ibid).

> “There is some puzzling, or troubling, or interesting phenomenon with which the individual is trying to deal. As he tries to make sense of it, he also reflects on the understandings which have been implicit in his action, understandings which he surfaces, criticizes, restructures, and embodies in further action. It is this entire process of reflection-in-action which is central to the "art" by which practitioners sometimes deal well with situations of uncertainty, instability, uniqueness, and value conflict. (Ibid.)”

Bould and Walker (1998) concur underscoring that

> “When a person is experiencing something, he or she may be implicitly learning; however, it can be difficult to put emotions, events, and thoughts into a coherent sequence of events. When a person rethinks or retells events, it is possible to categorize events, emotions, ideas, etc., and to compare the intended purpose of a past action with the results of the action.”

Notetaking, stepping back from the interactive sequence of events, critically reflecting according to the categories of results from the studies allowed for learning from the experiences.

Summaries of each presentation in terms of what was discussed and tested are included in the results section of Chapter 7 along with the researcher’s reflections on what was learnt from the feedback given and how it was used in the successive stage of the research.

The study results and hence the evaluation criteria equally represent dimensions of the Design-in-Government model developed incrementally at the end of each Phase of the research.

The study results were visualized incrementally at each Phase of the research. Gibbons (1994) notes that the task of modelling addresses knowledge creation for application hence, stakeholder feedback related to elements of the model's construction and visual communication were considered and anlayzed according to the same evaluation criteria and applied as part of the iterative process. The finalized model is prototyped in the next Phase of investigations (Phase Six - Chapter 8).

PHASE SIX

3.4.6 Model Prototyping

This phase of the research is concerned with prototyping the Design-in-Government Model. The task addresses the research aim concerned with formatting the study results for communication to government and other related stakeholders. The study involves the visual synthesis of cumulative study results from Phases One through Four of the research.

Approach

An approach towards modelling was adopted from Maxwell (2013). The process typically develops from concept and logic models to conceptual frameworks to more detailed constructions. The evolutionary process as it relates to this research and its outcomes is outlined in Table 3-32.

Table 3-32 Summary of Research Outcomes by Chapter

Chapter	Phase of Investigation	Research Outcomes
2	One	What Design is within Government
4	Two	Conceptual Image Logic Model • Concepts • Thematic Headings • Philosophical Considerations Conceptual Framework
6	Four	What Design Does within Government

As shown in Table 3-32, Phase 2 (Chapter 4) netted the logic model, comprised of concepts, thematic headings and philosophical considerations associated with the literature. The synthesis of these and other findings related to the research context such as operational and systemic dimensions were consolidated into the Conceptual Framework for Design-in-Government. Within this framing, the thematic area of Design was detailed through a focused review of literature to

examine what design is in this context (Phase One - Chapter 2). Finally, the outcome from Phase Four (Chapter 6) highlighted the finding that multiple dimensions of design can impact multiple areas of government simultaneously.

Foundationally, the Conceptual Framework for Design-in-Government provides the infrastructure for the Design-in-Government Model. Coral and Bokelmann (2017) argue that frameworks are a platform upon which theories and models can be constructed. In their study on The Role of Analytical Frameworks for Systemic Research Design, the authors discuss the benefits of the approach of using frameworks in model building. Noting that,

- frameworks help to organize research and provide a general list of areas or variables that will be used in any type of analysis.
- frameworks contribute meta-theoretical language, which enables scholars to discuss any particular theory or to compare theories. Coral and Bokelmann (2017)

These benefits represent auxiliary contributions to this exercise. Namely, as a model relating to an emerging area of theory (research) and practice it serves as a proposed formalized framing to organize thematic components, contents, concepts, and operations therein.

As a compilation of the related theory related to each thematic area, the model presents the rigor to support a baseline of language to standardize communications surrounding the novel phenomena.

Method

Prototyping or modelling is the principal method being used as the tool to visually synthesise data throughout the research. This is partially due to the professional design background of the researcher but also due to its appropriateness to the design related subject matter and to the aims of the research. The intent is that with each iteration, developmental phases of the research are validated, and the incremental refinements are applied in stages as the research progresses. Prototyping is a method widely used in design disciplines to “explore ideas and

show intention behind a feature or overall design concepts to users before investing time and money in [formal] development (usability.gov)." Prototyping involves the constructing or representation of one or more of the possible ideas explored in the previous phase. It is a convention that is welcomed early in the development process to allow for incremental changes preferably based on feedback gained from users during the course of production.

Analysis

Evaluation and analysis of the individual components of the model was carried out incrementally during the related Phases of investigation through stakeholder input and researcher reflection according to specific evaluation criteria. Table 3-33 outlines the Phases of investigation and related evaluation criteria and stakeholder engagement where results were presented. Evaluation of the model's components was rationalized in order to ensure suitability of it's construction to the target audience in terms of its context, concepts, content, communication and it's utility. As noted in Section 3.4.5, the criteria are based on categories of results from Phases One through Four of the research.

Table 3-33 Evaluation Criteria alongside Phases of the Investigation and Stakeholder Engagements

Ch	Phase of the Investigation	Evaluation Criteria	Stakeholder Engagement
2	One	Content	2014 WIRAD Symposium (Wales)
4	Two	Concepts	2013 DMI ADMC (Cambridge, UK)
5	Three	Concepts, Content, Context	2015 Design Principles and Practices (Chicago)
6	Four	Context, Concepts	2015 Policy and Politics Conference (Bristol, UK)
2-6	One-Four	Content	2016 DMI ADMC (Boston)
2-6	One-Four	Concepts, Content, Context	2018 World Design Summit (Montreal)
9	Seven	Utility of the Model	Questionnaires + Interviews with 6 Stakeholders

Feedback in terms of what was tested and discussed from each stakeholder presentation is included in the results section of Chapter 7 along with the researcher's reflections on what was learnt from the feedback given and how it was used in this Phase of the research.

The prototyping process in this chapter therefore exists solely as a compilation of the components as uncovered throughout the research investigation. The incremental visualization is presented as results in Chapter 8 according to the specific stages of development to illustrate the logic and rationale surrounding its construction.

Chapter 9 reports specifically on the model's utility as a communication tool.

PHASE SEVEN

3.4.7 Model Evaluation

Phase Seven, the final phase of the research is concerned with evaluating the Design-in-Government Model. The study addresses the research aim concerned with communicating the cumulative, visualized research results to stakeholders. Gibbons (1994) notes that the task of modelling addresses knowledge creation for application. As such, the decision to evaluate the model through direct input from targeted interviews with stakeholders was carried out as an approach to validate the utility of the knowledge created to the target audience (Mahdjoubi, 2007). The results form the basis of recommendations toward future modifications to the model and suggest its wider implication and benefit to multiple audiences.

Methods

Interviews, questionnaires, and content analysis were selected as appropriate methods for data collection and analysis to elicit primarily rich qualitative data from the model's intended end users. The targeted interviews were conducted, and questionnaires administered to practitioners spanning design, government, design knowledge transfer and design education.

Interviews and Questionnaires

Interviews are regarded as a valuable tool for targeted data collection in social science research. Alshenqeeti (2014) in his literature review of the interview method, puts forth definitions by Kvale (1996) and Schostak (2006) who define interviews as "a conversation, whose purpose is to gather descriptions of the [lifeworld] of the interviewee" with respect to interpretation of the meanings of the 'described phenomena' (Kvale 1996). They are also regarded as "an extendable conversation between partners that aims at having 'in-depth information' about a certain topic or subject, and through which a phenomenon could be interpreted in terms of the meanings interviewees bring to it (Schostak, 2006 in Alshenqeeti (2014)."

The author also notes the value of interviewing as being a means of building a holistic snapshot of the data collection experience including an analysis of words and views of the participants within a context which permits them to “speak in their own voice and express their own thoughts and feelings” (Berg, 2007). A further value of this method is the knowledge exchange that occurs through the experience. It is characterized as being a mutual one as the scope of learning broadens with the investigator having the freedom to ask for elaboration on answers and the respondent to questions.

Robson identifies four different kinds of interviews including structured, open-ended (unstructured), semi-structured and focus group interviews. The semi-structured interview is described as a more flexible version of the structured interview as “it allows depth to be achieved by providing the opportunity on the part of the interviewer to probe and expand the interviewee's responses (Rubin & Rubin, 2005 in Alshenqeeti, 2014).” Alshenqeeti (2014) recommends on the advice of other researchers that a checklist be used to assist with thoroughness of the process. This “allows for in-depth probing while permitting the interviewer to keep the interview within the parameters traced out by the aim of the study (Berg, 2007).”

Table 3-34 summarizes advantages and disadvantages of interviewing by Brown (2001). Although interviews are identified as being time-consuming and there is the potential for subconscious bias, there is a high return rate and fewer incomplete answers.

Table 3-34 Advantages and disadvantages of interviewing (Brown, 2001)

Advantages	Disadvantages
High return rate	Time-consuming
Fewer incomplete answers	Small scale study
Can involve reality	Never 100% anonymous
Controlled answering order	Potential for subconscious bias
Relatively flexible	Potential for inconsistencies

In light of the advantages and disadvantages, Robson recommends considering the use of more than one method when using interviews. Alshenqeeti (2014) notes that interviews - compared to questionnaires - are more powerful in eliciting narrative data that allows researchers to investigate people's views in greater depth (Kvale, 1996; 2003). With consideration of their mutual strengths and suitability towards the research conditions, a combination of both semi-structured interviews and questionnaires were selected as appropriate for this study.

The semi-structured interview allowed for the scripting of the engagements. This facilitated the time constraints of the study, which was carried out during the Christmas holiday season, interviewing professionals who had limited time and scheduling restrictions due to various personal and professional commitments. Additionally, the requirement to meet virtually, due to the remote nature of the participants for this study (international), provided the flexibility required to engage in more depth on specific questions where necessary. The questionnaire on the other hand, allowed for direct answers related to the model's utility. Both tools were useful in gathering the varied, data need to capture the participant's views.

Analysis

Content Analysis (CA) was selected as an appropriate analytical method primarily due to the requirement to interface directly with stakeholders to capture and assess their perspectives on the model's utility. Content analysis provides an appropriate means by which data derived from interviews with targeted user-groups can be analyzed for its implications in a methodical way. The procedure therefore ensures validity and replicability. Krippendorff (2004) defines content analysis as "a research technique for making replicable and valid inferences from texts [in] the context of their use."

Epistemologically, content analysis takes into account the nature of what the researcher considers to be content for the analysis. Key to the definition are "the operations that define the nature of the content analysis data (Krippendorff, 2004)"; in this case that is taken to refer to the meanings in terms of principles of the CF embedded in the model as artefact being tested. These include the

thematic, operational, philosophical, and conceptual dimensions rooted as components in the idea of the model which were considerations applied in its visualization through prototyping. To this end, Krippendorff adds, “recognizing meanings is the reason [why] researchers engage in content analysis rather than other some other kind of investigative method (ibid).”

The structure of the Content Analysis design includes the following process:

1. The identification of respondents with relevant expertise from the sector and stakeholders.
2. The provision of an introduction and explanation of the purpose and principle of them model.
3. The preparation of a set of questions to ask interviewees. Questions investigate areas including:
    - Model comprehension
    - Appropriateness of format
4. Carry out interviews describing how discussions were recorded.
5. Analysis of data identifying common themes, phrases/text, words.
6. Summarize and tabulate the findings.
7. Reflect on groupings. Consider implications for model layout and design. Discuss.

Parts 1 to 4 of this process are documented below, Parts, 5 to 7 are presented as results in Chapter 9.

Process

1. Identification of respondents

Over the course of the wider study, international connections were made with a range of academics and practitioners engaged within the design-in-government context. Based on that list, 12 possible participants were selected whom the investigator anticipated would be available to take part in the study on short notice. Electronic mail invitations were sent out each to confirm availability. Of the 12, 8 responses were positive. Of the 8, 6 were successfully carried out due

to scheduling conflicts, technical difficulties and challenges coordinating interviews around time zones.

Semi-Structured Interviews with 6 Design-in-Government practitioners spanning, policy making, public service delivery, governance, design education, design research, design promotion, design industry, design knowledge transfer in Canada and Brazil at the local, regional, national, and international levels were conducted. The participants each represented multiple sectors and fields therefore, varied perspectives were drawn from each during the interview process.

Table 3-35 Background of Interview Participants

Participants	**Field/Background**				
	Knowledge Transfer/Research	**Public Sector**	**Design Education**	**Design Industry**	**Other (related)**
P1 - UK	X				
P2 - UK	X		X		
P3 - UK	X				
P4 - Canada	X		X	X	
P5- Australia	X	X			
P6 - Canada		X			Public service delivery
P7 - Canada		X			Public service delivery
P8 - New Zealand	X	X			Public service delivery
P9 - Brazil	X		X	X	

Participants	Field/Background				
	Knowledge Transfer/Research	Public Sector	Design Education	Design Industry	Other (related)
P10 - Jamaica		X			Governance and policy making
P11- USA		X			Governance and policy making
P12- Canada	X			X	
P13- Canada	X		X	X	

Highlighted in Table 3-35 are the 6 participants interviewed and the range of fields their backgrounds represent as part of the data collection.

2. Provision of an introduction to the model

The interview was directed by a script to ensure consistency in the information communicated to participants (Appendix G). The script outlined the purpose and principle behind the model. The script was accompanied by a PowerPoint visual presentation of # slides within which the model was presented followed by the interviewed questionnaire administered in both text and verbally as part of the script.

A manual animation feature was used on the slide containing the model in order to advance the visualization according to its embedded components at the pace of the narrated script.

Figure 3-7 shows the areas of emphasis on the model at the time of the animated prompting.

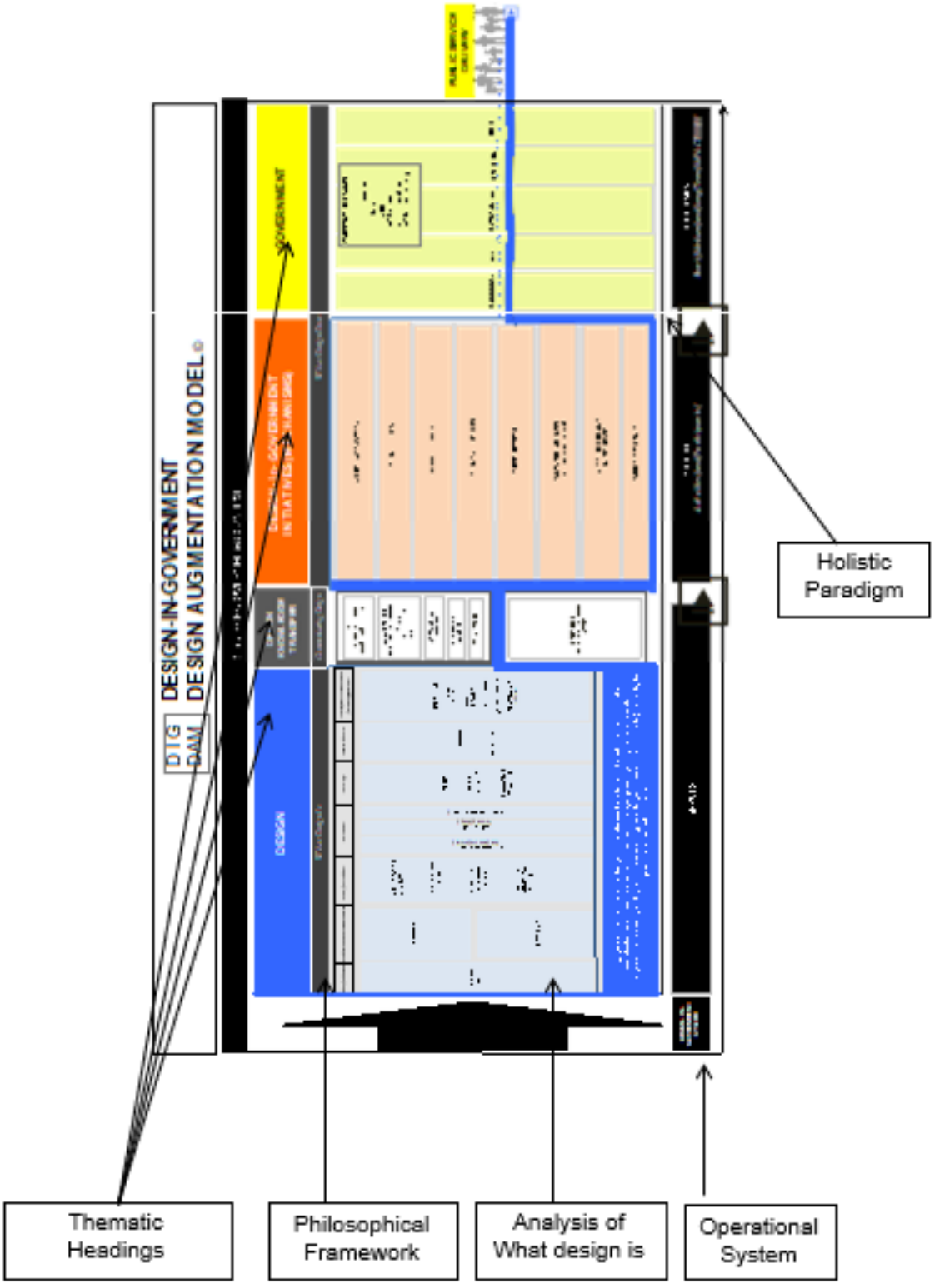


Figure 3-7 Animated model's areas of emphasis

3. Preparation of questions

A brief questionnaire was developed and administered specifically directed toward the models' utility in terms of its visual comprehension through its formatting. The questions were presented directly following the presentation of the model, its background and purpose.

Question 1 addressed the formatting for the target audience and used as scale to obtain a facilitated response. The scale was rated from 1 to 5 with 5 being the most appropriate formatting.

Question 2 was used to determine the most effective communication elements in the formatting.

Questions 3 and 4 were open ended to capture a clear idea of areas for refinement and to obtain the participants general impressions.

A copy of the questionnaire slide is presented below as Figure 3-8 Questionnaire Slide.

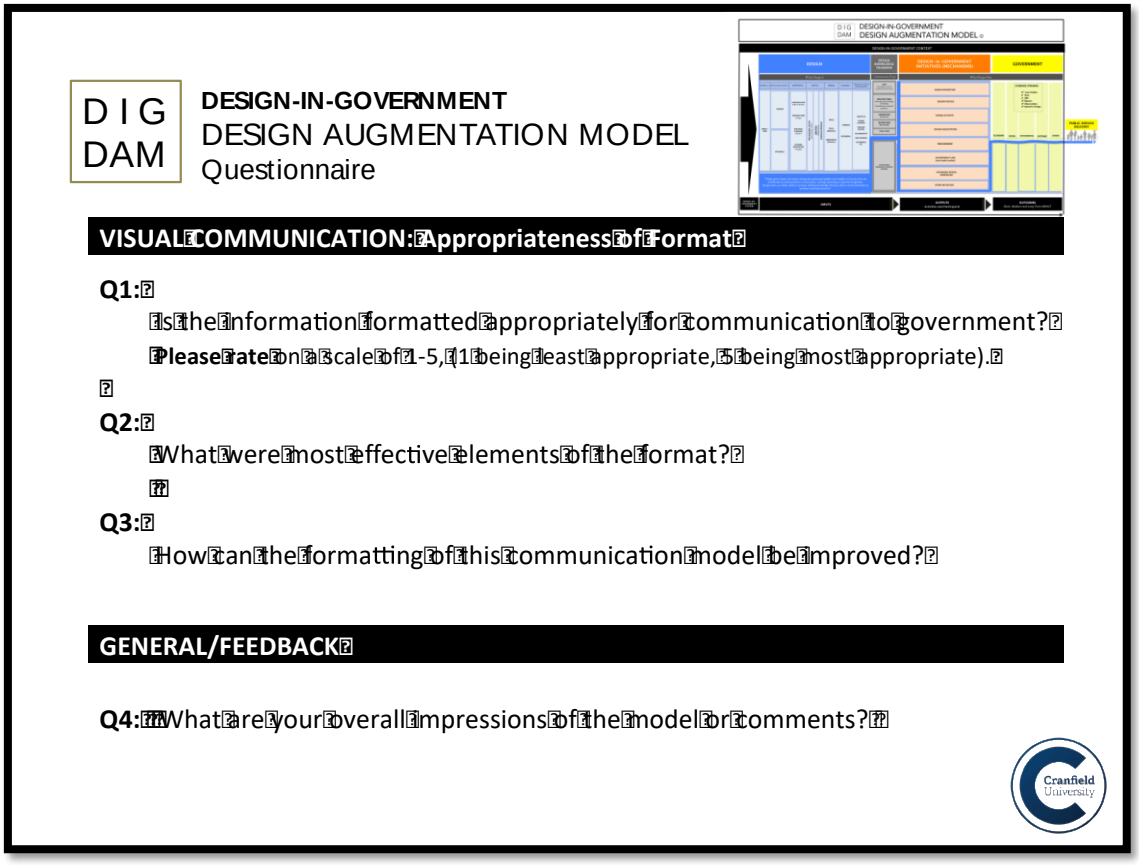


Figure 3-8 Questionnaire Slide

4. Interview process

Interviews were carried out over a 2-month period. Due to the remote nature of the participants, in person interviews could not be accommodated.

To facilitate the requirement to record the interviews and to present the visual content, the WebEx communications platform was utilized. Meeting requests and confirmations were sent to each participant. Where there were connectivity problems, Skype was used as an alternative tool with an external recording device employed to capture the audio. To facilitate the transcription process, the mp3 audio files were sent electronically to a third-party transcription company to convert into text. A sample transcribed report is available as an appendix to this thesis (Appendix G).

The text was reviewed and analysed for recurring themes reflecting common viewpoints and important recommendations from the targeted user group. These

results are presented in Chapter 9 of the thesis structured as Phases 5-7 of the Content Analysis design.

3.5 Chapter Summary

The methodology for this research was developed in a responsive way influenced by the uniqueness of the problem, a flexible approach taken, and insight gleaned from the experiences of both the audience and the researcher (Cresswell, 2003). The design is highlighted by a careful consideration of the contributing issues of paradigm stance, strategy, and method (Armitage, 2007) where a pragmatic paradigm, iterative strategy and a mixture of appropriate methods inform its development. These methods, both for data collection and analysis were rationalized in careful consideration of the 7 research objectives. These align correspondingly to the Seven Phases of investigations designed to answer the research questions and address the research aims. Practical engagements with stakeholders at the end of each phase of investigation aid in the incremental evaluation of study results and interactions with industry throughout the research process shed light on the evolving, novel context informing the research direction in an insightful and practical way.

Results from the First Phase of investigations was reported on in Chapter 2 to introduce and clarify key terms for the research. Results from the remaining Six Phases are presented in the chapters which follow.

4 ESTABLISHING THE DESIGN-IN-GOVERNMENT CONTEXT

"When ends are fixed and clear, then the decision to act can present itself as an instrumental problem. But when ends are confused and conflicting, there is yet no 'problem' to solve"

Schön, 1982

4.1 Overview

This study represents Phase Two of the overall thesis investigation concerned with establishing the context for the research (Figure 4-1). The study reports on an examination of the design-in-government context through a scoping review of literature.

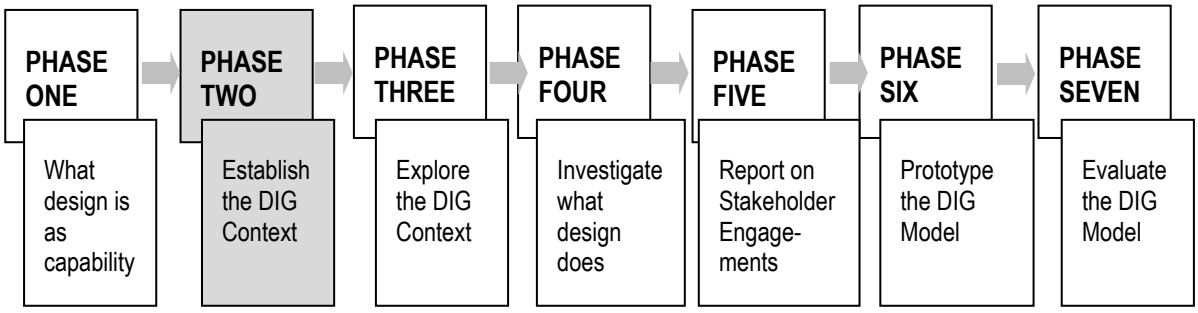


Figure 4-1 Phase of the research investigation. Phase Two highlighted.

The results are presented in 2 parts. The first part examines issues relevant to the nature of the field (Section 4.3.1). It is presented as a narrative summarized according to relevant topics which together give an overview of the key emphases of the research scope. Four themes representing streams in the literature are presented. In the second part (Section 4.3.2), the results include a descriptive mapping of the literature and related evidence according to the revealed themes. The study concludes with the collating and charting of results into a Conceptual Framework for Design-in-Government noting its application to the wider research. Stakeholder input and investigator reflections on the process and product from this investigation are presented in Chapter 7. Finally, findings related to the

methodological contributions of the scoping review exercise are discussed in Chapter 9 of the thesis.

4.2 Purpose

The purpose of this review is primarily contextual in nature functioning as a necessary construct within which to understand and address the research question. As the context also relates to the wider evolving field of research and practice, its broader application and purpose are acknowledged. The two streams of relevance (to the research investigation and to design research and practice) are tracked in terms of application and contribution throughout this chapter.

A High-Level Paradigm

The parameters for this study represent a high-level perspective of the practice and its related literature. The application of framing the interdisciplinary field is that in practice, it aids in identifying the operational elements of and dynamics between its stakeholders. Theoretically, it creates the context within which existing related literature can be placed. For example, much literature exists regarding the evaluation and measurement of design and also concerning national design policies. This thesis does not address the content of those studies specifically, rather it contextualizes those studies, initiatives, and realities which in essence make up the body of knowledge for the field of practice. This study therefore in its quest to investigate design's capability within government also more broadly constructs, situates, contextualizes, and classifies the field, its existing literature, practice operations, stakeholders, case studies and related evidence.

In terms of this study, the high-level perspective situates or contextualizes the research question and thesis investigation. In terms of its wider application to design research and practice, it provides the basis for the establishment of both a new area of research and practice proposing common language, understanding and orientation of the phenomenon. The need for this is critical as the field of

design-in-government is fast growing (Bason, 2013; Kimbell, 2016) and requires the necessary constructs for its formation (Moultrie, 2013).

4.3 Results

4.3.1 Examining the Nature of the Field

An Unstructured Field

Significant insights into the nature of the emergent field of design as it operates in government were identified during the scoping and search phases. Of primary emphasis was the unstructured nature of the field and its literature. This was experienced in the challenge of not being able to directly access the literature through the doorway of a named field or explicit area of research. Influences on the amorphous domain include the novelty of the field, its interdisciplinarity, and the nature of the word design itself. Miriam Webster describes design as word having an "unspecified context". This meaning that design is a broad term that requires contextualization. The requirement and importance are expressed by academics and practitioners alike.

Heskett (2005) explains that the word design "is rather like the word 'love', the meaning of which radically shifts dependent upon who is using it, to whom it is applied and in what context (Heskett, 2005)." Similarly, designer Heike Rapp, VP of Product Design at SAP, in a presentation on the *Future of Design and the Designer of the Future*, reiterates that the term design as a concept or idea is context specific. Rapp goes on to explain that the dynamics between design and context as being symbiotic meaning that "design affects context and context affects design (Rapp, 2020) (Figure 4-2)"



Figure 4-2 The relationship between design and context (Rapp, 2020).

Others actively involved in the field experience the practical challenges of not having defined parameters for the political scope of design established in order to facilitate common points of reference when addressing design-related issues within the context of government (European Commission, 2009; APDIG, 2013b). The European Commission's report on Design as a Driver of User Centred Innovation (2009), identified this lack of a framing of the concept of design in a political context to be a barrier in the use of design by governments.

> Design is a broad, multi-faceted concept with unclear boundaries. The broad nature of design is an advantage in many instances, but it does not aid communication with policy makers. As there is no clear understanding of what the design field encompasses, whether it is part of arts and culture, or of business and innovation, design tends to 'fall between two stools', for example by depending on several ministries (European Commission, 2009a).

In addition to the need for clarity in terms of what the field of practice includes, the contextual delineation also functions as a construct for the theory in this area. The requirements to structure the unstructured field therefore have implications for both theory and practice. Love (2002) asserts that it is essential to clarify "the scope, bounds and foci of fields of research and theory-making about [both] designing and designs" (Love, 2002).

In terms of this research, before the research question, "what is the capability of design in government" can be explored, design's association with government must first be established so as to differentiate it from other contexts. The term *design* alone could not be used as it is too general, requiring the need to qualify its context each time it is mentioned in this study, i.e., design-in-the-context-of-government. The task therefore began with the act of establishing the research scope.

As a starting point, the research scope is expressed as an area of focused interdisciplinary overlap between the areas of design and of government (Figure 4-3). This area represents the research setting as well as the specialized area of

practice (APDIG, 2013b). Streams of investigation and contribution in terms of theory and practice are shown as parallel lines through the research scope.

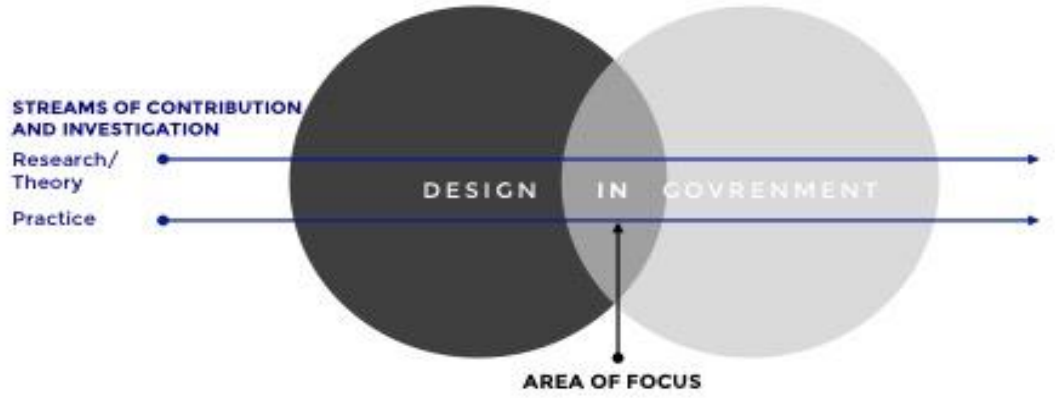


Figure 4-3 The Research Scope showing streams of investigation and contribution. Source: Author.

Although the two spheres presented here are general in nature, the uniqueness of the intersection carries with it a distinct history of application, use, operations, impact, challenges, and perspectives specific to the literature and the experiences of stakeholders directly and indirectly involved in its realm.

The content within this area of focus reflects a consideration of relevant historical events, global trends, industry shifts, theory, researcher insights and reflections that underscore the need for, use and role of design within the context of government, as well as the uniqueness of the interdisciplinary context itself. The examined considerations also shed light on significant terms, core concepts, challenges that are part of this area of research, and dimensions of design use that offer new perspectives and opportunities for exploration in this context.

It is important to note that developments in the use of design have “blurred the boundaries between design and a range of activities (Danish Design Committee, 2011)” including those in public and private sectors. As such, some of the evidence will be explored through design’s existence and related use in other contexts such as the private sector.

The broad nature of the terms design and government establish a high-level perspective for this investigation. This vantage point allows for an interdisciplinary

and holistic exploration in order to understand what is included in and excluded from this context.

The requirement to contextualize the field comes with it the need to collectivize what exists therein including its literature (Moultrie, 2009).

An Inadequately Named Field

Consistent with the tasks of contextualizing and collectivising the field, the high-level vantage point from which this research is positioned required a general term for use as a name for the collective. Starting from a "national design policy" perspective, a preliminary scoping of the search term using an internet database revealed an array of literature with terms being used to describe the intersect of design and government (Table 4-1). The results include terms that describe various dimensions of the field highlighting specific emphases. Areas of focus include the public sector, the public service, governance, and policymaking.

Table 4-1 Terms used in the literature to describe the area of design with government.

Term	Organization	Context/Definition	Source
Design-led government **Design led innovation in government**	C. Bason	Social innovation	https://ssir.org/articles/entry/design_led_innovation_in_government
Public Sector Innovation	Danish Design Centre	Towards Future Welfare There is an urgent need to continue and accelerate innovation from a systemic approach across sectors: health, social issues, and education, and learning. This means including private stakeholders and NGOs to truly release the potential of co-creating a welfare system that produces new value for citizens and our society, as well as to our companies. Our Future Welfare platform will operate in this	https://danskdesigncenter.dk/en/redesigning-public-sector-innovation-new-societal-era

Term	Organization	Context/Definition	Source
		intersection, driving long-term and ambitious change.	
Public Design	C. Bason	Public sector focus. Public sector = part of the economy, controlled by the state. Comprised of both public services and public enterprises (Miriam Webster dictionary	Leading Public Design: discovering human-centred governance Christian Bason, Policy Press, 2017
Design Thinking for Public Sector	Spring 2 Innovation Ottawa	Specific to the use of design thinking and the Public Sector	http://www.spring2innovation.com/services/public-service-of-tomorrow/
Public Service Design	Various/ Open Innovation Lab, MindLab (Denmark), Think Public	Service Design – focus on service delivery	
Design for Public Services	IDEO, NESTA	Focus on service delivery	https://www.nesta.org.uk
Design Policy	Raulik-Murphy and Cawood, 2009	Design policy can be defined as the process by which governments translate their political vision into programs and actions in order to develop national design resources and encourage their effective use in the county	http://www.designforeurope.eu/news-opinion/what-design-policy
National Design Policy	Various	Policy focus	
Design in Innovation Policy	Various	Innovation policy focus	
Government by Design	McKinsey and Company	"Four principles for a better public sector" Focus on Governance (government performance and decision making) and "Public sector management	https://www.mckinsey.com/industries/public-sector/our-insights/government-by-design-four-

Term	Organization	Context/Definition	Source
			principles-for-a-better-public-sector
Design in the public sector **Public sector Design**	Design Council	Public sector focus. Public sector = part of the economy, controlled by the state. Comprised of both public services and public enterprises (Miriam Webster dictionary)	https://www.designcouncil.org.uk/what-we-do/design-training-and-education/design-public-sector https://www.local.gov.uk/our-support/efficiency-and-income-generation/design-public-sector

The recognition of the diversity and inconsistency in the range of names used, constitutes the identification of a fundamental need/gap – the absence of a universal name for the emerging area. A term that takes into account all of the existing and varied areas of focus, modes of application and dimensions of design used.

Naming the emerging interdisciplinary field serves several other fundamental purposes:

- It fosters universal communication and understanding about the field.
- It helps to affirm the areas' existence as a discipline
- For the purpose of this research, it aids in drawing a line around this specific area of design research and practice, isolating from other non-related areas in order to evaluate it.
- It provides the necessary construct for the proceeding literature review.

Naming is also an important endeavour in declaring being and existence. Philosopher Hans-Georg Gadamer asserted the theory that language determines consciousness. "Being that can be understood is language (Gadamer, 1960)." Departing from the ideologies of his pre-WW2 contemporaries including Hume, and Kant, Gadamer's notion of the nature of human understanding and language were explained through his theory of Hermeneutics in his book *Truth and Method*.

> If I have no name for something, it does not “exist” for me, so existence, or failure to exist happens within language. Without language, there is no understanding, and language is a product of history and culture. Language is about communication. It is about transferring, aggregating, and processing information. The ability of language to perform these functions depends on the skill with which its users understand each other in any particular case. Language determines consciousness; and this determination depends on how well people have communicated. (Roberts, 2002)

The issue of naming, existence, language, and communication are intrinsically linked.

In this research therefore, where the areas of design and government intersect in the research scope will be referred to as the *‘design-in-government’* domain. It will represent not only the naming for this research context but also a proposed name for the area of research and practice as a discipline. In so doing, as aforementioned, the affirmation of the areas’ existence as a discipline is declared.

The word *‘in’* is being used linguistically, as a preposition of place, meaning *inside,* to show the relationship between the domains of design and government. This opposed to the preposition *‘for’* unsuitably implying design ‘*with regard to’* or ‘*on behalf of* ‘government.

The task of collectivization in this case implies the inclusion of design as a field along with its related theories, approaches, history etc. The UK’s All-Party Parliamentary Design and Innovation Group, a cross-party coalition of Parliamentarians and design sector organizations (APDIG website), argues that the task of viewing the field in this unified way is a challenging one but a necessary aim if design in this context is going to be defined and presented accurately to government. Moultrie (2013) comments on the need for collectivization of the field in order to measure design’s impact, identifying the difficulty of the task.

> Classification is needed to enable measurement. Measurements is needed to provide evidence. Evidence is helpful in informing Policy. Meaningful classification is therefore a prerequisite of sensible policy. [To accomplish this] we need to be somewhat precise about what is, and what is not, 'design'. We need to draw a line around it. And depending on where that boundary is placed, some people will be happy, others not – which makes it a difficult conversation to start. – However, together, these data sources might enable a story to be told if we could establish boundaries to determine what is and what isn't design (Ibid).

The collectivized title, *design-in-government* reflects first and foremost, the isolation of design within the context of government as well the functional and theoretical relationships that exists between the two spheres. These relationships will be examined further in the review process and throughout the entire thesis to include: the related literature, activities, participants, and operations representing the consolidated, related body of theoretical ideas and practice operations from both domains.

The proposed title also speaks to the prevailing dimensions of design which have become synonymous with design use in government. Service design, design thinking, and graphic design are aligned alongside other potential design offerings under the design-in-government umbrella.

Unclear Terminology

Another identified challenge associated with the nature of the subject matter and its literature surrounds complexities in core terminology relevant to the research, including the terms design, capability, and government. Each term is examined for clarification in Chapter 2 of this thesis.

Thematic Streams in the Literature

As identified in the scoping and search phases, similarities uncovered in the nature of the literature retrieved were captured as 4 distinct themes. The retrieved literature was mapped and distributed according to these thematic streams of content (Booth et. al., 2012). The thematic headings include literature relating to:

1. **Design**: (as it relates to government).
2. **Design Knowledge Transfer**: the transfer of knowledge from the domain of design towards government.
3. **Design-in-government strategies**: Mechanisms used to integrate design into government.
4. **Government**: including its various segmentations including the system of government, areas of government impact, value, and effectiveness.

Descriptors for each thematic area were developed to clarify criteria required for the classification and summarization of literature (Table 4-2).

Table 4-2 Descriptors for Thematic Areas of the Literature

Descriptors for Thematic Areas	
THEMATIC AREA	**DESCRIPTOR**
DESIGN	The thematic area of design captures the notion of design as capacity, potential and resource as it relates to the area of government. It includes a macro view of design including its theoretical and practical dimensions.
DESIGN KNOWLEDGE TRANSFER	The literature within the thematic area of *Design Knowledge Transfer* is concerned with components of generating and moving the information of *what design is* and *does* (in this context), as knowledge through to government. In this regard its purpose deals with knowledge generation, facilitating "understanding" of design, it's nature and potential and managing that knowledge toward government
DESGN-IN-GOVERNMENT STRATEGIES	The area of Design-in-Government Strategies is concerned with the various mode or mechanisms used to integrate design into government. These include National Design Policies (NDP), regional design policies, innovation policy/programs, support programs, agents, enthusiasts,

Descriptors for Thematic Areas	
THEMATIC AREA	**DESCRIPTOR**
	labs, etc. and occur at various levels of government as well as between countries (Raulik-Murphy,2009). The area includes the various activities involved such as procurement programs as well as the participants involved, and the reports or document produced (e.g., regional policy).
GOVERNMENT	The thematic area of Government is concerned with areas of design impact, effectiveness, or value within government.

4.3.2 Operational Relationships Between Themes

The review of literature within these thematic areas revealed functional relationships between the categories. The relationship was deemed to be a systemic one where specifically the scope of *design* as capacity moves towards *government* as resource. The themes of *knowledge transfer* and *Design-in-Government strategies* deals with facilitating the communication and integration of design as resource accordingly, to government. The operational relationships determined the placements of the themes accordingly. The notion of a systemic relationship within the design-in-government context is explored by other researchers within this context (Moultrie, 2010 and Whicher, 2016, SEE, 2015). However, none approach the notion from a holistic perspective of the context. The thematic categories here relate not only to practice dimensions, but also design competencies, the dynamics of which function as inputs, outputs, and outcomes within the design-in-government context.

Figure 4-4 shows the systemic relationship between the design-in-government thematic headings as inputs, outputs, and outcomes in the design-in-government system.

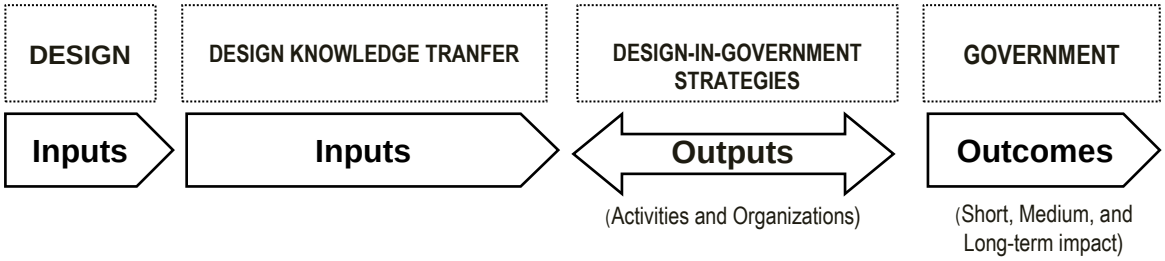


Figure 4-4 Relationship between DIG thematic headings and systemic components

4.3.3 Exploring Meaning in Design: Philosophical Considerations

Both design theory and practice recognize the foundational role those philosophical underpinnings play within the domain of design. These thoughtful ideals are intended to give design meaning. They are reviewed in this context to explore philosophical foundations for the research.

The field of design philosophy, although not fully established, is one that is cross-disciplinary in nature (Galle, 2002). As such it allows space for philosophical reflection for this research whose starting point for looking at design has been established as a broad one.

Searching for design meaning in the context of government is not a straightforward task. History has taught us in the area of design to either rely on subject matter "experts" to prescribe meaning on our behalf, for example, to art, artefacts, and the like; while at the other end of the spectrum, in contemporary times, we are directed to simply allow the subject matter to speak for itself.

All things being equal it might be prudent to approach it from a middle ground by allowing some of the literature to set parameters for our analysis as it relates to design-in-government. This followed by the testing of those parameters through real-life case study exemplars.

As previously indicated, the relevant paradigm for this research has been established as a holistic one acknowledging the tangible and intangible dimensions of design as well as its philosophical position as an agent that facilitates change (Simon, 1969). Aristotle equally identified the duality of art's

tangible and intangible dimensions adding that its aim “is to represent not the outward appearance of things, but their inward significance (no date).”

The recognition of design as having significance, meaning, purpose is a core aspect of its nature; a reflection recognized in design practice from design as artefacts (Kroes Houkes et al.) through to domains such as engineering design (Bucciarelli, 1996). This holistic understanding of design meaning is also explored philosophically in design theory. Maholy-Nagy’s (1947) philosophies assert the reality of the ‘indivisible nature of design’; a declaration of the inseparable dimensions of *what design is*, *what it does* and the wider context within which it finds itself. Design is contextual, evidenced by the need to isolate it’s definition depending on the context within which it exists (Ashton, 2007) e.g. “as the specification and expression of organizational and material forms in science and technology, or as an aesthetic perception in art (Fry,2009)”. These manifestations of design will be explored in the wider thesis. However, this information gives us further insight into the totality of design’s nature in a general sense. We can consider that these elements together (what design is, what design, does and its context) contribute to the entity that we regard and identify as ‘*design*’. Galle (2002) concurs, presenting his editorial introduction of the philosophy of design and design research from the perspective of and within the infrastructure of *what design is* and *what it does*. These kinds of philosophical reflections as they relate to design, he notes, “serve to help guide and suggest how the designer comes to understand what he is doing, and not simply how he comes to do what he is doing (Galle, 2002)”. Design in the context of government is inherently inward and outward facing; inward relating to how it informs its own identity as a practice, ability etc. as well as its outward association with and toward government. The mode by which design is transmitted outwardly is through some method of communication. The conceptual framework indicates this modality in operation referencing both tacit and explicit (Polanyi, 1966) means of communicating design knowledge thorough to government.

Heap et al., (2001) as well as Dilnot (1984) discuss this insight noting the importance of communicating design as being equally important as what design

is and what design does. As a reflection, these revelations personified as one, create a clearer picture of designs nature giving us a general idea of the core components of design meaning (Figure 4-5).

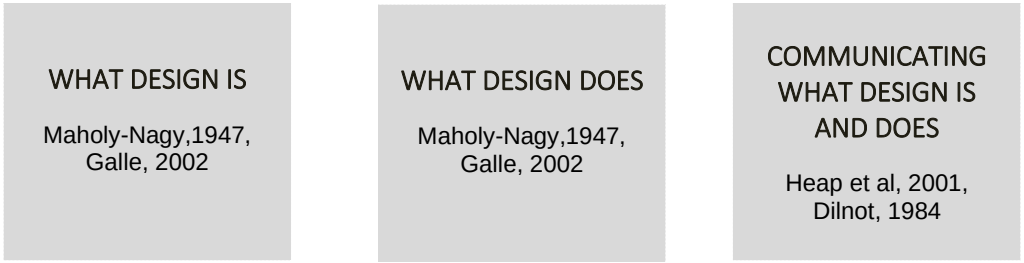


Figure 4-5 Elements of Design Meaning

Synthesized with the thematic headings, these components add a dimension of meaning the design-in-government context (Table 4-3).

Table 4-3 Thematic Headings Mapped Alongside Philosophical Considerations

THEMATIC AREAS	DESIGN	DESIGN KNOWLEDGE TRANSFER	DESIGN-IN-GOVERNMENT INITIATIVES	GOVERNMENT
PHILOSOPHICAL CONSIDERATIONS	**WHAT DESIGN IS** **Maholy-Nagy,1947, Galle, 2002**	**COMMUNICATING WHAT DESIGN IS AND DOES** Heap et al, 2001, Dilnot, 1984	**WHAT DESIGN DOES** Maholy-Nagy,1947, Galle, 2002	

Table 4-3 illustrates the synthesis of the philosophical considerations according to the research themes in a form of a Logic Model. As an exercise in sensemaking, the mapping shows the development of the area of Design being concerned with exploring what *design* is in the context of government. Although it can be reasoned that *design* can be understood by what it does, its identification in application is determined first by establishing its identity. Hence, the logical placement in reflection is according to the prescribed mapping. As indicated, validation of these element will occur through industry engagement (Chapter 7) as well as through the triangulation of research data in the thesis (Chapters 5 and 6).

Hence, it is from this philosophical stance that the research will proceed, ensuring that *what design is*, *what design does* and that it is *communic*ated to government is considered as part of the research aims in order to validate it's meaning in the context of government.

Independent of this work, the proposed philosophical considerations act as a foundational element in design-in-government research and as such are considered to be a contribution of knowledge.

4.4 Mapping the Field and its Literature

Consistent with the objectives of this chapter, this section is concerned with collating, summarizing, and reporting the results of the scoping review of literature. Specifically, this section maps literature related to the design-in-government context according to themes uncovered during the initial phase. The themes represent related streams of though in the literature.

The mapping and distribution of the literature accordingly was useful to inform the next stage of the search strategy (Booth et. al., 2012) which involves an analysis and visual synthesis of study results.

4.4.1 Design

The thematic area of design captures the notion of design as capacity, potential and resource as it relates to the area of government. It includes a macro view of design including its theoretical and practical dimensions.

The literature revealed complexities in the word "design". Equally the thematic area of design as it relates to government is complex and diverse. There are a spectrum of capabilities covered by the term "design" (Heskett, 2005) including all dimensions of design as profession, design education, design research, design as ability, as well as the tools, history, philosophy and theory therein. As an area, it functions as inputs into the design-in-government system of operations (Table 4-14). Conceptually, the area of design represents a potential resource of capacity and impact towards government (Chapter 4.5). An understanding of "what design is" in this context is required (de Leon, 2013; Zitkus *et al.*, 2018).

A deep dive into the thematic area of design was conducted in the wider research (Chapter 2) to investigate its identity, scope and reach as capability within the design-in-government context. The investigation was explored from theoretical and practice perspectives in Chapters 2 and 5 respectively employing the use of Table 4-4 to guide the investigator in the data collection. Table 4-4 summarizes the results from this study under this thematic heading.

Table 4-4 Thematic area of *Design* – Scoping Review Summary of Findings

Thematic Heading	**DESIGN**
Operations (DiG System)	*Inputs*
Philosophical Consideration	*What Design is*
Descriptor	• General design philosophy, history, theory and criticism • Concerned with the practice (knowledge + skill as well as the design industry and interdisciplinary perspectives) • Concerned with design as capability?
Areas included	**General:** • Design Philosophy • Design History • Design Theory • Criticism • Definitions
	Concerned with design as practice, and industry: • Practice (disciplines by boundary) – AS PRACTICE vs. in practice – (Kimbell, 2016) • IN PRACTICE (Kimbell, 2016) – Skills, knowledge etc. – i.e., practice outputs (communication, object, action, thought – Buchanan, 1998) • Industry (collective)

	Sub-Disciplines and Interdisciplinarity:
	• Design Research
	• Design Strategy
	• Design Management
	• Design Value (Heskett)
	  ○ Economic
	  ○ Social
	  ○ Environmental (Sustainable)
	  ○ Systemic
	• Social Design – Dilnot

	Design as Capability/ Design Capabilities • (SEE, DeEP, Moultrie,)
Sub Questions	What is design? What is design in this context?

4.4.2 Design Knowledge Transfer

Communicating Design

The uniqueness and peculiarities concerning design knowledge and its communications as theorized by author Clive Dilnot (1989) were important reflective considerations for this research. Specifically, that:

1.Communication about design policy is not only about design but how design relates to all the elements associated within the jurisdiction of government.

2.Explication about design (what it is) beyond the disciplinary persona is vital.

3. A design vocabulary, a conceptual language to ground our arguments is vital to facilitating understanding.

In terms of this research Point 1 highlights the emphasis on relationship between the thematic areas of design, design knowledge transfer and of government. Specifically, communication bout design in this context is not only about what design is but how it relates to each area of government.

Point 2 highlights the requirement to communicate design's identity beyond its known disciplinary persona. Dilnot (1983), in his study exploring the "social and political implications of design policy, introduces the concept of "the impasse in design understanding." The concept relates to the divide between the abstract mode of reasoning behind design activity that "does not reveal the richness of the design process or the design activity in any conceptual terms that can be used to justify design or to ground design policy decisions."

In some instances, design use in government is applied according to the regard, as profession or the concrete design activity associated with its professional delineation – that is to say the act of designing (Gertler and Vinodrai, 2006). An example would be government use of service design, interior design, or graphic design services to achieve specific goals. Here however, and as it applies to design policy, Dilnot addresses the abstracted elements of the profession and the

need for its illumination. Design, its process, activity, ways of thinking, approaches to solving problems and evidence-based practices that are intrinsic parts of design's identity.

Finally, to communicate this information, facilitate understanding and to ground our augments, the development of a design vocabulary is vial. Here Dilnot notes that "in this context, he notes "explication is vital; the 'resolution of design processes which are at present unclear' is a primary task in constructing a design vocabulary; a conceptual language that can ground our arguments. (Dilnot, 1982)"

In addition to "unclear" dimensions of design including its thinking and processes; the peculiarity, and complexity of design as discipline, competence, and unique nature, involves dimensions of both tacit and explicit knowledge. The distinctiveness of which requires specific facilitation of understanding, ideally from those experienced in its practice, to clarify and translate its application in interdisciplinary contexts. Mollie Ruskin, designer for the United States Digital Service, stresses that the role of the designer working within government is not only to clarify meaning but also to "demystify what design means and make real and tangible what is possible (Ruskin and Teal, 2016)".

The literature points to a number of ways information about design is communicated to government.

Through labs, within and independent of government, design firms, consultants and practitioners, academia, think tanks and "trained' government practitioners; information concerning what design is, what design does, design's impact, value, ways of integrating it into policy and role as an integral part of innovation are communicated.

The information is communicated through physically engaging with design (as object, communication, process, approach), design services, the informant, and through knowledge transfer at workshops, conferences, meetings.

Table 4-5 charts the anatomy of design communication in this thematic area as evidenced though the scope and search of literature.

Table 4-5 Design Communication in the Design Knowledge Transfer Thematic Area

Design Communication in the Design Knowledge Transfer Thematic Area		
Categories	**Examples in the literature**	**References**
Who	Labs Industry firms and practitioners Academia Researchers Think Tanks…. Governments themselves	
What	What design is, what design does, design impact, design value, how to integrate design into policy, the value of design in innovation	
Where	Conferences Workshops Other	
How	Print and digital material including reports, journal papers, monographs, Graphic images, concrete objects, built environments and related elements, proposed solutions (through problem solving exercises), revised processes, lectures, conference presentations	
Mechanisms Utilized	Design tools Methods and graphics Objects and environments	

The Knowledge Transfer Communication Path

The literature shows that information about design-in-government primarily is primarily communicated from the domain of design through to government as well as to its users and beneficiaries through public service delivery (Figure 4-6).

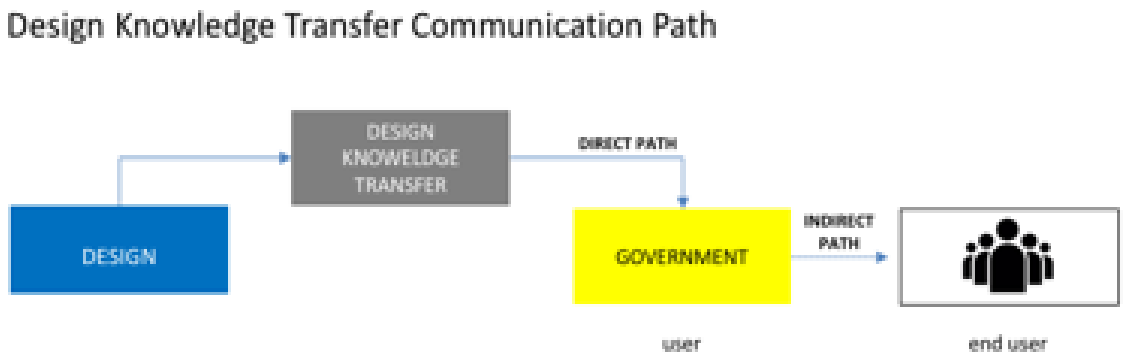


Figure 4-6 Design Knowledge Transfer Communication Path. Source, Author.

Managing Knowledge

As highlighted, the process of moving knowledge from design through to government is an integral part of the design-in-government domain. The complexities associated with managing the movement of knowledge are significant.

Graham et al., (2006), discuss confusion and misunderstandings with concepts relating to moving knowledge to action. Described as the Knowledge-to-action process (KTA) and discussed with reference to the health-care field, the discourse brings to light elements of the process and "addresses the need for conceptual clarity" to describe intent. In addition to crafting a conceptual framework "for thinking about the process and integrating the roles of knowledge creation and knowledge application, the authors put forth a glossary of terms and definitions to describe concepts and tasks associated with knowledge translation, knowledge transfer, knowledge exchange, research utilization, implementation, diffusion, and dissemination (ibid.)" (Table 4-6).

Table 4-6 Definitions and Terms in the KTA process (Graham *et al.*, 2006)

Term	Definition and Source
Knowledge Translation	"The exchange, synthesis and ethically-sound application of knowledge – within a complex system of interactions among researchers and users - to accelerate the capture of the benefits of research (for Canadians) through improved health, more effective services and products, and a strengthened health care system." Canadian Institutes of Health Research (http://www.cihr-irsc.gc.ca/e/29418.html accessed Jan 24, 2006) "The collaborative and systematic review, assessment, identification, aggregation and practical application of high-quality disability and rehabilitation research by key stakeholders (i.e., consumers, researchers, practitioners, policy makers) for the purpose of improving the lives of individuals with disabilities."19 US National Center for the Dissemination of Disability Research (NCDDR)
Knowledge Transfer	"a systematic approach to capture, collect and share tacit knowledge in order for it to become explicit knowledge. By doing so, this process allows for individuals and/or organizations to access and utilize essential information, which previously was known intrinsically to only one or a small group of people." Government of Alberta (http://www.pao.gov.ab.ca/learning/knowledge/transferguide/index.html accessed Jan 24, 2006). "Successful knowledge transfer involves much more than a one-way, linear diffusion of knowledge and skills from a university to industry; it depends on access to people, information and infrastructure." UK Particle Physics and Astronomy Research Council (PPARC) (http://www.pparc.ac.uk/in/aboutkt.asp accessed Jan 24, 2006). "Knowledge transfer is about transferring good ideas, research results and skills between universities, other research organisations, business and the wider community to enable innovative new products and services to be developed." UK Office of Science and Technology (http://www.ost.gov.uk accessed Jan 24, 2006).
Knowledge Exchange	"Knowledge exchange is collaborative problem-solving between researchers and decision makers that happens through linkage and exchange. Effective knowledge exchange involves interaction between decision makers and researchers and results in mutual learning through the process of planning, producing, disseminating, and applying existing or new research in decision-making." Canadian Health Services Research Foundation (http://www.chsrf.ca/keys/glossary_e.php accessed Jan 24, 2006)

Term	Definition and Source
Research Utilization	"Process by which specific research-based knowledge (science) is implemented in practice"
Implementation	"The execution of the adoption decision, that is, the innovation or the research is put into practice" (http://www.nursing.ualberta.ca/kusp/rustudy2/glossary.htm accessed Jan 24, 2006).
Dissemination	"The spreading of knowledge or research, such as is done in scientific journals and at scientific conferences." (http://www.nursing.ualberta.ca/kusp/rustudy2/glossary.htm accessed Jan 24. 2006)
Diffusion	"The process by which an innovation is communicated through certain channels over time among members of a social system." (p5)

The results presented in Table 4-6 include a selection of terms, based on a study conducted with "33 applied research funding agencies in 9 countries. 29 terms were identified that are used to refer to some aspect of the concept of knowledge to action." As the information discusses a universal process, the information is deemed to be generalizable across disciplines and countries. Insights are discussed as they relate to the design-in-government context.

Highlighted in the study is the note that knowledge transfer includes the sharing of both tacit and explicit knowledge – an identified characteristic of design knowledge. Also, of note is the fact that "successful knowledge transfer involves more than a one-way, linear diffusion of knowledge and skills." This implies that the movement of knowledge from *design* towards *government* is bilateral, an observation not yet understood through the reviewing of design-in-government literature. In addition, the exchange of knowledge is described as collaborative in nature. Finally of note, Knowledge Translation includes a specific purpose for which it is being applied.

As highlighted by the authors in this study, "some terms are used to describe the entire process, others are used to represent actions or specific strategies taken to cause the uptake to occur." Additionally, as noted in the results of this study, the overall process involves actors including, industry, universities, and research

organizations, as well as the professionals, the tools used, and “products” produced.

The charting of terms and descriptors in this study, inform the development of the themed area of the design-in-government domain by outlining the multiple terms, actors, processes and products involved in the entire or part of the KTA process. It also acts as a starting going to help guide the investigation and understand not only the literature associated with this area but also, operationally what occurs in this field.

Managing knowledge across disciplinary boundaries is an important concern identified by several authors as equally relevant with respect to design in the context of government. Kimbell (2016) for example explores the of the encounter between design expertise and policy making practice, looking specifically at modes of engagement between the disciplines.

Similarly, but with an emphasis on knowledge transfer, Carlile (2004) examines “managing knowledge across boundaries in settings where innovation is desired,” specifically identifying the political interface as one such boundary. The author distinguishes between three complex processes in this context – knowledge “transfer, translation and transformation” putting forth a framework to clarify the process (Figure 4-7).

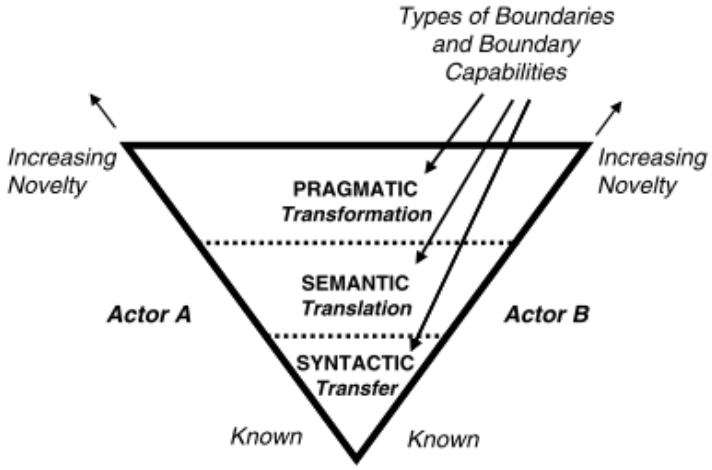


Figure 4-7 An Integrated Framework for Managing Knowledge across boundaries, Carlile, (2004).

Carlile (2004), like other authors, address the issue of semantics, stressing common language, the Knowledge-to-action process (KTA) (Graham et.al. 2006) as well as knowledge creation, design transference and the tools used therein to address the need for conceptual clarity.

Summary

In summary, the literature within the thematic area of *Design Knowledge Transfer* is concerned with components of generating and moving the information of *what design is* and *does* (in this context), as knowledge through to government (Chapter 4.4). In this regard its purpose deals with knowledge generation, facilitating "understanding" of design, it's nature and potential and managing that knowledge toward government.

As uncovered in the scope and search phases, and as summarized in Table 4-7, the literature within this themed area is concerned with theory regarding knowledge, design knowledge and the Knowledge-to-action process (KTA) (Graham et.al. 2006). It includes those involved in the process of generating and communicating design knowledge as well as the unique considerations concerning how design is communicated to others. To this end it involves agents, universities, research groups, labs as well as the tools they use, and outputs produced.

Table 4-7 Thematic area of *design knowledge transfer* - summary

Thematic Heading	**DESIGN KNOWLEDGE TRANSFER**
Operations (DiG System)	*Inputs*
Descriptor	• General theory regarding knowledge, Design Knowledge, The Knowledge-To-Action (KTA) process • Includes related actors, tools used, outputs produced, types of organizations (e.g., Research groups, labs, design consultants) • Concerned primarily with Transferring Design Knowledge to Government
Areas included	**Theory:** • General ○ knowledge • Design Knowledge • Communicating Design Knowledge • The Knowledge-to-Action Process

	Includes related actors, tools used, outputs produced, types of organizations
	• Individuals
	  ○ Practitioners
	  ○ Researchers
	  ○ activists
	• Groups/ Organizations
	  ○ Research groups
	  ○ Universities
	  ○ Labs
	  ○ Professional organizations
	• Tools
	• Other
	  ○ Conferences
	• Outputs
	  ○ Reports, papers, workshops tools
	  ○ Design outputs

Further Questions	

4.4.3 Design-in-Government Strategies

The literature points to numerous “strategic modes” (Heskett, 1999) or methods available to integrate design into government noting the absence of a theoretical framework to identify the various modes and to assess their impact (ibid.). Table 4-8 outlies some of the strategies currently in use. The table reflects an analysis and synthesis of evidence retrieved from the literature. Of note are the range of synonyms used for each strategy, the range of strategies as well as the overlapping of elements within each. In effort to make sense of the diverse data, the content is organized into categories of similarities including covert and overt mechanisms. As outputs in the design-in-government system, the data is generally characterized as being activities, participants, or intangible design capacity such as design approaches or methods. The categorizations and content are not exhaustive and are meant to provide a general framework within which the field, it’s operations and literature can be generally classified and understood contextually as it continues to evolve and best practices exchanged (Raulik-Murphy, 2010).

Table 4-8 Summary of Design-in-Government Strategic Modes

Summary of Design-in-Government Strategic Modes					
Design-in-Government Strategies			**Description**	**E.g.,**	**Ref.**
Overt “Design-Led Government”	Design into Policy	Design (in) Innovation Policy		EU	SEE, DeEP
		Design Policies (Local, Regional, National)			
		Procurement			
	Design Support		Various activities and participants: Activists, Associations,		Raulik-Murphy, 2010
	Design Promotion				
	Design Programs			DIAC/ Canada	

Summary of Design-in-Government Strategic Modes					
Design-in-Government Strategies			**Description**	**E.g.,**	**Ref.**
			Labs		
	"Labs"	Design/Innovation Labs			
	Design Practitioners and capabilities (tangible)	Design Managers Specialized Design Firms Design outputs (e.g., the use of a one of design service e.g., Graphic design or service design)			
	Other	Knowledge Transfer Agents			
Covert	Design capabilities (intangible)	Design thinking Collaboration Human/User Centered Approaches E.g., Connected Government			
	Other				

Design Policy

Design into policy is a familiar strategy implemented by governments whereby dimensions of design's capacity such as user centeredness, human centeredness, service design, design programs, design support or design promotion are employed strategically by governments. Raulik-Murphy (2009) defines design policy as "the process by which governments translate their vison into programmes and actions in order to develop national design resources and encourage their effective use in the country." Depending on the policy structure in each country, this may occur at the national, regional, or local levels of

government. In terms of design promotion and support, many countries have a body specifically mandated to promote and support design. Moultrie and Livesey (2009) note that “in some nations however, this role is fulfilled at a regional rather than national level. In other countries, there are no government-funded bodies, but professional associations that have similar ambitions.” When observing the ecosystem of design support, Mortati (2017) identifies that there is a need for both national and regional/local actions to co-exist.

The UK’s Design Council (2020) notes that the emphasis with respect to design policy is primarily on the process than on the dimension of design used. They note that the “process of designing which leads to the creation of an appropriate solution, be it a functional product, efficient public service or public policy that genuinely accommodates the perspectives of people on the receiving end (designcouncil.org).”

In both theoretical and practical contexts, the novel concept of design policy is often misunderstood for Policy Design. From a political perspective, policy design

> “Involves the effort to more or less systematically develop efficient and effective policies through the application of knowledge about policy means gained from experience, and reason, to the development and adoption of courses of action that are likely to succeed in attaining their desired goals or aims within specific policy contexts (Howlett, 2017).”

From a design practice perspective, policy design focuses on “the potential for design to improve the policy development process (designcouncil.org).” This emerging area sees the focus on offering contemporary skills and tools to policymakers through engagement with outside organizations. Contemporary policy design strategies aim to “help civil servants experiment with new approaches, particularly design and data science (ibid.).” Through feedback from recent projects, The UK’s Design Council reports the use of design dimensions such as ethnography, collaboration, and design visualisation as design dimensions being employed in the policy design process (designcouncil.org).

Design action plans

Countries such as England and Denmark have formalized strategic plans aimed at the prioritization of design into government policy. Denmark, in their strategic "Roadmap" to 2020, lays out a staged approach. In it they distinguish between first, second and third generation design policies. First generation policy emphasizes "awareness of the potential of design for enterprises outside of the design sector" (Denmark, 2011). They view second generation policies as those "emphasizing the dissemination of knowledge on how to use design and, in the Danish case, on creating better-functioning markets for design services (Ibid)." With a view to 2020 they aim to be a fully integrated 'design society', the current formulation of third generation design policies, "emphasizes the use of design as an important tool for cultivating innovation and meeting societal challenges (ibid)".

Design Innovation Policy

Design innovation policy also known as design in innovation strategy, design-led innovation in government, design into innovation, or design-driven innovation refers to a link between the concepts of creativity and innovation. The premise is that effective innovation should include "design activities to create solutions that are better, more desirable and fit-for-purpose (Innovate UK, 2020). In this regard, design is the approach or methodology by which to do so. Traditional innovation policies do not view design in this regard and as such it is not included as a key element in most national innovation policies.

Design Innovation is a successful concept already realized by leading-edge companies such as Apple who see design as the key to growth and competitiveness. The success in small and medium sized enterprises has influenced countries such as New Zealand, South Korea, Australia, Singapore, Denmark, Estonia, Finland, France, and Latvia, to now recognize design as a factor for innovation in the public sector and in society (Design for Public Good, 2010; SEE, 2014)".

Strategically, design innovation policy is achieved through governments building design into mainstream practice in the public sector or by building capacity for design driven innovation. The European Commission's Action Plan for Design-driven Innovation (2013) prioritizes this task throughout Europe at national, regional, and local levels of government. Their action plan emphasizes that: "A more systematic use of design as a tool for user-centred and market-driven innovation in all sectors of the economy, complementary to R&D, would improve European competitiveness."

Specifically, this strategy involves governments investing in the integration of design into innovation policies and programs and building capacity for design-driven innovation for economic impact. The implementation of same will not only enrich the economy, but it will also increase global competitiveness.

There are several core elements underpinning the design innovation policy landscape. As categorized by DeEP (2014), they are fundamental components in this process. Table 4-9 outlines the interrelated classifications which include policies, initiatives, organizations, research, and reports.

Table 4-9 Categories of design innovation policy, Deep (2014)

Category	Description
Polices	Strategic policy documents that include or reference design innovation, for example, design policy, innovation & growth strategies
Initiatives	Defined policy actions or programmes resulting from policy
Organizations	A body (public or private, regional, national, or European) relevant to design innovation policies or initiatives.
Research	Published, peer-reviewed research and design innovation polices, incentives or organisations
Reports	Other published reviews, assessments etc. of design innovation policies, initiatives, or organizations.

SEE Platform in their 2014 report on Mapping Design innovation Ecosystems, explore ways to develop better policies for design noting a gap between in uptake at the national level as opposed to regional and local policy levels. Their report cites “only a few regions in Europe with design integrated into innovation policy including Central Finland, the Czech region of South Bohemia, Rhone-Alps in France, Central Macedonia in Greece, Silesia in Poland, and Wales in the UK as well as some city strategies including Copenhagen, Lahti, and Ljubljana.

Their conceptualization of the ‘Design Innovation Ecosystem’ is based on the premise that “the design system should not operation in isolation from the broader innovation system (ibid.)” and can serve as a tool to inform design-driven innovation policy. The theory was tested and validated through 23 Design Policy Workshops involving policymakers, designers, SME’s, third sector organizations and academics in 11 Different countries validating

The Design Innovation Ecosystem (Whicher and Swiatek, 2015), maps the capacities involved in this system of operations (Figure 4-8). The components of the model include Design Users, Design Support, Design Promotion, Design Actors, Design Education, Design Research, the Design Sector, Design Funding and Design Policy.

Other Strategic Modes

Where governments do not have or are unable to initiate a formal design policy throughout their system of government, some are considering other means of integrating elements of design into their mainstream operations. Various dimensions of design practice such as service design implemented for specific purposes or design approaches such as design thinking, which aims to change governments’ approach to problem solving, are being integrated though design innovation labs. These hubs are usually created by governments and positioned in-house such as in the United Kingdom or outsourced to specialised consultancies such as in the USA. Regarded as a crucial means of delivering services effectively and efficiently (Livehued.com), targeting systemic thinking, helping governments navigate complex problems and change, these entities

such as IDEO'S Innovation Lab have wider aspirations to "rethink systems" (Finance innovation Lab).

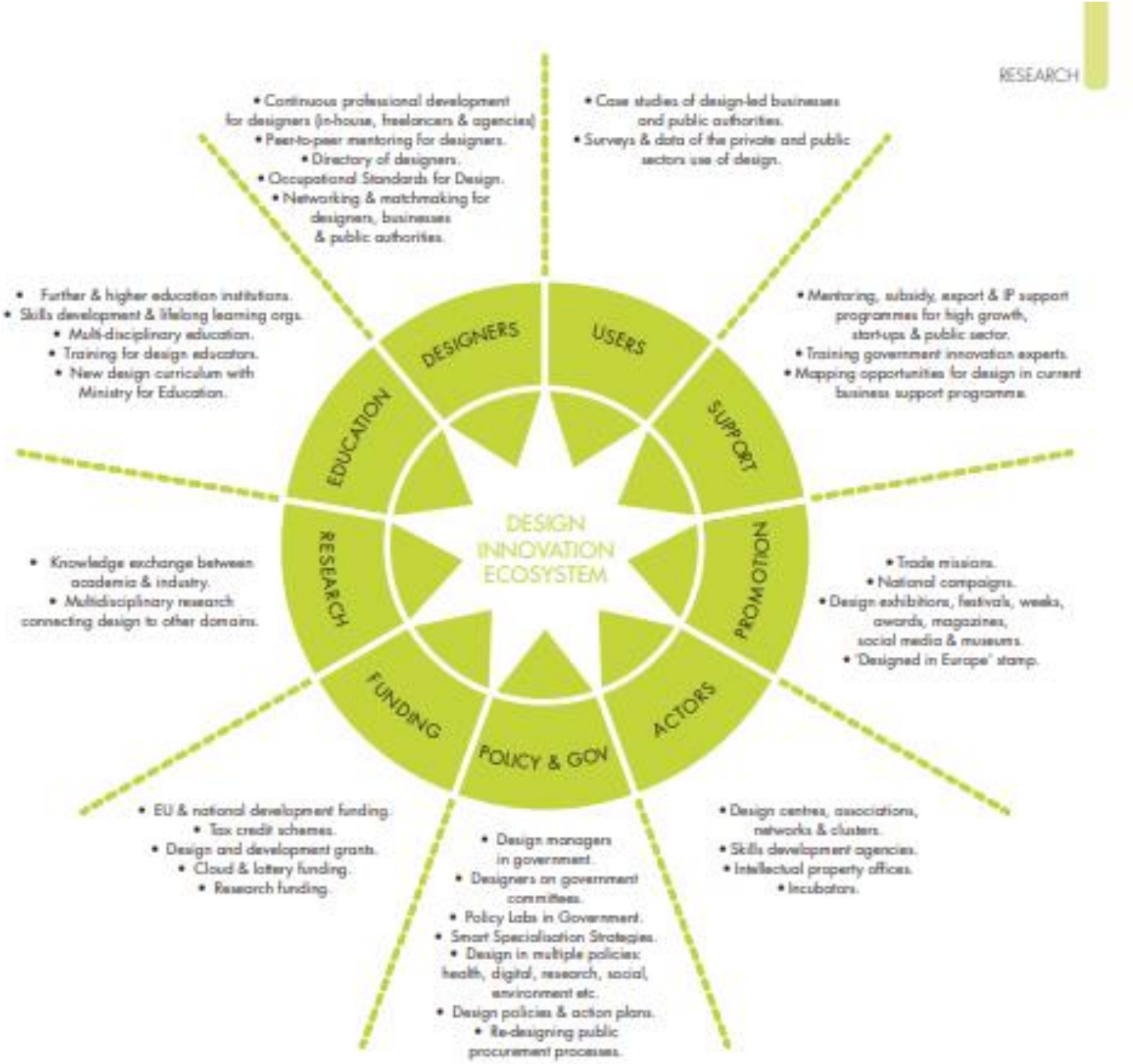


Figure 4-8 The Design Innovation Ecosystem (Whicher and Swiatek, 2015)

Gryskiewicz et al. (2016) put forth the following working definition of this evolving phenomenon.

> An innovation lab is a semi-autonomous organization that engages diverse participants—on a long-term basis—in open collaboration for the purpose of creating, elaborating, and prototyping radical solutions to pre-identified systemic challenges.

Whicher (2019) reports that globally there are more than 100 policy labs highlighting their distinctly collaborative nature.

> "[These] multi-disciplinary government teams developing public services and policies using innovation methods to engage citizens and stakeholders. These policy labs use a range of innovation methods and approaches, including co-production, co-creation, co-design, behavioural insights, systems thinking, ethnography, data science, nudge theory and lean processes. Although the methods may vary, one element is consistent: policy labs actively, creatively, and collaboratively engage the public and a wide range of stakeholders in jointly developing solutions (ibid)."

Summary

The thematic area of Design-in-Government Strategies is concerned with the various modes or strategies used to integrate design into government. These include National Design Policies (NDP), regional design policies, innovation policy/programs, support programs, agents, enthusiasts, labs, etc. and occur at various levels of government as well as between countries (Raulik Murphy, 2009).

The area includes the various activities involved such as procurement programs as well as the participants involved, and the reports or document produced (E.g., a regional policy). Philosophically the area involves the notion of what design does and represents outputs operationally within the design-in-government system, charged with moving dimensions of design through to government.

Table 4-10 summarizes the results from this study under this thematic heading.

Table 4-10 Thematic area of *Design-in-government Strategies* - summary

Thematic Heading	DESIGN-IN-GOVERNMENT STRATEGIES
Operations **(DiG System)**	*Outputs* *(Activities + Participants)*
Philosophical Consideration	*What Design Does*
Descriptor	• General related philosophy, history, theory and criticism • General activities and participants concerned with enabling design into government or placing design into government
Areas included	**General:** • Design-in-Government Philosophy • Design-in-Government History • Design-in-Government Theory • Design-in-Government Criticism

	General activities and participants concerned with enabling design into government or placing design into government
	• Design Promotion
	• Design Support Including Funding
	• Design Enthusiasts
	• Design Activities
	• Related government documents, reports, policies, design-in-innovation policies, and strategies
	  ○ General – About
	  ▪ Criticism
	  ○ Major Reports/Country:
	  ▪ Finland
	  ▪ Denmark
	  ▪ USA
	  ▪ Canada
	  ▪ Brazil
	• Design and SME's
	• Procurement
	• Labs
	• Participants (other)
	  ○ Design practitioners
	  ○ Government practitioners (policy makers)

Further Questions	

4.4.4 Areas of Government Impact

As noted in the focused review of literature on design, consistent with the broad perspective taken toward the concept of *design capability* for the research, the high-level perspective allows for the term *government* to be taken in the same regard. In its general sense the term refers to, the system of government. The view allows for the consideration of a universal and unifying reference to government that extends beyond regional, national, international, and cultural boundaries and that relates equally to service delivery, policymaking, and governance. The consideration allows the holistic perspective of government to be viewed alongside the holistic perspective of design. Within this broad classification, all literature relating to design as well as its potential impact in all areas of government can be considered and categorized.

The classification of government according to a generalized framework is a strategy utilized in many pan-government interventions adopted by organizations such as the United Nations. Strategies such as connected government and enterprise architecture (Saha, 2010), identify and utilize ordered commonalties of countries as foundational baselines of metrics to facilitate efficiencies internally, externally and inter-governmentally. Typically, these frameworks include the distinction of government to include the categorizations of economic, social, environmental, and systemic dimensions.

Similarly, design-in-government literature refers to government in this way generally according to economic, social, environmental, cultural, systemic, and political streams of design's impact. The whole of government framing also implies that the system of government includes not only various levels and divisions (departments) but also the functions of policy making, service delivery, techniques, instruments and methods of governance as well as the system of operations (Bason, 2014).

Design's Value and Potential

The proliferation of global economic, social, environmental, and political crises in our recent history have created the need for new approaches to help

governments solve complex domestic and global problems and re-engineer outdated processes for a future of uncertainty and change. The awareness and articulation of the value of design has been a factor influencing governments consideration of its use.

Occurring equally in public, private, and third-party sectors, design's wider impact, quantifiable benefit and significance in diverse fields and contexts has also influenced a consciousness of its value. The Canadian Design Industry Advisory Committee (DIAC) Design Industry Report (2004) highlights design's value as a significant finding, noting that design "builds global brands, transforms our cities into destinations, makes companies more competitive, enhances quality of life, grow the economy, anticipates future needs and create sustainable communities". Similarly, Gertler and Vinodrai note the broad economic impact of design.

> "The accumulated evidence suggests that design is a critically important source of economic value. It can enhance sales by improving both the functional and aesthetic qualities of a product. It can also reduce production costs, simplify, and enhance the sustainability of the production process, and be used to differentiate and brand products in the market. The discussion below highlights the major findings from recent studies that demonstrate this point clearly (Gertler and Vinodrai, 2006)."

Heskett makes a case for the economic value of design, arguing that the foundation of the growing evidence base begins with the discipline of economics acknowledging design as well as the discipline of design becoming proficient in communicating its economic role (Heskett, 2008)." Regarded as a "pioneering writer and lecturer on the economic, political, cultural and human value of design (Sparke, 2014)," Heskett, examines "the influence of major economic theories in shaping views of what constitutes value as created by design (Heskett, 2008)". His viewpoints have been revolutionary, enabling a "window to business activity that enables designers to communicate the value of their work (Ibid)" and in turn facilitating the recognition of design's economic value by and in both public and private sectors.

The value of creativity has also evolved as an integral component in the way we think, produce and interact in the economic, cultural and geographical realms of life (Florida, 2002). The rise of the Creative Class is marked by societal and economic shifts that favours "individuality, self-expression, and openness to difference" in social and economic contexts.

Florida descries the creative class as the focal point and the capital engine of today's economy; a group of people who are responsible for the production and cultivation of "new ideas, new technologies, and new creative content (ibid)". This applies to a multitude of varying fields such as science, engineering, architecture, design, education, entertainment, music, and the arts.

The identification of the *Creative Class* captures the variety of ways in which creativity has broken into and redefined the workings of our society and our economy as we understand it today noting its newly defined value to these contexts. As noted by Sir George Cox in his UK review of Creativity in Business, "Creativity, properly employed, carefully evaluated, skilfully managed and soundly implemented, is a key to future business success – and to national prosperity (Cox, 2005)."

Similarly, as a way of innovating in government, the opportunity for design thinking in the public sector has been recognized and adopted for its added value. Primarily as an approach for its human centered and user-centered focus, design thinking in this context, prioritizes the end users' needs putting them at the centre of policymaking. The approach also focuses on incorporating collaborative approaches to decision-making and includes Integrative Thinking (Martin, 2007.) abductive thinking and creative problem-solving to work through complex challenges, influence innovative solutions, change government systems and develop policies that are insightful, targeted and effective (Nesta, IDEO, no date). The impact of these competencies within government can produce short, medium, and long-term impact.

Design for Public Good (2010), a collaborative Pan European Report that sees design thinking as a way for governments to innovate and meet the challenges of delivering quality public services in a time of austerity. The Report introduces

The Public Sector Design Ladder - a tool to visualize the application of design thinking at three levels in the public sector (Design for Public Good, 2010) (Figure 4-9). The steps are used in the report as an analytical tool to classify profiled case studies of design thinking in government from Denmark, Finland, the UK and Wales. The steps on the ladder are also presented as a diagnostic tool for governments to identify where they place in in their level of design use.

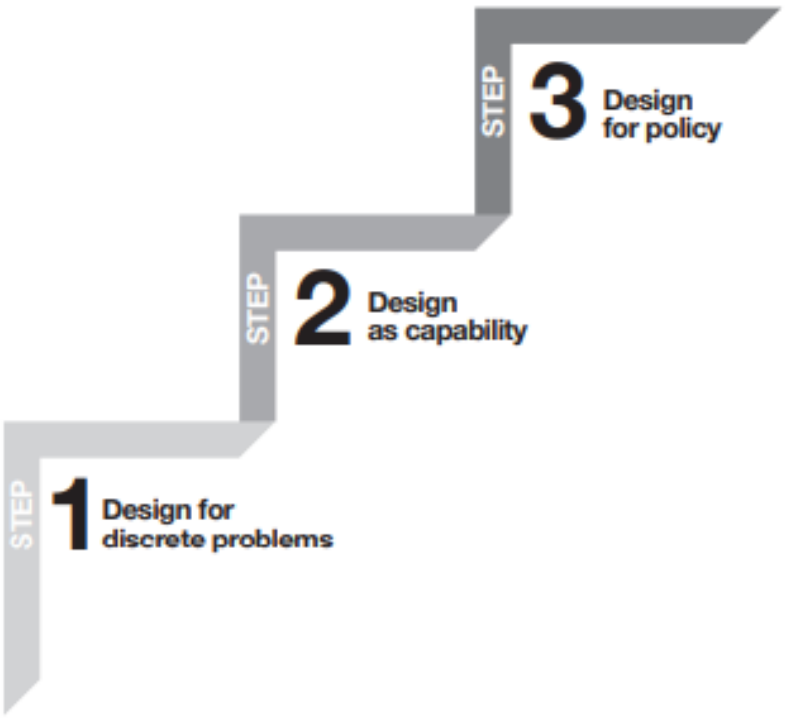


Figure 4-9 The Public Sector Design Ladder, 2010

The steps are described in Figure 4-9 with Step 3, *Design for Policy,* being the optimal goal for the comprehensive integration of design as a way of thinking by government policymakers.

Table 4-11 The Public Sector Design Ladder: Description of Steps

The Public Sector Design Ladder. *Design for Public Good, 2010*	
Step	**Description**
Step 1:	Design for discrete problems design projects are one-offs and design thinking is not embedded in the commissioning organizations. Public sector service design projects, of which there are numerous good examples, fit into this category. Projects can be very small or have wide systemic implications. They can tackle societal problems such as malnutrition among the elderly, violence in hospitals and worklessness, among many others. This category also covers design's application as a way of making technology useful and usable for people
Step 2	Design as capability Here, public sector employees not only work with designers, but they also understand and use design thinking themselves. Many design techniques are easily transferable to non-designers and can create significant efficiencies as part of day-to-day operations. Staff: – use the new skills to solve numerous problems too small to merit the hiring of designers. – gain a shift in perspective in seeing things from the point of view of the citizens they serve. – become more adept at hiring design teams when required.
Step 3	Design for policy Here design thinking is used by policymakers, often facilitated by designers. This is a relatively new discipline and much of the work on it so far has been experimental, but the logic of design's application here is strong given that it meets some key policymaker needs: – A joined up process, from policymaking to implementation – A low-cost way of mitigating risk through prototyping – A way of getting an overview of a system – A way of cutting across departmental silos and engaging people from outside government too.

The report notes the efficacy of the methodology in numerous countries, connecting government at all levels of the public sector, public service and policy with its citizens and providing a vehicle towards innovation (Ibid.).

The documented evidence validates the use of design thinking broadly across the context of government.

Many documents related to design use in government site the various domains of government as potential areas of impact. However, the primary focus in most studies is the economic value and impact.

The Economic Value of Design

In recent history, vast amounts of evidence on an international scale have emerged overwhelmingly supporting the economic value of design. The targeted use of design towards economic goals within and by governments at all levels, is one influencer of this trend.

De Leon (2013) rationalizes this focused use by governments noting their requirement to measure things quantitatively. "For design to be on the policy agenda, for governments of any complexion, requires evidence not just anecdotal. And the source of evidence is the HM Treasury. What is there to measure and why?" More generally, the economic case for design use in government has been made in the face of the changing face of innovation and of global competitiveness.

The Changing Face of Innovation

In addition to its declared value in business and services, the economic case for design involves its recognition and role in the contemporary innovation process which effects a diverse range of sectors. Gertler and Vinodrai (2006) highlight in their review of literature on the critical role of design in the innovation process, that the transformative change away from traditionally recognized research and development activities, is rooted in fundamental influences including the "*cultural economy*, creativity and the *business of design* (Gertler and Vinodrai, 2006)*".*

Its role in the private sector creates patterns for its application in the public sector. Cox (2008) contends its role is primarily that of being "a structured creative process that provides a competitive tool for firms in these various sectors (DTL 2005, Cox, 2008)." Porter (1998) notes design as being fundamental in realizing

innovation which gives companies vital differentiation in the marketplace (Porter, 1998).

Of note in the changing face of innovation is the reality that the innovation system now takes place within a broader context which includes sectoral, regional, and national innovation systems, and within this context, it is widely recognized that "innovation is the outcome of a *social process* involving a range of economic actors (ibid)." Gertler and Vinodrai argue that the profile of the range of actors must be expanded to include a "broader range of highly skilled workers and creative workers in order to capture more fully the nature of the contemporary innovation processes; this away from the traditional capacity of firms including R&D workers, scientists, engineers, or workers in other highly educated occupational categories (ibid).

They acknowledge the influences of the creative and cultural industries as "important sources of innovative products" but also for the creative skills that exist outside of the creative industries as contributors to innovation (Saxenian, 1994; Florida, 2002; Markusen, Schrock and Cameron, 2004). Referencing Florida's (2002) creative class, the list of workers in creative occupations includes:

> scientists and engineers, university professors, poets and novelists, artists, entertainers, actors, designers, and architects, as well as the thought leadership of modern society: nonfiction writers, editors, cultural figures, think-tank researchers, analysts and other opinion- makers. … [as well as] creative professionals who work in a wide range of knowledge-intensive industries such as high-tech sectors, financial services, the legal and health care professions, and business management.

From this perspective and considering the range of contributing factors including people, products, processes, skills and the like, design here, as a economic value is conceived as being "a structured creative process that provides a competitive tool for firms in all sectors (DTL 2005, Cox, 2008)"

Global Competitiveness

The reality of global competitiveness has also been noted as being a key contributing factor to governments' interest in design over the past 15 years. The Global competitive index ranking of countries in terms of competitiveness has created and awareness of the need to innovate for the future in order to stay competitive on a global scale.

The Cox Review on Business and competitiveness (2005) identifies "that strength in design at a national level is necessary for ongoing economic sustainability in the face of emerging economies as providers of low-cost production as well as sources of design (Moultrie et al, 2009)."

Traditionally however, design has not been regarded as factor in innovation and as such has not been included in many innovation policies. The realities of economic and social distress have prompted countries to look for new drivers of innovation and to work collaboratively between sectors to implement change. As articulated in the European Commission's strategic document, Europe 2020,

> "Europe faces a moment of transformation. The crisis has wiped out years of economic and social progress and exposed structural weaknesses in Europe's economy. In the meantime, the world is moving fast and long-term challenges – globalization, pressure on resources, ageing – intensify. The EU must not take charge of its future".
>
> "My recommendations are aimed at what government can do to help bring about a climate that encourages and supports greater creativity. That opens the way for better business performance but doesn't deliver it. The latter can come only from business itself. Government can help prepare the track and remove some of the hurdles; it can't run the race."
>
> "Part of the strength of my recommendations lies in the fact that many organizations are involved in carrying them out: development agencies, government departments, universities and others all have specific roles to play (European Commission, 2020).

National and international commitments in terms of monetary support, action plans, design promotion and policies that encourage participation by private and third sectors are necessary to benefit from design's future impact on global competitiveness.

Other Areas of Impact

Farson's (2008) declaration that "design is a force for transforming everything, which can address the needs of all people, turns the focus of design's potential impact towards other pressing concerns such as social, environmental, and systemic issues. Heskett's claim that "design is a fundamental determinant of the quality of human life is evidenced by the use of design to address challenging social issues such as end of life care in Singapore, and dementia, homelessness, and poverty in the UK. Countries such as Canada have yet to embrace design's "relevance to societal issues such as ageing populations and social exclusion, the catalyzing of better cities, better healthcare, and better service for communities and individuals (Dott07)." Promoting design's impact in various sectors is government through research and case studies as well as through the sharing of best practices by governments is key to promoting design's role in this regard.

Evidence also exists to validate design's role in aiding in environmental and systemic challenges. Spearheading "social and sustainable design based on political awareness rather than consumerism (Scarzella, 2020)", designer, author and activist Victor Papanek in his 1971 book, Design for the Real World "appeals for inclusion, social justice, and sustainability (ibid.)." Years later, the ideals continue to be relevant, embedding itself into the ethos of most design fields which now face a world challenged by environment crisis. Fry (2008) underscores design's role in this regard noting that "responding to ethical, political, social and ecological concerns now requires a new type of practice that recognizes design's importance in overcoming a world made unsustainable."

In terms of design's role in creating systemic change in government, Bason argues that the future of how we run government is at stake. Noting that more needs to be done beyond design approaches being used in government to

innovate public policies and services. By “bringing design methods in play, public managers can lead change, and discover a new model for steering public organizations (Bason, 2017). Summarized in Table 4-12 the thematic area includes dimensions of the system of government evidencing design impact including economic, social, environmental, and systemic domains. Operationally, the impact is taken to mean short-, medium- or long-term impact and represents *outcomes* in the design-in-government system. Philosophically, the area is concerned with what design does in the design-in-government system.

Table 4-12 Thematic area of *government* - summary

Thematic Heading	**Areas of GOVERNMENT Impact**
Operations	*Outcomes* *(Short, Medium, Long-Term impact/effectiveness/value)*
Philosophical Consideration	*What Design Does*
Descriptor	• General System of Government, Public Sector Renewal (includes Governance and Policymaking (Whicher, 2015) • Concerned with the short, medium and long-term impact of design as outcomes into areas of government
Areas included	**General System of Government:** • **Economic** (Porter, 1998; Cox, 2005; Department of Trade and Industry, 2005; Gertler and Vinodrai, 2006; Heskett, 2017) (Thenint, 2008) (Hobday, Boddington and Grantham, 2012) • **Social** (DOTT07, no date; Farson, 2008; (Margolin and Margolin, 2002)) Mindlab, 2009 • **Environmental** (Papanek, 1972; Fry, 2009) • **Systemic** (Bason, 2010, 2012, 2013, 2017; Joyce, White and Lindsey, 2015; Kimbell, 2016) • **Other** ○ Cultural

	Concerned with the short, medium and long-term impact (effectiveness, value) as outcomes into government
	• What is the impact?
	  ○ Case studies (various libraries)
	• Areas of impact?
	  ○ **Economic** (Porter, 1998; Cox, 2005; Department of Trade and Industry, 2005; Gertler and Vinodrai, 2006; Heskett, 2017) (Thenint, 2008) (Hobday, Boddington and Grantham, 2012)
	  ○ **Social** (DOTT07, no date; Farson, 2008; (Margolin and Margolin, 2002)) Mindlab, 2009
	  ○ **Environmental** (Papanek, 1972; Fry, 2009)
	  ○ **Systemic** (Bason, 2010, 2012, 2013, 2017; Joyce, White and Lindsey, 2015; Kimbell, 2016)
	  ○ Other:
	  ▪ Cultural…
	• Measuring Impact (Malvido *et al.*, 2008; Moultrie, 2009; Moultrie and Livesey, 2009)

Sub Questions	What is the impact? Where are the areas of impact?

4.5 A Conceptual Framework for Design-in-Government

Maxwell (2013), in his book on qualitative research designs, provides a comprehensive description of conceptual frameworks.

> [A conceptual framework] is primarily a conception or model of what is out there that you plan to study, and of what is going on with these things and why—a tentative theory of the phenomena that you are investigating. The function of this theory is to inform the rest of your design— to help you to assess and refine your goals, develop realistic and relevant research questions, select appropriate methods, and identify potential validity threats to your conclusions. It also helps you justify your research. The conceptual framework is a theory, however tentative or incomplete it may be (ibid.).

As an emerging field, a related conceptual framework was non-existent. For this research, the development of a conceptual framework will serve as a structural and analytical device to make sense of the retrieved data. For both this research as well as the field of practice, it will aid in a better understanding of the design-in-government phenomenon.

In the realm of design-in-government, design researchers focusing on specific concerns within the context have adopted frameworks from other disciplines or crafted their own theoretical framings related to their specific area of focus (Sun, no date; Terence Love, 2007; Raulik-Murphy, Gisel; Cawood, Gavin; Larsen, Povi; Lewis, 2008; Moultrie and Livesey, 2009; Swann, 2010; Hobday, Boddington and Grantham, 2012; Walters, Whicher and Cawood, 2012). Although currently no designated conceptual framework exists to holistically examine the phenomenon of design in the context of government, insights from the above-related constructs inform the development of a framework for this research and in turn for the evolving area of research and practice.

In their quest to further explore an economic rationale for design theory in innovation, “PDR at Cardiff Met developed, tested and validated the concept of a design-driven ecosystem or ‘Design Innovation Ecosystem’ framework (Whicher

and Swiatek, 2015).” The authors highlight the established theory on innovation systems and its role in informing innovation policy. In their study they explore if Design Innovation Ecosystems can be a useful concept for design-driven innovation policy? The concept of an ecosystem speaks to the nature of the design-in-government context, its interrelationships and dynamic nature in terms of its ability to function effectively and efficiently.

Moultrie et al’s (2009) study focuses on the economic rationale for design in innovation specifically through the idea of measuring design impact. The research identifies the enabling conditions of a National Innovation System as a framework which includes the dimensions of inputs/capabilities, outputs and outcomes (Figure 4-10).

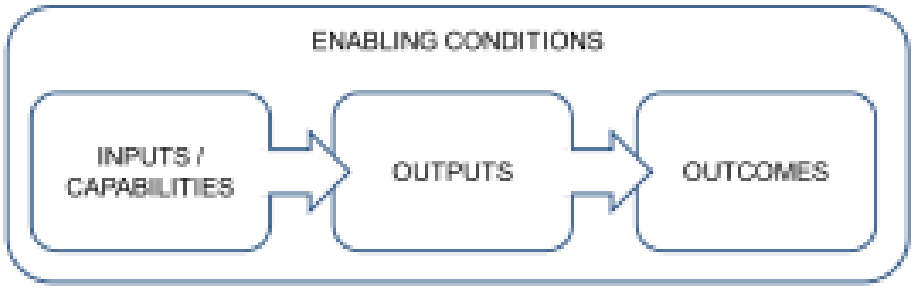


Figure 4-10 Simplified National Innovation System. Source, Moultrie et al., 2009

As described in the study, enabling conditions include: the legal structures, institutions and policies that provide the enabling framework for innovative activity. Inputs include factors relating to long term strength, such as investment in R&D, and the skills of those involved in technology development. Outputs are the direct results of the input investments in either financial or human capital, ranging from technical papers to patents. Finally, Outcomes are the results of those outputs, including exports and the growth of the technology sector (ibid).

As noted by the authors, “the study recognizes that design, like innovation, should be treated as a complex system (ibid);” the identification of which validates similar results in this study identifying the systemic dimension of the design-in-government context. Similar to the Design Innovation Ecosystem framework, the contextual narrowness of the National Innovation Systems deems it unsuitable

for this research. The framework, as the name suggests, and as the descriptors highlight, relates to the specific economic context for design.

The Design Council's collaborative report, *Design for Public Good (2013)*, utilizes their own tool, *The Public Sector Design Ladder* (Design Council, 2013) as a diagnostic construct to frame their analysis of case studies that demonstrate varying degrees of design use within government (The Design Council *et al.*, 2013). The ladder progresses from Step 1 through to Step 3, the latter being the optimal level where design thinking is used by policymakers to overcome common structural problems in traditional policymaking (Ibid.).

Limits of the tool for this research are its use primarily to examine design use (what it does) and not what it is or areas of potential impact. That is to say it is not a holistic evaluation tool. Its elements described in each "step" are valid however in terms identifying of varying dimensions of design use by governments.

Finally, Kimbell (2016) in her empirical exploration of the encounter between design expertise and policy making practice, identifies the gap in design research concerning the absence of a dedicated conceptual framework for design in the context of government. The study involved her role as a participant observant based in a UK government policy lab (Kimbell, 2015). To frame her data collection and analysis, she adopts a framework used in the social sciences that "analyses the encounters between several different fields of knowledge and practice (Ibid)." The framework by Barry et al (2008) pinpoints three modes of engagement between the disciplines as well as three rationales within which theses modes play out (Kimbell 2016).

The modes of engagement between design and policy adapted by Kimbell include:

In *service* mode, one discipline or field being is in service to another to fulfil a need or address a lack with a hierarchical division of labour. For example, design expertise supports policy making by creating visualisations of people's experiences of government services or policies for civil servants to use.

In *partner* mode, two or more fields integrate to combine resources resulting in new ways of doing things, whose value is assessed according to the criteria of antecedent fields. For example, design and policy making expertise are combined into a new hybrid that is recognizable to specialists from each and can be made sense of in existing terms.

In *challenge* mode, one discipline's way of approaching problems and solutions calls into question the assumptions, claims and methods of another. Such interdisciplinary encounters spring from a self-conscious dialogue with, or criticism of, the limits and status of existing fields. Challenges can be antagonistic (in which the tensions are not productive) or agonistic (in which the tensions are productive).

The three rationales within which the modes play out as adapted by Kimbell include:

The first logic is *accountability* – the idea that one field's knowledge base or expertise (for example designers using inventive methods to engage with service users and stakeholders) can help another field to better engage with the publics to whom it is accountable.

The second is the logic of *innovation* – the idea that new kinds of expertise and novel solutions will only come about by going beyond existing ways of doing things. For example, combining aspects of existing fields will generate results that open up the space for future possibilities to emerge.

The third is *re-ordering* – the idea that what a field is made up of and concerned with is not a given and may be changed in the interactions with other specialisms. This results in "new objects and practices of knowledge, practices that are irreducible to previous disciplinary knowledge formations and to accountability and innovation" (Barry et al 2008: 42 in Kimbell, 2015).

Advantages of using the framework are identified including:

- The focus on interdisciplinary and current changes in policy making practice,
- Similarities between the kinds of research practices examined,

- The long tradition of empirical study informing the framework development. (Kimbell, 2016)

Kimbell's study in highlighting the dynamics of interdisciplinary engagement targets the operational or systemic dimension which are inherently part of the design-in-government context. The adoption of Barry, Born and Weszkalny's framework into this study as an integral component is considered as part of the proposed conceptual framework. It allows for theoretical considerations to understand the dynamics that exist therein.

The final consideration in the construction of the conceptual framework for design-in-government is the research problem. Maxwell (2013) stresses its inclusion as part of the conceptual framework partly "because it identifies something that is going on in the world but also because its formulation is a key task in the design of the overall study (ibid)."

The charting of results in this section informs the visualization of the conceptual framework and also creates a clarified understanding of the DIG landscape through the visual synthesis and analysis of results primarily from theoretical insights. Together with elements of the research question, (research problem), the summarized results from this Scoping Review of Literature including the identified structural, philosophical, operational, and conceptual elements/principles are consolidated, tabled (Table 4-13) and visualized (Table 4-14) as proposed Conceptual Framework for Design-in-Government.

Table 4-13 The Conceptual Framework (CF) for Design-in-Government (Principles). Source, Author

The Conceptual Framework for Design-in-Government (Principles):
1. A holistic view of design as it operates in government. This includes thematic, philosophical, operational, and conceptual elements. **A. Thematic:** includes thematic areas of *Design, Design Knowledge Transfer, Design-in-Government Modes of implementation*, and areas of *Government* impact. (Source, Author) **B. Operational:** identifies i) the placement of themes, ii) relationships between them, iii) reflects dynamics of interdisciplinary engagement (Barry, Born and Weszkalnys, 2008; Kimbell, 2016), iv) Identifies the role each area plays as part of the design-in-government system of operations in term of *inputs, outputs* and *outcomes*. (Source, Author; (Malvido *et al.*, 2008; Moultrie, 2009; Moultrie and Livesey, 2009) **C. Philosophical:** involves areas of design meaning involving *What Design Is, What Design Does*, and *Communicating What Design is and Does.* (Dilnot, 1982, 2018; Moholy-Nagy, 1991; Love, 2002) **D. Conceptual:** reflects embedded concepts of *capacity, potentiality* and *impact* consistently echoed throughout design-in-government literature. (The Design Council *et al.*, 2013)
2. Identifies the various dimensions of capacity that design exists as and its diverse applications. (Buchanan, 2001; Quartz + Co., 2011; The Design Council *et al.*, 2013; SEE Platform, 2015)

Table 4-14 The Conceptual Framework (CF) for Design-in-Government (Visualization). Source, Author

THE DESIGN-IN-GOVERNMENT (DIG) CONCEPTUAL FRAMEWORK				
Thematic Heading	**DESIGN**	**DESIGN KNOWLEDGE TRANSFER**	**DESIGN-IN-GOVERNMENT MECHANISMS**	**Areas of GOVERNMENT Impact**
Operations (DIG System)	Inputs	Inputs	Outputs (Activities + Participants)	Outcomes (Short, Medium, Long-term impact)
Philosophical Considerations	What Design is	What Design is + What Design Does + Communicating What Design is and Does	What Design Does	
Concepts	potentiality, resource, capacity, and impact			

The results present a holistic overview of the emerging interdisciplinary research and practice domain. As such the following preliminary statement can be made:

Design-in-government represents a high-level contextualization of the layers and components of a complex evolving interdisciplinary domain of research and practice. As a conceptual framework, it orders related, diverse theoretical, operational, thematic, and conceptual components for universal referencing and orientation between stakeholders. The conceptual framework for design-in-government represents a contribution to research, practice, and policy.

4.6 Chapter Summary

The Design-in-Government Context

The review results thus far have shed light on the nature of the emerging interdisciplinary field and its literature from a theoretical perspective. The field is described as unstructured and complex with diverse terminology breeding confusion amongst stakeholders. Uncovered thematic categories represent classifications for the varied literature but equally represent organizational placements for the actors within the field and their functional dynamics therein. The order of these placements within the context reveals the system of operations that exists. The high-level vantage point allows for a holistic perspective of the field and its literature to be considered for evaluation as part of the investigation of the research question. Finally, within the contextualization, the thematic area of design can be located. The nature of design within this context exists as capacity and resource towards government. It's full range of ability as capacity is considered including tangible and intangible dimensions that exist beyond disciplinary and aesthetic distinctions (Chapter 2).

The results from this study are employed as a way to establish the context of design-in-government and by so doing successfully achieves an objective of the research. The study helps to identify what is known in terms of the context and to inform what is yet to be explored in the wider research. The visualisation of study findings into a conceptual framework function both as a summarized representation of the research results for use at engagements with industry to garner feedback (Chapter 7) and validate findings as well as an analytical framework for sensemaking in the subsequent studies (Chapters 5 and 6).

Implications for the Wider Research

Although the research results evidence the existence of a design-in-government context along with indications of its nature and related components, these findings are based on theoretical revelations limited by the lens of the scoping review.

The need to observe the context and its contents from a practice perspective would be beneficial to modify or confirm these findings. An exploratory case study of the field will be carried out in Phase 3 of the research to observe the [phenomenon in situ.

The Conceptual Framework for Design-in-Government would serve as a guide for the investigation in terms of what to look for. To answer the research question, *What is the Capability of design in government,* the area of design, explored in Phase One, and now situated contextually based on this study, can also be observed during the study. The practical exemplars will aid in validating both what design is as well as what design does in the context of government.

To more broadly understand what design does within this context, during Phase Four of the investigation 30 case studies of design use in government will be examined against the Conceptual Framework. The convention of using secondary case studies adopted by other researchers in this domain (Whicher and Swiatek, 2015) will help to triangulate data already gathered in this research and track more specifically the dimensions of design being used alongside their actual areas of impact (Chapter 6).

In these studies, the CF functions as an analytical tool to make sense of the results in context.

5 EXPLORING THE DESIGN-IN-GOVERNMENT CONTEXT

"Design activity is the means by which knowledge about the world is transformed into real world phenomena – products, systems, services, organizations, images, government policies, education programs etc. – that provide social, economic and technology development benefits."

Terence Love, 2007

5.1 Overview

This study is concerned with gaining insights into the emerging design-in-government context from a first-hand perspective. It represents Phase Three of the wider thesis which is primarily concerned with empirically exploring the phenomena (Figure 5-1).

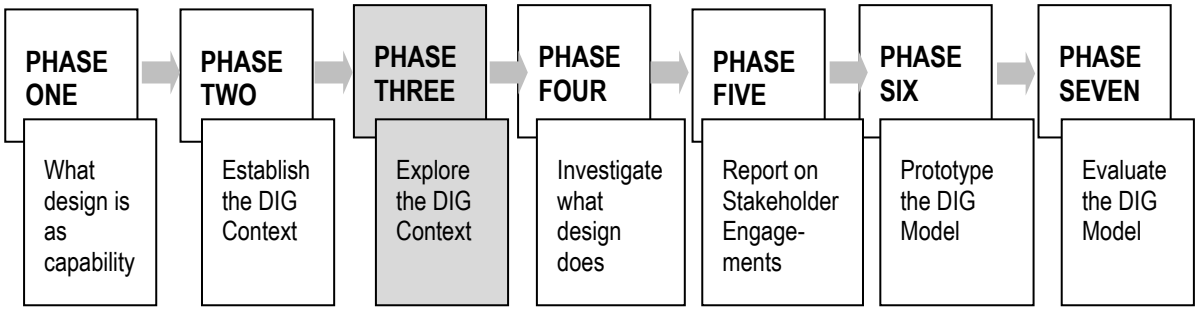


Figure 5-1 Phases of the research investigation. Phase Three highlighted.

An exploratory case study was selected as the most appropriate method for this study. The immersive method provides the investigator with the opportunity to view the field from both high level and low-level perspectives thereby offering key insights into to the contextualization of design within government.

Armitage (2007) stresses the importance of considering the experiences of the researcher and the target audience in research. With the nature of the field being an emergent one, engaging directly with design practitioners in situ as they interact with the system of government and its practitioners was a critical way to

understand the novel area. Relative to the research question, *What is the capability of design in government?,* gaining knowledge of the design-in-government phenomena and understanding how design is manifested therein is fundamental to understanding its capability.

During the case study, the investigator was situated within the design policy division of the case study organization for three consecutive months full time. Due to the collaborative nature of the practice, and the open plan of the office work environment, the investigator interacted with employees from the wider firm daily. Study participants included 25 design-research staff members across 8 design departments including the 3 senior directors, their clients as well as consortia members from the 11 European members states. Observations occurred informally during daily work activities. During the placement tenure, the following tasks were undertaken when data collection occurred. They included,

- General daily activities as directed by design policy team research director.
- Attendance at team meetings and the organization's weekly staff meetings.
- Preparing case studies for the organization's on-line case study library.
- Aiding in research on Innovation Labs around the world.
- Supporting the policy team in their attendance and presentation of the impact of their research to international design policy practitioners in Brussels.
- Supporting the policy team in the organization and implementation of an industry-academia conference with consortia partners in Finland.

The data collection activities consisted of direct observation (DO), participant observation (PO), reviews of organizational documents (REV), unstructured interviews (UI), and investigator reflections (REF).

The experiences allowed for unique internal and externals views of the field and its operations. The observational data was recorded as researcher notes taken during the case study period. Samples of the notes are included as Appendix K.

For this study, the Conceptual Framework for Design-in-Government (CF) (Table 5-1), a key outcome from Phase Two of the research and one which outlines a

proposition of the entire design in government context, is the primary framework guiding this study.

Table 5-1 Principles of the Design-in-Government conceptual framework

The Conceptual Framework for Design-in-Government (Principles):
1. A holistic view of design as it operates in government. This includes thematic, philosophical, operational, and conceptual elements. **A. Thematic:** includes thematic areas of *Design, Design Knowledge Transfer, Design-in-Government Modes of implementation*, and areas of *Government* impact. (Source, Author) **B. Operational:** identifies i) the placement of themes, ii) relationships between them, iii) reflects dynamics of interdisciplinary engagement (Barry, Born and Weszkalnys, 2008; Kimbell, 2016), iv) Identifies the role each area plays as part of the design-in-government system of operations in term of *inputs, outputs* and *outcomes*. (Source, Author; (Malvido *et al.*, 2008; Moultrie, 2009; Moultrie and Livesey, 2009) **C. Philosophical:** involves areas of design meaning involving *What Design Is, What Design Does*, and *Communicating What Design is and Does.* (Dilnot, 1982, 2018; Moholy-Nagy, 1991; Love, 2002) **D. Conceptual:** reflects embedded concepts of *capacity, potentiality* and *impact* consistently echoed throughout design-in-government literature. (The Design Council *et al.*, 2013)
2. Identifies the various dimensions of capacity that design exists as and its diverse applications. (Buchanan, 2001; Quartz + Co., 2011; The Design Council *et al.*, 2013; SEE Platform, 2015)

In this regard the CF through its various components, directs the researcher as to what to look for and consider in the exploration. The first part of the framework includes four (4) thematic streams, modes of operations, philosophical considerations and concepts that make up the evolving, domain of research and

practice. The second part of the framework focuses specifically on the thematic area of Design. Since what design is as capability is also of concern in the study, insights from the literature review (Phase One) which detailed aspects within the thematic area of design were also observed in this case study.

In terms of the analysis of data, the CF equally functions as an analytical tool aiding in sensemaking of the phenomenon for the investigator through research reflection. Referencing the theoretical elements of the framework from this practice perspective aids in the validation and/or refinement of its components thereby finalizing the development of the construct.

Through the lens of the design-in-government framework, observations are rationalized, analyzed, and summarized in this chapter. The content is charted based on what the investigator was looking for (dimensions of the CF principles), what was observed (the data collected) and finally, how the data informs the refinement of the framework refinement. Figure 5-2 charts the procedure used to organize the results in the next section of this chapter.

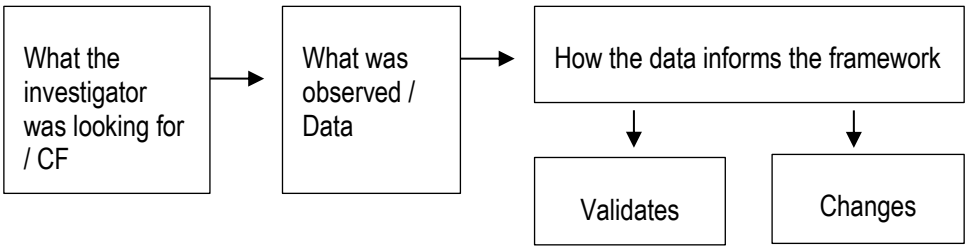


Figure 5-2 Organization of charted research results

A sample of researcher notes from a review of the organization's published literature and from observations of project work is highlighted in Section 5.2.1 as an example of the process used to capture and analyze data from the study. Presented as a narrative, the results present a holistic view of design as it operates in government as well as the various dimensions of design's existence and its diverse applications (Parts 1 and 2 of the CF). Summarized results from the other experiences are charted in Table 5-2, Table 5-3 and Table 5-4.

The chapter concludes with a summary of refinements to the conceptual framework based on the results from this study. Implications for the wider research are then discussed.

5.2 Results and Analysis

Housed within a university in the United Kingdom, this uniquely structured organization operates as a multi-disciplinary and interdisciplinary design research-practice spanning local and global contexts. The organization actively engages with a wide variety of clients including local, national, and international governments via policymakers and programme managers in various sectors, as well as small and medium sized enterprises and the design industry.

As identified in the organizations published literature, the firm operates primarily from the thematic areas of *design* (as practice) and design *knowledge transfer*. Their approach combines “quality research activity alongside an experienced consultancy practice (REV).” Equally, beyond their service offerings as a traditional design practice, their work spans the areas of *design-in-government* strategies, and *government* impact domains. In terms of knowledge exchange and design implementation facilitation into policy, their design policy team alongside their 11 industry partners have “influenced 17 design-related policies and 40 design-related programmes representing new investment in design of €6.2m.” They document that they can “demonstrate impact in all of the partner countries because they have facilitated peer-learning and exchange among innovation policy-makers across Europe enabling them to transfer and adapt best practices in design policies and programmes.”

Evidencing short term impact in government, “as a result of policymakers participating in their workshops, engagement by their partners and drawing on their research, design now features in national level policies in Denmark, Estonia, Finland, and Greece as well as at regional level in Wales (UK), South Bohemia (Czech Republic), Greater Copenhagen (Denmark), Central Finland, Central Macedonia (Greece), Ljubljana Urban Region (Slovenia), Malopolskie and Silesia (Poland). Some examples include the Estonian Design Action Plan, the Regional Development Strategy for South Bohemia, the Smart Specialisation Strategy for Central Macedonia, the Regional Development Strategy for Ljubljana, the Innovation Strategy for Wales, and the Regional Innovation Strategy for Silesia (REV).”

These examples evidence the thematic area of design in practice and in engagement with all thematic areas of the CF. It also highlights the philosophical principles of the context in operation, illustrating not only what design does in this context, but also, what it is and how it's communicated. Finally, the conceptual aspects of impact and potential are noted in the project outcomes within government. Tables 5-2 and 5-3 chart additional study evidence in these areas. These results verify the existence of all categories of the CF as well as the placement of the themes.

Evidence of the range of design capabilities in operation were observed through examples of the organizations' project work. The 8 design departments carried out both stand-alone as well as collaborative projects where design industry capabilities, tangible outputs as well as intangible dimensions of design in practice such as approaches, and processes were seen.

For example, a collaborative research endeavour between the user-centered design department and the surgical and prosthetic design departments explored barriers to user-centered design in the development of bespoke medical devices (Figure 5-3). The study addressed the gap between manufacturing practices despite recommendations through literature and legislation favouring a user-centered approach (REV-1). Observed were tangible (3D prototypes) and intangible (user-centered principles) dimensions of design in operation.



Figure 5-3 Image of surgical brain implant based on prototypes using 3D printing and Computer Aided Design (CAD) technologies. (Source: The organization's website, 2020)

Another observed collaborative research project was carried between the Eco Design and User-Centred Design department. Product design outputs typically married these two areas of focus as the design work allowed for user insights and environmental insights to be addressed. This bridge made outputs relevant to both public and private sector contexts and demonstrates how design outputs can meet multiple dimensions of impact simultaneously (e.g., the economy and the environment). From household products to medical devices (Figure 5-4) the range of projects were diverse but always relevant to industry needs and user needs at minimum. Figure 5-2 shows a vascular monitoring device and a mineral water bottle design, both were carried out as part of their consultancy practice addressing health needs.

According to the organizations marketing materials (REV), "the digital Doppler is a family of next-generation handheld medical ultrasound Dopplers for use in both vascular and obstetric medical practice. It's the world first handheld doppler that combines the best performance in probe sensitivity, audio clarity, and a visual representation of waveforms that previously had only been available with large and expensive desktop laboratory systems." The water bottle design featured a new injection blow moulded technology "specifically aimed at children to

encourage greater water consumption and offer a healthier choice to more processed and sweetened drinks available (REV-3)."



Figure 5-4 Examples of Product Design Source: The organization's marketing materials.

Through the lens of design for health, or the environment for example, impact from industry projects like these are used to reinforce the potential for design impact in related government areas. As stressed in an informal meeting with a senior director the importance of the policy department was regarded as "the driver that facilitates the change in government necessary which in turn creates opportunities for the other teams to move forward (UI)."

Research from all projects were published to provide industry evidence, further new knowledge, and document impact in the respective fields of practice. Combining the work of multiple departments not only highlighted the currency available from both process and product in terms of design outputs it demonstrated the range of tangible and intangible design dimensions at play as capacity through practice operations.

Through the lens of Buchanan's (1998) classifications, tangible design dimensions observed in operation included design as Communication (signs, words, symbols, and images) as well a design as Construction (things or physical

objects) (Buchanan, 1998). These were seen primarily through graphic design (REV), service design (DO) (REV), surgical and prosthetic design (DO) (REV) (Figure 5-3), and product design department outputs.

Intangible dimensions of design employed in practice included design thinking, design approaches and service design as part of their design consultancy work. These were observed in both public and private sector contexts. In one particular user experience project for industry, the organization was required to "find insight backed opportunities to improve the customer experience of buying a specific small kitchen appliance. Figure 5-5 Shows the Service Design team in the process of concept creation utilizing design thinking, approaches, and tools.



Figure 5-5 Service Design delivering intangible design outputs Source: The organization's marketing materials.

The output was a customer journey map "which detailed each stage of and touchpoints of the user's journey from initial need identification through to first use and storage. Key insights discovered in the research were translated into proposed products and service design concepts as well as other opportunity areas highlighted for the client to enhance the customer experience of its kitchen products (REV-4)."

Table 5-2, and 5-3 summarize additional observations evidencing dimensions of the design-in-government context. The first column relates to what was being looked for (CF dimensions) during each experience.

Table 5-2 Summary of results of observations into Thematic Areas of the Design-in-Government Context

Thematic Area / CF Principle being observed	Description of the Experience	Data Collected (What was observed)	How the data relates to the framework	
			Validate	Change
DESIGN KNOWLEDGE TRANSFER	Worked at 2 conferences hosted by the organization in Brussels and Finland to disseminate project findings to government and the design industry. Attendance at 2 policy formation consultations hosted by the organization. Attendance at 2 workshops with government officials and their teams. Document review Review of the organizations published research Observed inclusion of research as part of the design brief for projects Observed the daily work activities of project teams	Design knowledge transfer was observed in operation towards government. Observed the use of design dimensions including design **thinking, design approaches and design research as part of facilitation endeavours and of the organizations design consultancy work (DO), (PO), (REV**). Design research as a method for knowledge transfer Observed the use of design communication tools for knowledge transfer including research papers, interviews, special reports, policy updates and case studies about programs and policies on design, innovation, and related subjects such as competitiveness, sustainability, R&D, entrepreneurship, and socio-economic development". Evidence of the production and publication of industry leading literature and reports, and the dissemination of same as print and digital resources to clients and stakeholders Collaboration of efforts in knowledge transfer efforts. Examples observed were ground-breaking projects with local hospitals from the surgical and prosthetic design team and user-centered design team and service design projects in collaboration with the policy design team for the European Commission targeting Alzheimer care reform. The inclusion of academia as a vehicle for knowledge transfer	Identification of the thematic area of Design Knowledge Transfer and the dynamics of its interaction towards government The various dimensions that design exists as The various manifestations of design Evidence of Collaboration in design knowledge transfer	The addition of academia as a vehicle for design knowledge transfer
	Working in the Design Policy Department: Informal interview with the head of the policy department: For the Policy department, knowledge generation and exchange were key deliverables required as part of the scope of work for the main project between 2010-2015. During an informal interview, the department director noted that the awarded funding scheme usually mandates the required project outcomes.	Outputs from this project that were reviewed by the investigator included: • 8 research papers relating to design policy and design innovation in government were reviewed • 9 Reports "examining trends in design policies and programmes. Collating good practices and methods in design for the public sector. Outlining policy recommendations on design policy, design support, service design, social design, and design management." Observed published evidence of:	The thematic area of Design Knowledge Transfer Various dimensions that design exists as	

Thematic Area / CF Principle being observed	Description of the Experience	Data Collected (What was observed)	How the data relates to the framework	
			Validate	Change
	It was also observed that in the area of design policy, the organization publishes the only collection of reports "entirely dedicated to matters related to design policies and promotion programs" (from 2005 onward).	• 102 workshops delivered to policymakers and programme managers across Europe on the themes of design policy, design support, service design, social design, and design management. • 75 presentations to enhance the understanding of design among innovation audiences including 806 policymakers, 191 SME managers. Organizational publications reviewed included: • bulletins containing research, case studies, policy updates and resources from around the world. • 44 case studies on design and innovation policies and programmes to encourage the exchange of good practices between regions (Ibid). Access to this breadth of data informed the investigator's understanding of the research scope, it's diversity, challenges, and uniqueness as a field of practice.	Various design tools in operation	
	Participation in Design-in-Government Research: The on-going project while the investigator was in residence was related to the European Commission's 2010 Innovation Policy, *Innovation Union,* and the subsequent 2013 *Action Plan for Design-Driven Innovation in Europe*. A formal scope of services document was not reviewed, but from observation the following knowledge outputs and knowledge exchange experiences were noted as part of the pan-European project (DO-1) (REV):		The thematic area of Design Knowledge Transfer	
	Working in the organization's case study library: At the time of this writing, the organization had catalogued an extensive library of "98 case studies of design programmes and practices, highlighting examples of government policies and programmes where design and innovation are linked." As part of its development, during the placement the investigator was charged with the responsibility of collating case studies from the 11 consortia members, evaluating them against the "case study" criteria and writing them for publication as part of the on-line library. A total of 15 case studies were reviewed. One criterion for inclusion was that each case study demonstrate impact. The impact needed to be identifiable meaning not necessarily quantifiable, but	During this task the following observations as findings were noted: 1. **Documented case studies are a primary means by which the design industry is able to show design use and impact generally but here specifically to their target audience of government officials.** 2. **A structured protocol of inclusion criteria for case studies needs to be utilized.** 3. **Dimensions of design used toward government is varied. E.g., objects, graphics, design thinking, design strategy, architecture and interiors, methods, tools, user experience.** 4. **Design impact occurs in many ways in various areas of business and government.** 5. **The online library database format allows government and others globally access to the information.** 6. **related information can be extracted from the case study format including, location (country), dimension of design used (e.g.,**	The thematic area of Design Knowledge Transfer Evidence of various dimensions of design in use and where and how they impact government.	

Thematic Area / CF Principle being observed	Description of the Experience	Data Collected (What was observed)	How the data relates to the framework	
			Validate	Change
	simply measurable. Out of the 15 case studies 12 were written up and added to the library. In addition to impact, the case studies documented evidence of design use from 7 European Countries.	**Graphic, fashion, thinking), funding stream, implementing body (design firm, researcher, university etc**.)		
	Attendance at 2 workshops, 2 conferences, 2 roundtable discussions: In addition to the case study library, the organization regularly disseminates knowledge through their publications and attending and organizing workshops, conferences, roundtable discussions, along with presentations, and through the use of design tools. According to the firms published material these publications are "distributed to more than 60 countries around the world.	**Figure 5-6 Facilitating knowledge sharing between stakeholders** The investigator was afforded the opportunity to travel to three European cities as part of the policy team as they worked on this European Union research project. During visits to London, Belgium and Helsinki, the team led and participated in knowledge transfer activities and executed presentations evidencing design use and impact in government. The conference that the policy team organized and implemented in Finland was an industry-academia conference. One goal was to facilitate stakeholder engagement between these two important actors and by so doing reinforce and map the key role each plays as part of the ecosystem of design innovation in government.  **Figure 5-6 shows industry and academic engagement and knowledge sharing at a conference in Helsinki organized by the host case study organisation.**	The thematic area of Design Knowledge Transfer Evidence of various dimensions of design in use and where and how they impact government.	

Thematic Area / CF Principle being observed	Description of the Experience	Data Collected (What was observed)	How the data relates to the framework	
			Validate	Change
	Research on Innovation Labs: An emerging vehicle for knowledge transfer is government innovation labs. During the case study placement, the investigator was involved in collating evidence that documents the emerging trend globally including location, level of government, structure and design tools used for knowledge generation and transfer.	Evidence of the emerging trend globally. Including reviews of the 4 international examples including • MindLab in Denmark • Helsinki Design Lab in Finland • The LAB at the Office of Personnel Management in Washington Dc • DesignGov in Australia	The thematic area of Design Knowledge Transfer The thematic area of Design-in-Government Strategies	
DESIGN IN GOVERNMENT STRATEGIES	**Attendance at a workshop with policy makers hosted by the organization:** The design policy department was actively involved in structuring this particular domain of the CF through knowledge generation (design research) and by providing workshops and consultancy services directly to countries requiring assistance in writing design related policies. **A review of organizations literature, offered a definition of Design Policy Consultation** From 2000 - to date, the organization has published an extensive number of reports and papers articulating the various activities and participants that are resident as mechanism to enable design's move through government. These include the specification of the categories of design promotion.	• It was observed that the organization operated in a consultancy role and design support/promotion capacity to governments assisting in the crafting of design and innovation policy and supporting the development of innovation labs within governments throughout Europe. Their published definition of Design Policy Consultation: "The facilitation of peer-learning and exchange among innovation policymakers across Europe enables them to transfer and adapt best practices in design policies and programmes."	The thematic area of Design-in-Government Strategies Evidence of how design firms assist government in policy writing. Evidence of design support and promotion	

Thematic Area / CF Principle being observed	Description of the Experience	Data Collected (What was observed)	How the data relates to the framework	
			Validate	Change
DESIGN IIMPACT IN GOVERNMENT	A review of the organizations literature offered highlights the impact of the organization's consultations with various countries on design policy development within government strategies.	"As a result of policymakers participating in workshops, engagement by partners and drawing on their research, design now features in national level policies in Denmark, Estonia, Finland and Greece as well as at regional level in Wales (UK), South Bohemia (Czech Republic), Greater Copenhagen (Denmark), Central Finland, Central Macedonia (Greece), Ljubljana Urban Region (Slovenia), Malopolskie and Silesia (Poland). Some examples include the Estonian Design Action Plan, the Regional Development Strategy for South Bohemia, the Smart Specialisation Strategy for Central Macedonia, the Regional Development Strategy for Ljubljana, the Innovation Strategy for Wales and the Regional Innovation Strategy for Silesia (REV – 5)."	Evidence of the thematic area of design impact in government Evidence of design impact Evidence of impact in government	Evidence that impact between design and government is reciprocal in nature
	Informal interview with Design Policy Department Lead. Review of the organization's documents	According to the design policy department lead, the one key focus of their design policy work is "creating impact, cataloguing impact and disseminating impact to and about government." Design projects carried out by the organization were usually supported by data, (evidence to support process or design decisions) or involved measuring or documenting impact after implementation. Evidence revealed: • economic impact – documented design policy and service design projects • social impact – documented design policy and service design projects • environmental impact – documented eco design, product design, user centered design projects • systemic impact – documented in service design and design policy projects	Evidence of design impact Evidence of impact in government Evidence of impact in various areas of government	
	Working in case study library and document review Review of 15 case studies from across Europe.	According to the review of published information, the organization had catalogued an extensive library of "98 case studies of design programmes and practices, highlighting examples of government policies and programmes where design and innovation are linked." As part of its development, during the placement the investigator was charged with the responsibility of collating case studies from the 11 consortia members, evaluating them against the "case study" criteria and writing them for publication as part of the on-line library. A total of 15 case studies were reviewed. One	Evidence of design impact Evidence of impact in government	

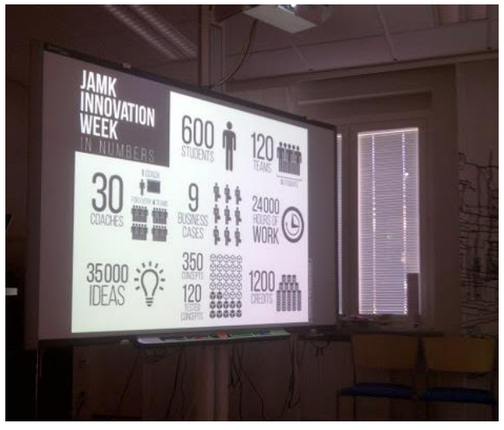
Thematic Area / CF Principle being observed	Description of the Experience	Data Collected (What was observed)	How the data relates to the framework	
			Validate	Change
		criterion for inclusion was that each case study demonstrate impact. The impact needed to be identifiable meaning not necessarily quantifiable, but simply measurable. Out of the 15 case studies 12 were written up and added to the library. In addition to impact, the case studies documented evidence of design use from 7 European Countries.		
	Presenting Design Impact Work in this activity included supporting the policy team in their attendance and presentation of the impact of their research to International Design Policy practitioners in Brussels. The *Panel included Design Association, Design Research, Government, Design practice, Design Industry. Challenges:*  	*Evidence of design impact presented at this presentation include* • "The influence of design on 17 design-related policies and 40 design-related programmes representing new investment in design of €6.2m. • Demonstrated impact in all of the partner countries because we have facilitated peer-learning and exchange among innovation policymakers across Europe enabling them to transfer and adapt best practices in design policies and programmes. • As a result of policymakers participating in their workshops, engagement by partners and drawing on the organization's research, design now features in national level policies in Denmark, Estonia, Finland, and Greece as well as at regional level in Wales (UK), South Bohemia (Czech Republic), Greater Copenhagen (Denmark), Central Finland, Central Macedonia (Greece), Ljubljana Urban Region (Slovenia), Malopolskie and Silesia (Poland). Some examples include the Estonian Design Action Plan, the Regional Development Strategy for South Bohemia, the Smart Specialisation Strategy for Central Macedonia, the Regional Development Strategy for Ljubljana, the Innovation Strategy for Wales, and the Regional Innovation Strategy for Silesia. • the implementation of 40 new design-related programmes. Some examples include Design Management in the SME Wallet (Flanders), ChangeWorks (Denmark), Design Bulldozer (Estonia), Schauman Service Factory (Central Finland), Extroversion (Greece), Design for Dementia (Ireland), Design At Your Service (Silesia), Design Thinking in Public Services (UK) and Design for Independent Living (Wales). This amounts to new investment in design programmes of over €6.2 million. • Continued provision of support government to develop, implement and evaluate design policies and programmes in the coming years."	Evidence of design impact Evidence of communicating design impact	

Table 5-3 Summary of the results of observations into the Philosophical, Operational and Conceptual Areas of the Design-in-Government Context

What the investigator was looking for /CF Dimensions	Description of the Experience	Data Collected (What was observed)	How the data relates to the framework	
			Validate	Change
Philosophical: involves areas of design meaning involving *What Design Is, What Design Does*, and *Communicating What Design is and Does.* (Dilnot, 1982, 2018; Moholy-Nagy, 1991; Love, 2002)	During daily work experience in the office the instigator was able to observe both design in practice (the act of designing) as well as design as practice (through evidence of the firms' operations). Review of the organization's documents Design Communication through presentations to industry at workshops, project outputs, as well as through their publications.	According to a review of the firm's published material, the organization combines "quality research activity alongside an experienced consultancy practice (REV)." Operationally, "the firm undertakes research, enterprise, and knowledge exchange across a number of research and practice groups that encompass the policy, management and practice of product and service design in both the public and private sectors (REV)." The case study library, reports, published journal papers, objects produced, processes and tools used all evidenced dimensions of design meaning and the *communication* of same.	The demonstration and communication of *what design is and does* was built into the core of the business operations and flowed as tangible and intangible outputs and outcomes towards government.	
Operational: identifies i) the placement of themes, ii) relationships between them, iii) reflects dynamics of interdisciplinary engagement (Barry, Born and Weszkalnys, 2008; Kimbell, 2016), iv) Identifies the role each area plays as part of the design-in-government system of operations in term of *inputs, outputs* and *outcomes*. (Source, Author; (Malvido *et al.*, 2008; Moultrie, 2009; Moultrie and Livesey, 2009)	Worked at 2 conferences hosted by the organization in Brussels and Finland to disseminate project findings to government and the design industry. Review of the firms published material	Design knowledge transfer was observed in operation towards government. The observed interplay amongst each thematic area in reality evidenced that the location of each placement was accurate in terms of adjacency. However, the use of government practitioners by knowledge transfer agents to gather data about policy making conventions for example suggests that the flow of knowledge travels both ways between the disciplines. There are a diverse range of DIG initiatives being employed by governments globally. Benchmarking or best practices is the vehicle through which many governments are informed of the options (IIDA, Raulik-Murphy). The research-practice-academia collaboration as a design-in-government component, particularly in knowledge generation and transfer. Can be seen as a practice model for DIG Consortia (need for collaboration)	The themes of *design*, *design knowledge transfer, design-in-government mechanisms,* and *areas of government impact* were evident. Placement of themes were accurate Interplay between thematic areas exists.	There are a diverse range of DIG initiatives being employed by governments globally. Benchmarking or best practices is the vehicle through which many governments are informed of the options (IIDA, Raulik-Murphy).
Conceptual: reflects embedded concepts of *capacity, potentiality* and *impact* consistently echoed throughout design-in-government literature. (The Design Council *et al.*, 2013)	Review of the firms published material (Design for Public Good) The review of 15 case studies. Attendance at staff meetings	The potential for design was seen through the review of published literature. Design impact was observed through the review of case study reports. the motivation of staff towards the work to convey the impact of design through their work and, the rationale of publishing reports and papers as an integral part of project work and the cataloguing of impact in the form of a case study library. This was observed during presentations to staff at group staff meetings	Conceptually, the ideas of capacity, potentially and impact were evident.	

Table 5-4 Summary of observed dimensions of design as capacity

What the investigator was looking for	Description of the Experience	Data Collected (What was observed)	How the data relates to the framework	
			Validate	Change
Evidence of design as practice and in practice. (Kimbell, 2016)	During daily work experience in the office Attendance at knowledge transfer engagements Review of the organization's documents, including published materials Attendance at presentations to industry Attendance at industry engagements including workshops	Design in practice was observed daily through the act of designing throughout the project teams, as well as design research activities. Design as practice was evidenced through the firms' operations and declared in their published materials. Their approach combines "quality research activity alongside an experienced consultancy practice (REV)." Operationally, "the firm undertakes research, enterprise, and knowledge exchange across a number of research and practice groups that encompass the policy, management and practice of product and service design in both the public and private sectors (firm's published material)."	**Evidence of design as practice and in practice.**	
Manifestations of Design: (Buchanan, 1998) • **Communication** (Signs and words) *symbols, images*:		Observations of a range of design manifestations in project outputs including: • design as signs, symbols graphics – graphic design • Design Tools: personas, mind maps, customer journey maps, • Design research • Research reports (service design department) • Design approaches	Evidence of design as communication	
• **Construction** (Things) *physical objects*:		• Prosthetic design • Products (product design dept and the eco design department)	Evidence of design as construction	
• **Strategic Planning** (Action) *activities, services, and processes*		• service design, problem solving processes and tools • design management • design policy planning	Evidence of design as strategic planning	
• **Systemic Integration** (Thought) systems, environments, ideas, and values:		• Design-thinking approaches and methodologies employed in workshops and in design projects.	Evidence of design as systemic integration	
Elements of Design's Nature		Collaborative, impactful, human-centered, user centered and sustainable. . • Human and user centred is a fundamental approach to their projects. • Sustainable as a conscious consideration in projects.	Evidence of elements of designs' nature	

5.3 Chapter Summary

The exploratory case study proved to be an effective method to examine the design-in-government phenomena from an empirical perspective. The host organizations' unique placement in the field as a leader in the area of design -in-government research, their history of documented impact and global influence made it a valuable placement for this case study. The experience provided an efficient means of gaining an in-depth understanding of the range of principles that make up the research context, thereby informing the refinement of the conceptual framework.

Refinements to the Conceptual Framework for Design-in-Government.

The CF and its dimensions were used as a tool to understand, organize, and analyze the observed information and by so doing, the evidence informed refinements to the conceptual framework in terms of its two key areas:

- A holistic view of design as it operates in government including structural (themes and placements), philosophical, operational, and conceptual elements.
- The various dimensions that design exists as, as capacity and its diverse applications are evident.

As summarized in Table 5-5, the results confirmed evidence of the existence of all of the principles in the context. Insights were also gleaned. Through observations of the case study's operations and services performed, all four thematic areas were seen. However, in the area of Design Knowledge Transfer, 'academia' and 'industry' were added as agents for knowledge exchange.

The dynamic interplay between the areas validated the operational realities that exists amongst them. However, during knowledge exchange experiences between design policy agents and government, it was evident that knowledge transfer occurred both ways. Also, with clear objectives to create impact in government as well as demonstrated causal links observed to achieve that, the operational realities as input, outputs and outcomes were further evidenced.

Table 5-5 Summary of refinements to the CF

The Conceptual Framework for Design-in-Government (Principles):	Validate	Change
1. A holistic view of design as it operates in government. This includes thematic, philosophical, operational, and conceptual elements.	✓	
A. Thematic: includes thematic areas of *Design, Design Knowledge Transfer, Design-in-Government Modes of implementation*, and areas of *Government* impact. (Source, Author)	✓	For Design Knowledge Transfer, 'academia' and 'industry' were added as an agent for knowledge exchange.
B. Operational: identifies i) the placement of themes, ii) relationships between them, iii) reflects dynamics of interdisciplinary engagement (Barry, Born and Weszkalnys, 2008; Kimbell, 2016), iv) Identifies the role each area plays as part of the design-in-government system of operations in term of *inputs, outputs* and *outcomes*. (Source, Author; (Malvido *et al.*, 2008; Moultrie, 2009; Moultrie and Livesey, 2009)	✓	There is a diverse range of DIG mechanisms being employed by governments globally. Benchmarking or best practices is the vehicle through which many governments are informed of the options (IIDA, Raulik-Murphy). The reciprocal nature of knowledge exchange between knowledge transfer agents and government practitioners.
C. Philosophical: involves areas of design meaning involving *What Design Is, What Design Does*, and *Communicating What Design is and Does.* (Dilnot, 1982, 2018; Moholy-Nagy, 1991; Love, 2002)	✓	
D. Conceptual: reflects embedded concepts of *capacity, potentiality* and *impact* consistently echoed throughout design-in-government literature. (The Design Council *et al.*, 2013)	✓	
2. Identifies the various dimensions of capacity that design exists as and its diverse applications. (Buchanan, 2001; Quartz + Co., 2011; The Design Council *et al.*, 2013; SEE Platform, 2015)	✓	

In terms of DIG mechanisms being employed by governments globally, there are a diverse range of approaches to integration of design into government being

employed by governments globally. Benchmarking or best practices is the vehicle through which many governments are informed of the options (IIDA, Raulik-Murphy) however, as observed in the policy workshops, it can also be tailored to suit each countries particular government structure.

What design is and does was clearly articulated through the scope of project work in operation utilizing tangible and tangible dimensions of design as well as a range of design tools, methods, approaches. Finally, conceptually, design as resource was visible in the positioning of the firms work as a means to advance designs economic, social, environmental, and systemic potential.

Other insights

During work in the case study library, it became obvious of the importance of the use of case studies as evidence of design use and impact and also of the proliferation of case studies available for reference during this particular period.

Also, a greater understanding of the role the wider research practice plays towards government became equally apparent. Although the policy team was the primary liaison with government in terms of design support and knowledge transfer it also acted as a facilitator for the delivery of services from the other design disciplines to provide design services to government.

Further insights are discussed in the final chapter of this thesis as they relate to the wider significance of these insights and implications for further research.

The Finalized Conceptual Framework for Design-in-Government

Based on these results the following revisions to the CF are noted:

- Although a well-established and industry leading organization, It is acknowledged that this is only one example of a research practice demonstrating design as it interacts with government. It is important therefore that the CF be a flexible document whereas the practice evolves, further refinements can be made.
- The reciprocal nature of the system is also noted as knowledge transfer for example between design and government is shared. Impact is also

reciprocated, as impact in government is established, it is also acknowledged as design impact.

The empirical evidence of the Design-in-Government domain obtained in this study, together with the theoretical findings from the scoping review finalizes the development of the conceptual framework for design in government. The results present a holistic overview of the emerging interdisciplinary research and practice domain. As such the following statement can be made:

"Design-in-government represents a high-level contextualization of the layers and components of a complex evolving interdisciplinary domain of research and practice. As a conceptual framework, it orders related, diverse theoretical, operational, structural, and conceptual components for universal referencing and orientation between stakeholders. It also identifies the various dimensions of capacity that design exists as and its diverse applications. Insights from a critical review of related literature, empirical evidence from an exploratory case study within this unique field, and stakeholder engagement, inform its development. The visualization serves as the foundational structure for a design-in-government model developed to bring understanding of the scope of design as resource to government."

The conceptual framework for design-in-government represents a contribution to research, practice and policy and is discussed as such in Chapter 10 of this thesis.

The finalized framework will be used in the next study as an analytical framework in the analysis of case studies to further identify what design is and does in this context.

Finally, consistent with the tradition of conceptual frameworks, the finalise CF from this chapter will be used as a precursor to inform the development of a finalized model (Chapter 8) to communicate research results to government.

6 WHAT DESIGN DOES IN THE CONTEXT OF GOVERNMENT

"If design, or what design does, cannot be described, how can it be justified, either within the production process or within society at large, or to educationalists?"

Clive Dilnot, 1982

6.1 Overview

This chapter examines 'what design does' in the context of government. The study represents Phase Four of the thesis investigation (Figure 6-1).

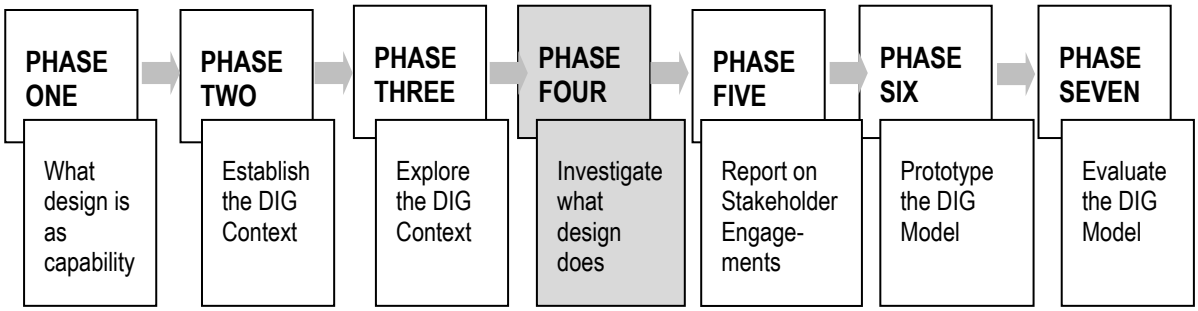


Figure 6-1 Phases of the research investigation. Phase Four highlighted.

The endeavour aids in creating an understanding of the various dimensions of design in use and their application towards various areas of government. Through the study's findings design's capability and potential reach is revealed answering the primary research question.

The interpretative study examines 30 international case studies of targeted design use in government and tracks them according to thematic codes derived inductively from the case studies and deductively from the conceptual framework for design-in-government (CF). Analysed are the strategic details of each study alongside the dimensions of design used, the knowledge transfer process, the

modes used to implement design into government and the areas of government impact.

The enquiry in its execution also aids in identifying, modifying, validating and consolidating theoretical and empirical findings from Phases 1, 2 and 3 of the research. The refinement of these results together with the findings from this study, presents an informed high-level perspective of the design-in-government context, a more focused view of its component parts in application, and a grasping of the dynamics of the DIG system through the mapping of the flow of design activity trough to government. This application of the CF demonstrates its utility as an analytic tool to understand, assess and build the emerging area of research and practice. As a product, the CF contributes knowledge in these areas.

Finally, the findings from this chapter feed into the development of a model being developed as part of the wider research in Chapter 8.

Purpose

Design's Strategic Use

Tracking what design does though its use helps to gain an accurate view of its potential for impact within government. Without this information, government practitioners are not equipped to use design efficiently and strategically as resource. Design theorist Terrance Love (2007) advocates careful dynamic modelling of the systems and sub-systems as a way of" "investing to improve design-related outcomes in specific sectors to shape its outcomes." The outcomes of design's strategic use are efficiencies in terms of the use of resources as well as the maximization of impacts.

Context

The case studies were implemented between 2004 and 2014 from a sampling of countries including: Singapore, Belgium, France, UK, New Zealand, Netherlands, Norway, Italy, Finland, Canada, Argentina, Poland, Czech Republic, and Spain. This helped to capture the global trend of the phenomenon. All case studies

reviewed were problem driven that is to say they were initiated to solve specific problems or to meet a specific need. All problems utilized some dimension of design as a means to arrive at a solution to that problem. In all cases some degree of impact was achieved and noted.

The coding was performed across descriptive and analytical axes. Boyatzis (1998) highlights the option for the researcher to utilize the themes and codes as descriptive material. Hence, specific textual data extracted from the case studies was noted on the descriptive side (left axis) and scoring for the presence of themes from the CF on the analytical side (right axis).

A large amount of rich data was extracted. A summary of the key results of the analysis and coding of the 30 case studies are discussed below. Excerpts from the raw data are shown as tables on the following pages. The larger dataset is included as APPENDIX I to this thesis.

6.2 Results and Analysis

Finding 1: Collaboration

The descriptive coding captured a variety of relevant information including whom the projects were initiated by, implemented by, funded by as well as connections to any policies or public service sectors involved. This data when mapped shows the range of stakeholders and procedures in place to execute a design related project in the context of government. Of note were the collaborative efforts between public, private, the not-for-profit sector and academia on projects. The impact recorded was specifically into areas of government however impact was equally noted amongst the stakeholders. This reciprocated impact can easily be charted in another study.

Finding 2: Targeted vs Actual Impact

The data revealed differences between intended and actual impact.

During the period examined, the results indicated that design was utilized strategically targeting specific areas of government activity namely, social, economic, environmental, systemic, and cultural areas. These targets were

related to specific causes or issues such as poverty reduction, health care, education, crime reduction, youth unemployment etc. The descriptive codes captured targets that were declared explicitly in each case study as well as targets that were actually met even if they were not deliberately set out to be achieved. Within the descriptive codes, Table 6-1 shows the heading of “Targeted Impact” in terms of the broad government sector and the more specific Targeted Cause or “department” such as healthcare. The heading of “Actual Impact” is also indicated. By examining and analysing the targeted versus the actual impact of each study the capability of design could be seen.

In the area of targeted impact related to a specific cause, (for example poverty, health care, behavioural change, efficiency, etc.), trends were observed.

- Where the targeted impact (cause) originated as singular (eg. only health care), the resulting actual impact was dual at minimum, benefiting multiple causes such as staff productivity, energy efficiency and procurement innovation.

For example, in one case study involving the NHS, “the National Innovation Centre team were approached by the Blood and Transport Services (NHSBT) with a design brief to create a user centered design for a new blood donor chair. Although the goal was solely “to enhance the donation experience and improve the whole process for support staff,” which it achieved successfully, the actual impact also included, reduced costs, improvements in wayfinding and innovation in their procurement process. In terms of wayfinding, it was noted that the design solution “clarified the ‘journey’ taken by visitors to the town hall for their desired service and presented proposals for the town hall’s spatial organisation and operations." https://renfrewgroup.com/portfolio/blood-donor-chair/

Table 6-1 Descriptive codes showing targeted vs actual impact

No.	Case Study	Brief Description	Source	Public Service Sector	Targetted Impact (Sector)	Targetted Impact (Cause)	Type of Design Used (Declared)	Design Output	Actual Impact
3	Social Inclusion of Seniors in Urban Centres	"Individuals with adequate social relationships have a 50% greater likelihood of survival compared to those with poor or insufficient social relationships." The goal of this project was to prevent social isolation and improve quality of life in the senior population. The project aim was to make the involvement of the elderly in their local service centre more active, engaging and personally rewarding. By making seniors aware of existing services and thereby establishing social connections, the direct impact on quality of life will affect lontg-ter health and happiness in the seior population.	www.namahn.com, yellowwindow.be	Public Social Services	Social	Healthcare	Service Design	Service	social, behavioural, quality of life, inceased life expectancy.
4	4 Tuesdays on Eco-Design	The '4 Tuesdays on Eco-design' are four-day seminars which aim to raise awareness of eco-design amongst designers and project managers, introducing them to eco-design and the main tools for eco-designing products.	http://www.seeplatform.eu/casestudies/4%20Tuesdays%20on%20Eco-design		Environmental	Knowledge transfer	Eco-Design	Approach	Environmental, Innovation,
5	Whittington Hospital Pharmacy	To improve service deliver at the Whittington Hospital Pharmacy through 1. Improving the patient experience 2. Developing ways to use the space to promote healthcare messages 3. Offsetting expenditure by increasing pharmacy sales	http://www.designforeurope.eu/case-study/whittington-hospital-pharmacy	NHS	Social	Healthcare	Service Design	Service	Economic, Social, Emotional, Quality of Life

Table 6-2 highlights a sampling of the case studies evidencing singular areas of targeted impact (causes) resulting in multiple areas of actual impact.

Table 6-2 Targeted impact (causes) vs. actual impact

Targeted impact versus actual impact		
Case Study	**Targeted Impact (cause)**	**Actual Impact (cause)**
Whittington Hospital Pharmacy	Health Care	Health care, emotional care quality of life
4 Tuesdays on Eco Design	Knowledge Transfer	Knowledge Transfer, Innovation
Blood Donation Chair	Health Care	Health Care and Procurement innovation
Social Inclusion of Seniors	Health Care	Health care, quality of life, increased life expectancy

- Further, the data also revealed that where the targeted impact (Sector) originated as a singular target (E.g. only economic), the resulting actual impact was to dual targets.

For example, a project targeting social impact in reality netted both social and economic impact. In most cases, the economic impact was measured quantitatively, and other benefits were acknowledged but not analyzed as relevant data.

- Similarly, the data showed that where the targeted impact was dual, the resulting actual impact was multiple.

For example, where the targeted impact was toward social and environmental concerns, the actual impact was social, environmental, and economic.

Table 6-3 highlights a sampling of cases from the data set illustrating these trends.

Table 6-3 Targeted sector impact versus actual impact

Targeted impact related to sector versus actual impact		
Case Study	**Targeted Impact (sector)**	**Actual Impact (sector)**
Whittington Hospital Pharmacy	Social	Social and Economic
4 Tuesdays on Eco Design	Environmental	Environmental and Economic
Barking and Dagenham Council	Social and Environmental	Social, Environmental and Economic
Behavioural Insights Team	Social and Economic	Social, Economic, Systemic

- In the area of targeted impact - the data showed that in 75% of the case studies, only singular sectors within government were targeted; that is to say, towards only economic, or, social, or environmental or systemic areas of government activity.

The analytical coding offered equally valuable data. Unlike the descriptive coding, here the themed area and related sub-themes included in the CF, were used as qualifiers to describe, analyse, interpret and/or validate the existence of the particular theme within each case study. This procedure was repeated for each themed area.

For example, with respect to the area of design, each dimension of what design is functioned as a sub-theme as well as an analytical code. Table 6-4 lists the codes that were applied for this area.

Table 6-4 Thematic area of design – analytical codes

Thematic area of *design (sub-themes)* – Analytical Codes
Design
• **Produces outcomes that are tangible and intangible**

• **Manifested as: communication (signs and words), construction (things), strategic planning (action), systemic integration (thought)**
• **Exists as: Professional sector, ability, approach/process**
• **Utilizing: skills, tools (methods), knowledge (theories)**
• **Qualities: eg. Human centered, collaborative, problem-solving, sustainable, user centered, etc.**

The descriptors for each sub-theme were considered in the analysis.

- 'Presence or absence scoring' (Boyatzis, 1998) of all the case studies showed relevance to each sub theme in the area of design (Table 6-5).

This is significant since each sub-code listed, reflects a dimension of a what design is theoretically, as examined in Phase One of the study. Also, since these dimensions were consolidated into a definition of design as it exists in this context, this exercise validates not only the proposed definition in practice, it also validates the elements which make up the scope of design's capabilities within the context of government. This successfully addresses the core research question.

- The presence or absence scoring in this themed area also validates the existence of design's capabilities as being ability and approach/process in addition to the professional industry that it is usually regarded as in this context.

Where case studies explicitly noted the design field engaged in the specific project, within the description of the case study, the design process or design approach was declared as being of value to the client. Based on this observation it can equally be noted that both the process and product were highlighted as being evident in all case studies. The analysis of results equally verified this observation.

- The results additionally show that with respect to all of the case studies, design outcomes were always found to be both tangible and intangible despite the declared type of design used.

Table 6-5 Analytical coding in the thematic area of design

		DESIGN (what design is in the context of government)												
		INPUTS												
No.	Case Study	Outcomes Are:		Manifested As:				Exists as:				Utilizes:		
6	Barking and Dagenham Council	x	x	x	x	x	x	x	x	x		x	x	x
7	Behavioural Insigts Team	*	*	*	*	*	*		*	*			*	*
8	Better by Design	*	*	*	*	*	*		*	*			*	*

- The coding of 100% of the case studies identified the existence of each analytical thematic area as part of each study. Specifically, design, design knowledge transfer, design-in-government modes as well as areas of impact within government.

This validates the existence of design-in-government system and sheds light on what that looks like in operation across various types of projects in diverse countries.

6.3 Chapter Summary

The study was beneficial to visually map what design does within the context of government qualitatively from a perspective not related to any one case study.

Thematic analysis facilitated the examination of secondary case studies in a general way without regard for the method used in each study. Important insights into the nature of design, how design operates within government and the potential for design were revealed. Some insights were beyond this research such as the indication of common funding streams for projects, the range of design promotion actors, and geographic locations.

The outcomes evidence the reality that the use of design in government is presently relegated to singular streams of use and intended impact (economic, or social, or environmental, or political).

The research revealed a gap between the intended and actual impact with the latter being multi-dimensional.
Along these lines the study shows that design has the potential to operate holistically in the context of government. Holistically meaning, the strategic use of streams of design's capability can be targeted for multiple streams of impact.

This type of approach towards design's use has not previously been identified.

Through the analytical coding, the investigation validated outcomes from the wider research studies including:

- The definition of design.

- what the capabilities of design are.
- the conceptual framework (along with its principles).

Based on the results from this study, a prototype framework will be modelled (Phase Six - Chapter 8) which reflects the holistic nature of design's capability and potential for impact.

Beyond this study, the process revealed the ease with which additional case studies can be examined to determine the relationship between specific design implementation strategies and more efficient inputs or outcomes.

Finally, the study shows how intrinsically linked the ideas of what design is and what design does are – two philosophical tenants at the core of this research which give design (in all its manifestations), meaning.

7 EVALUATION OF STUDY RESULTS

"Involving practitioners in research design, implementation and analysis improves the quality and usefulness of research."

Smith, Bingman et al., 2003

7.1 Overview

This chapter reports on the incremental evaluation of study results from Phases One through Four of the research through an iterative process of engaging with stakeholders, industry, and thought leaders. It represents Phase Five of the wider thesis investigation (Figure 7-1).

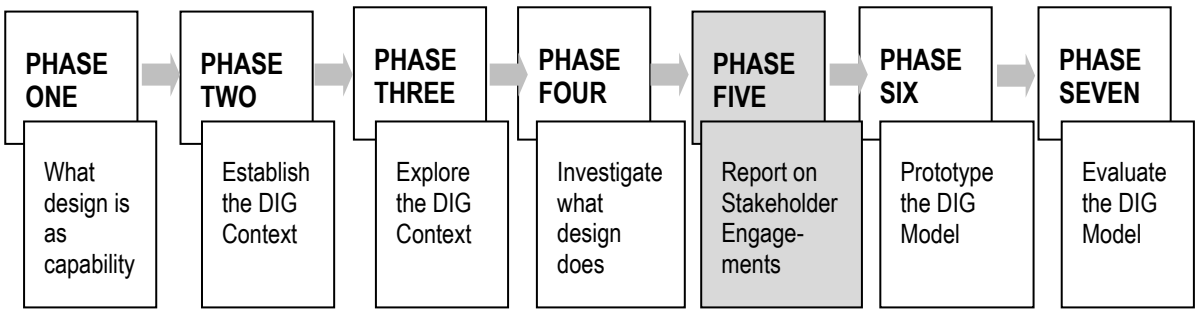


Figure 7-1 Phases of the research investigation. Phase Five highlighted.

Due to the novelty of the subject matter, the proliferation of new knowledge in this field being disseminated during the time of this research, and the opportunities afforded to the investigator to present study results, the decision to engage with stakeholders and industry proved to be a practical way of informing the research and evaluating study results incrementally as the findings emerged.

The ongoing interaction with stakeholders throughout the research process, after each phase of investigation, informed the researchers' reflections by furnishing the investigator with knowledge and insights of the unfolding phenomena in some cases as the information was being made available. Robson (2015) notes that the "practitioner-researcher synergy is beneficial [in that the] insights and role of

a practitioner helps in the design, carrying out and analysis of useful and appropriate studies (Robson and McCartan, 2015).” In addition to validating the written and visualized study results, the experience of engaging with stakeholders also informed the research direction, and raised considerations related to the development of the design-in-government model from the practitioners who would in fact be using it. Further, the incremental input from industry grounded and validated the theoretical findings in realism and helped to inform the selection of appropriate methods for successive phases of the research.

Approach Summary

During the research process, results from Phases One through Four of the research were captured and presented in both written and graphic visualizations at 6 International academic and industry conferences in 4 countries internationally between 2013-2019. Table 7-1 charts the conference presentations according to the chapter and phase of investigation that the results were primarily related to.

Table 7-1 Stakeholder Engagements alongside Phases of the Investigation and Chapters

Chapter(s) being evaluated	Phase(s) being evaluated	Stakeholder Engagement
2	One	2014 WIRAD Symposium (Wales)
4	Two	2013 DMI ADMC (Cambridge, UK)
2-5	One to Three	2015 Design Principles and Practices (Chicago)
2-5	One to Three	2015 Policy and Politics Conference (Bristol, UK)
2-6	One to Four	2016 DMI ADMC (Boston)
2-7	One to Four	2018 World Design Summit (Montreal)

This chapter summarizes 1. what was presented at each stakeholder engagement, 2. what was being "tested" or the goal, 3. stakeholder feedback and finally, 4. researcher reflections on what was learnt from the feedback given and the application of that information to the wider thesis.

What was being "tested" corresponds to categories of results for each phase of the research. Each category directly relates to a research objective. As described in Table 7-2 these categories include results related to context, concepts, content, and communication objectives of the research. Their relationship to each Phase is charted in Table 7-3

The evaluation criteria considered for each experience, corresponds directly to the research objective for each phase. Table 7-2 the categories of results. Their relationship to each Phase is charted in Table 7-3

Table 7-2 Categories of Results and Descriptors

Category	Description
Context	relating to the design-in-government scope/framing
Concepts	relating to the ideas imbedded within the DIG context
Content	referring to the specific information/knowledge within the DIG framing as organized under themed headings.
Communication	relating to communication goals, objectives, tools specific to the DIG Context.

Table 7-3 Stakeholder Engagement alongside Evaluation Criteria

Ch	Phase of the Investigation	Evaluation Criteria	Stakeholder Engagement
2	One	**Content**	2014 WIRAD Symposium (Wales)
4	Two	**Concepts**	2013 DMI ADMC (Cambridge, UK)
5	Three	**Concepts, Content, Context**	2015 Design Principles and Practices (Chicago)
6	Four	**Context, Concepts**	2015 Policy and Politics Conference (Bristol, UK)

Ch	Phase of the Investigation	Evaluation Criteria	Stakeholder Engagement
2-6	One-Four	**Content**	2016 DMI ADMC (Boston)
2-6	One-Four	**Concepts, Content, Context**	2018 World Design Summit (Montreal)

Section 7.2.1 and 7.2.1 presents results from the first 3 engagements. The remaining 3 engagements are summarized in Section 7.2.4.

In addition to the conference presentations, during the same period, the researcher also attended 43 related conferences, workshops, lectures, roundtable discussions, and symposiums to benefit from new knowledge opportunities internationally. Appendix E charts the range of engagements attended as well as their relevance to the wider study. The influence of engaging with the subject matter reflectively through attendance at these engagements is discussed in section 7.2.5 of this chapter. The chapter concludes with a summary of the successful evaluation of research results from Phase One through Four and the implications for the cumulative visualisation of results into the Design-in-Government model which is carried out in Chapter 8.

7.2 Results

7.2.1 WIRAD Symposium, Wales, UK

The firs stakeholder engagement was a conference paper presentation at the Wales Institute of Research in Art and Design (WIRAD) Emerging Researchers Symposium. WIRAD is Wales's premier Art and Design research institution. The event was held at the Wales Millennium Centre, Cardiff, UK September 11-12, 2014. According to their literature, the aim of the symposium was to provide new art and design researchers, typically PhD students an opportunity to present their work and share ideas (https://wiradsymposium2014.wordpress.com/about/). Conference delegates included design-in-government practitioners, academics/researchers, and art and design practitioners from various disciplines.

Summary of Presentation

The joint symposium paper and presentation was entitled, *Design Capability in Government.* The study was carried out early in the research as part of the scoping task to clarify meaning of core terminology in the wider research. The concepts of design, capability, and design capability in the literature were examined.

Goals

The goal of this engagement with stakeholders was two-fold. First it was intended as a way to validate the content of the findings, including a validation of the existence of confusing terminology in practice. Secondly the goal was to gain an understanding of how the findings together fit as an element of the literature review.

In terms of its relevance to the wider research, the goal of the study was foundational to addressing the research aims and answering the research question. Hence the stakeholder validation of the research content and direction at this early stage was critical.

Feedback and Application

Feedback was obtained both on the written conference paper as part of the review process as well as verbally during the presentation.

An excerpt reviewer comment shown in Table 7-4 highlights feedback validating the existence of and problematic nature of diverse definitions for the terms being address both in research and practice. This supports the need for a definition of design specific to this context which therefore became a required research outcome in Chapter 2 (Phase One). Testing the appropriateness of the proposed definition was slated as a goal for a later subsequent stakeholder engagement. This is discussed in section 7.2.2 of this chapter.

Table 7-4 Reviewer comments from WIRAD peer reviewed conference paper, 2014. Source, Author.

Reviewer Comments:
This paper presents a very interesting contextualisation of the definitional requirements for design in government research. Whilst many researchers have talked about the problematic nature of the various definitions of design, the additional complication of defining capability and thus design capability is novel. The paper uses this exploration of the available definitions to provide a proposed definition of design capability suitable for the research. The conclusion of this paper could be improved by 1) a clearer link between the explored definitions and the chosen definition, and 2) explanation of how the author plans to test the appropriateness of the final definition.

Feedback was also focused on the need for the investigator to apply the findings from Phase One into the research as data that validates the existence of confusion with reference to the use of the term *capability* within both the theory and practice of design-in-government. These considerations were adopted into Chapter 2 (Phase One) of the research.

Reflection

Stakeholder input was an effective tool to successfully evaluate and make sense of the study results from Phase One of the research. The feedback validated the importance of integrating these important considerations into the research as a way to clarify context and understand elements foundational to answering the research question by addressing key terminology.

Finally, the symposium focus, geared towards PhD researchers, proved to be a constructive experience. Observing the presentations of peers specifically in the area of design research and listening to the feedback given allowed the researcher the opportunity to understand alternative methods, research designs, and consider various ways of presenting research results.

7.2.2 DMI CADMC, Cambridge, UK

The second stakeholder engagement attended was the 2013 Design Management Institute Cambridge Academic Design Management Conference. Cambridge University, Cambridge, United Kingdom, September 4-5, 2013. Conference delegates included practitioners from design-in-government, design, government, design management, the third-party sector, academia, and research.

A conference poster entitled. “D.A.M. Political Reform: An Integrative Structural Tool for Comprehensive Design Policy Development” was displayed over the two-day duration of the conference with the investigator present to discuss its content with viewers.

The poster presented on initial findings of Phase One of the research looking at dimensions of what design is a capability. It included both written and visualized results.

Summary of Presentation

Although early in the research, the presentation proposed a mock-up of a tool that represented the synthesis of preliminary findings acquired during the scoping phase.

The findings indicated the existence of various elements regarded as design’s nature, perceived as capabilities, which could be beneficial to governments considering design for use as policy. The analogy of a dam was identified and presented as an appropriate concept image successfully capturing the elements of potential, resource, impact, and flow consistent with design’s identity as capability.

Goals

The goal of the engagement was to test both the findings (content), and the ideas (concepts) associated with the study as well as the proposed visual synthesis as a tool (communication).

Feedback

Stakeholder comments were varied and constructive. Insights were captured as notes by the investigator during or shortly after informal discussions with viewers in situ. Table 7-5 summarizes a capture of the comments with the general evaluation criteria which guided the process of reflection for the investigator.

Feedback related to the research direction was also gained and noted although not solicited. The wider benefit of stakeholder feedback beyond the intended goals was recognized.

Table 7-5 Summary of Comments from Delegates at 2013 DMI CADMC

Stakeholder	Stakeholder Feedback	Related Criteria
Delegate 1	"The concept of a dam is strong analogy to capture the abstract dimensions of design as capacity"	Concept
Delegate 2	"Interesting topic, keep going"	Direction
Delegates 2 and 3	"The use of colour is effective to convey the distinction between the area of design and government and how the two interact"	Visual communication
Delegate 4	"There are additional modes of integration besides the policy route. Consider adding those as these findings research evolves."	(Findings) Content
Delegate 5	"The high-level perspective is novel"	Context
Delegate 6	The modeling is based solely on theoretical evidence. Consider examining what the findings look like from a practice perspective.	Research Direction

Reflection and Application

The following reflections were considered and applied based on stakeholder's comments.

- The research question has not been explored fully therefore what the capabilities are may change. As a result, a checklist may not be the most effective tool and a tool may not be the most appropriate construction. Consider prototyping after results from *"what design is"* are complete.
- Additional areas of need as identified in the scoping stage, have not been analyzed and prototyped.
- What design is includes more than simply it's conceptual dimensions. Develop conceptual framework further (in application) in order to understand context clearly including how it operates.
- The concept of a *dam* will be maintained but used only as an analogy. Varying methods of communicating it will be explored in future iterations.
- Location of knowledge transfer is accurate – upfront in "policy" process
- A more general term as a themed heading will be used to communicate the various kinds of design strategies which exist.
- Reservoir: Checklist of *capabilities* not comprehensive and needs to more generalized. Exploring *what design is* should inform what needs to be communicated.
- The feedback recommending that theoretical finding be validated with practitioners suggests the requirement for an appropriate method to explore the phenomena from an empirical perspective.

Summary of Learnings

Prototyping as a method is valuable in assisting to clarify problems and work towards innovative solutions. As a means of analysing and synthesizing data visually, it allows for users to contribute feedback during its development to ensure appropriateness and accuracy. The mocking up a of a prototype in this early stage of the research and presentation of same to industry and academia, facilitated targeted discussion and feedback that informed the research direction.

To this end, visualizing results during this early stage was a beneficial tool as part of the iterative process, especially as it applies towards the fulfilment of the second research aim concerned with the visualization of results into an information tool for stakeholders and industry.

The concepts and the high-level perspective were perceived to be strong areas of interest to the delegates whereas the solution of a checklist as a tool did not come across as an appropriate means of delivering information. A focus on the design-in-government context, to be finalized in the development of the conceptual framework will be valuable in informing the visualization of the high-level context and therefore the form and shape of future iterations.
Further refinement of 'what design is' in the context of government (the main content of the construction) will help to inform the type of construction to meet the communication aim of the wider research.

With the understanding that conceptual models undergo numerous iterations as a working tool because they are used as instruments for developing and clarifying theory (Maxwell, 2013), revised iterations will continue to be included in future stakeholder engagements as part of the visualization of results in order to inform the incremental development of the final model construction for the overall research.

7.2.3 Design Principles and Practice Conference, Chicago, 2015

The third stakeholder engagement occurred at the 2015 Design Principles and Practices Conference, Chicago, Illinois U.S.A. The 9th annual research conference took place over a 3-day period and according to the published literature, it was attended by over 185 delegates from 30 countries (https://designprinciplesandpractices.com/about/history/2015-conference).

Summary of Presentation

The conference presentation reports on results from Phases Two and Three of the investigation. The draft paper is concerned with the development of the research context (Phase Two) and the exploration of this context in practice based on results from a three-month case study placement (Phase Three). The

study results from Phase Two were visualized into a conceptual framework (CF) which guided the study in Phase Three in terms of what to explore. As the conference audience was primarily related to the fields of design, emphasis was placed on presenting findings related to the thematic area of design within the CF to clarity what design is in relation to the wider context.

Goals

The goal of the stakeholder engagement was three-fold. To evaluate:

1. The Design-in-Government Context – i.e., the content of the CF which includes its thematic, conceptual, operational, and philosophical components.
2. What design is within this context – i.e., the content within the thematic area of design. This is essentially the results from Phase One of the study and includes a written proposed definition of design).
3. The visualization of the results into the CF construction (visual communication).

Stakeholder Feedback

Comments, questions, and suggestions from the delegates were minimal, varied but constructive. Directly after the presentation, at the request of the delegates to clarify some of the detailed content, time was spent reviewing specific presentation slides.

Table 7-6 Summarizes 4 of the key emphases noted from the stakeholder feedback.

Table 7-6 Summary of Stakeholder Feedback

Stakeholder Feedback	Criteria
The Design-in-Government context was an interesting perspective to allow the reader/viewer to situate themselves into.	Context
A great deal of detailed information to present all at once.	Content Research Direction Communication
The use of colour is effective in the modelling.	Visual communication
Consider highlighting the qualitative data in the visual presentation.	Communication

Reflection and Application

Within the thematic area of design, a proposed definition of design was presented as part of the presentation of results. The overall volume of information presented prevented this fundamental research outcome to be effectively processed by the delegates as no feedback on this element was received. The triangulation of methods in the research design should allow for targeted feedback on this specific outcome.

It was an ambitious undertaking to present the context for the research with all of its details, the contents within that context which were equally detailed, and all within the 10 minute/20 slides constraints set out by the conference. It was equally unrealistic for the delegates to grasp the volume of detail presented under those conditions. The challenge for the viewers to understand and process that scope of information in a brief time period was reflected in their comments and requests for slides to be reviewed for clarification. Although the experience helped to evaluate findings from the context as well as the thematic area of design, presenting on one or the other would have been more beneficial to the viewer. Simplified presentation goals for future stakeholder engagements will be considered. Notwithstanding these challenges, the use of colour proved to be beneficial in helping viewers to understand the general elements of the context and to situate themselves therein. The use of colour will therefore be maintained as a visual communication tool in future iterations of the visualized results.

The design-in-government context has been demonstrated as a valuable outcome of the study essentially informing all stakeholders involved in the realm, including design and government practitioners of the general operations and functional relationship between the component parts. As such allowing the framework to be “open” to allow for additions to each principal as the field expands would create opportunities for further refinement.

Table 7-7summarizes results from the remining 3 stakeholder engagements including investigator reflections on the feedback given and the application of same to the wider research.

7.2.4 Summary of Results from Remaining Stakeholder Engagements

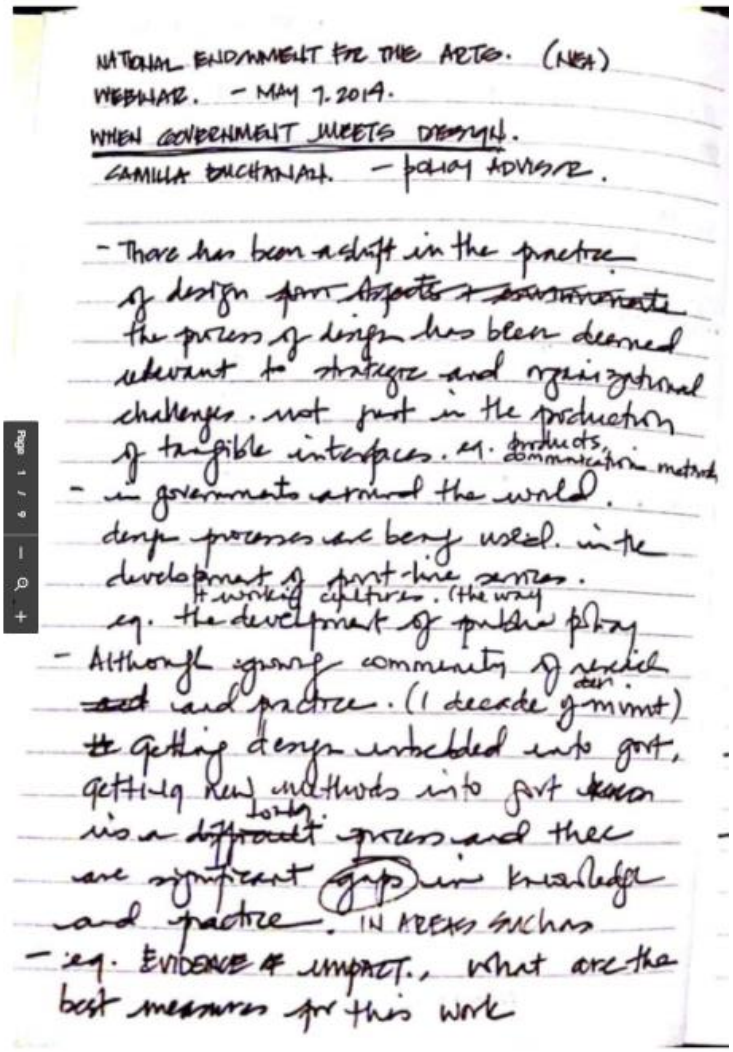
Table 7-7 Summary of results from Stakeholder Engagements from 2015-2018

Stakeholder Engagement	Summary of Presentation	What was being tested (Criteria)	Stakeholder Feedback	Researcher reflection and application to the thesis
Policy and Politics Conference, Bristol, UK, 2015 The fourth engagement with stakeholder took place at the 2015 Policy and Politics Journal and Conference held in Bristol, UK. The event featured over 140 paper presentations and was attended by over 154 delegates from 28 countries. The aim of the conference is to advance knowledge in public and social policy and to foster active discussion and debate. https://policypress.wordpress.com/2015/10/01/democracy-inequality-power-policy-politics-conference-2015/	Notes form a draft paper entitled Examining the Capability of Design in Government for the Development of Public Services was presented to test initial findings from a study related to Phase Four of the research. During this Phase, the question of what design can do in this context is explored through a review of 36 cases studies of design use. The draft paper discuses insights into limits of the current use of design in public service delivery highlighting the prevalence of familiar design dimensions including service design, design thinking, and graphic design in use. The study aims to propose other areas of design that could potentially be engaged to create added impact.	The goal of the presentation was to gain insights specifically from Public Policy researchers and practitioners to understand how design capabilities directly relate to their work in public service delivery. The content was presented visually, using the Conceptual Framework for Design-in-Government to contextualize the information. Immediate feedback from conference delegates who were primarily government practitioners were noted and included as data for this thesis.	Delegates noted difficulty in understanding the context presented in the CF. They couldn't situate themselves in the mapping of the field. One attendee asked for examples of how design is used in public service delivery so they could understand the application of design. Attendees were interested to see the outcome of the wider study and voluntarily gave their contact information for follow up.	What became clarified through the feedback from delegates is the requirement for public service practitioners to understand specifically how design is used and how it is applied to policy design. Although this information is addressed generally in design-in-government literature, which is examined and categorized in this research, it is not of direct concern in this research. The results from the research communicated what design is and its contextualization with respect to government. The requirement to show results in a way that demonstrates its application is validated through this experience, more specifically, the use of case studies as a tool to demonstrate design's utility. The categorization of these case studies according to the CF's thematic categories or design's dimensions might be a way to do so. The conclusions from this experience, therefore, inform the development of a future paper. The goal for this conference was achieved.
DMI ADMC, Boston, USA, 2016 Results from Phase Four of the research were presented at the 20th Design Management Institute (DMI) Academic Design Management Conference and journal in Boston, USA, July 22-29 2016. The conference theme "Inflection Point" focused on the intersection between design research and practice where significant dramatic change occurs. The conference program describes the motivation of the organizers recognizing that "partnerships between academia, industry and government are becoming the new normal; hence, collaboration and knowledge-transfer are creating inflection points capable of changing the course of companies, industries, economies and governments."	The double-blind peer reviewed paper was entitled "Towards a Design-in-Government Framework: A Thematic Analysis of Case Studies Examining the Capability of Design in Government." The results represented the finalized study results presented exclusively to government practitioners at the Policy and Politics conference the year prior related to Phase Four of the research.	What was being tested was the content of the results namely the holistic perspective that all dimensions of design could impact all dimensions of government simultaneously. This result challenged current perceptions of design as capacity in government	Feedback was relevant to the context, the content of the results presented, and the method employed. Delegate responses included: " The dimensions of design beyond discipline and design thinking are interesting to observe" " The use of secondary case study is an effective method to	Stakeholder feedback validated the following: 1. Dimensions of what design is as identified in Chapter 6. 2. That these dimensions are regarded and used by practitioners as capacity. 3. An understanding of the holistic perspective that all dimensions of design have the potential to impact multiple sectors of government simultaneously. Reflection:

Stakeholder Engagement	Summary of Presentation	What was being tested (Criteria)	Stakeholder Feedback	Researcher reflection and application to the thesis
The goal of the conference was to "facilitate a diverse, rich, and provocative dialog between academic researchers and design practitioners in industry; to surface opportunities for new connection, combination, cooperation and collision." http://www.dmi.org/?ADMC2016Overview The conference was targeted for its diverse global audience of design and government practitioners and academia.	In this paper, the question of what design can do in this context is explored through a review of 36 cases studies of design use. The paper highlights the range of design's existence as capability and its holistic use in all areas of government.		use to capture a variety of realities about what design is and does within the context of government." "The conference presentation is very theoretical. It needs to include practical examples of the data used especially when presenting to practitioners."	The *design-in-government system* is demonstrated as a valuable outcome of the study essentially informing all stakeholders involved in the realm, including design and government practitioners of the general operations and functional relationship between the component parts. The section concludes with opportunities for further refinement by allowing it to be "open" allowing for additions to each thematic heading as the field expands. Application: Feedback was also relevant in terms of how to visualize the results in the subsequent refining/prototyping of the model in Chapter 8.
World Design Summit, Montreal, Canada 2018 The final conference presentation was at the 2018 World Design Summit held in Montréal Canada. The international event was described as an unprecedented gathering of diverse disciplines with a common focus: how design can shape the future. Its relevance was seen by the research as a way to position the research for current and future application as new knowledge. The event hosted design professionals, government and business leaders, industry representatives, media, and NGOs from around the world.	The presentation summarized results from Phase Seven of the research which evaluated the finalized results to targeted stakeholders through interviews and questionnaire.	In this presentation, the results from the wider study were summarized and presented to stakeholders generally to introduce the overall results to the research and practice communities.	The presentation was one of the final ones of the conference and as such attendance was minimal. In attendance however were delegates from Canada, the UK the US and Poland all interested in seeing the published results.	The conference was an opportunity to engage with global leaders related to design in the context of government. Attending other presentations allowed the research to further contextualize elements of the emerging practice in terms of how dimensions of design, design knowledge transfer, design-in-government modes of integration and design impact all further revealed the realities of the design-in-government contextualization as identified through this research.

7.2.5 Attendance at industry events 2013-2019

Attendance at 45 international industry events across 5 countries from 2013-2019 informed the researcher on current developments in the emerging field. The events ranged from webinars and workshops to book launches, conferences, academic presentations, and colloquiums. In some cases, the researcher was able to engage informally with key practitioners and thought leaders directly. The information contributed to an enriched understanding of the wider context and its related issues. Transcripts and reflections were documented manually in the form of research notes for each event.


NATIONAL ENDOWMENT FOR THE ARTS. (NEA)
WEBINAR. - MAY 7. 2019.
WHEN GOVERNMENT MEETS DESIGN.
CAMILLA BUCHANAN. - policy ADVISOR.

- There has been a shift in the practice of design ~~from Aspects + ...~~ the process of design has been deemed relevant to strategic and organizational challenges. not just in the production of tangible interfaces. eg. products, communication material
- in governments around the world. design processes are being used. in the development of front-line services. eg. the development of public policy (working cultures. (the way
- Although growing community of research and practice. (1 decade of innovation) ~~to~~ getting design embedded into govt, getting new methods into govt is a difficult process and there are significant gaps in knowledge and practice. IN AREAS SUCH AS
- eg. EVIDENCE OF IMPACT., what are the best measures for this work

Figure 7-2 Researcher notes from an industry event

Figure 7-2 shows an example of researcher notes taken at webinar hosted by the National Endowment for the Arts (NEA) entitled When Government Meets Design. The webinar featured Design Policy Advisors from the United Kingdom and the United States. The notes show how the knowledge exchange session.

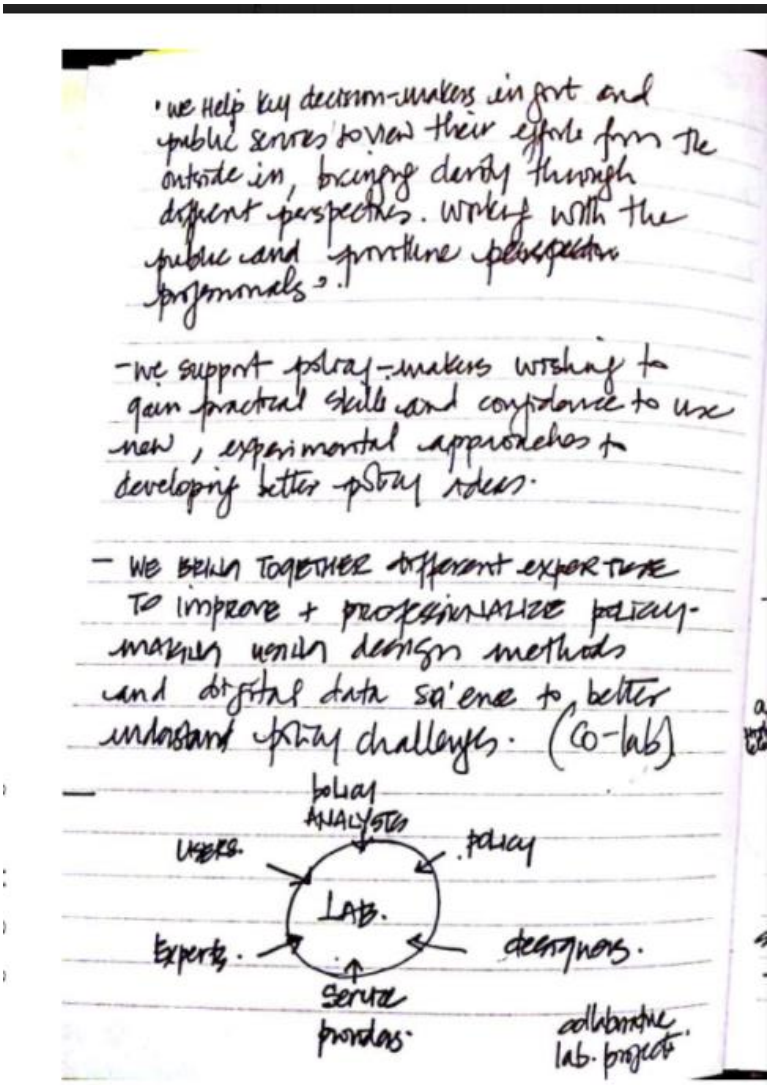


Figure 7-3 Researcher notes from an industry event

was instrumental in helping the researcher understand, directly from design-policy practitioners, how they work with governments and the benefits they bring to the policy process. The graphics helps to clarify understanding as part of the reflective process.

Research reflections in terms of the contribution of key learnings and their application are summarized and included as an attachment to this thesis as Appendix E.

7.3 Chapter Summary

Throughout the research process, the researchers' experience of presenting results to stakeholders, attending workshops, engaging with thought leaders being involved in other knowledge sharing experiences, and recording and reflecting on the information and insights gleaned, not only helped to successfully evaluate the study results through a consideration of the categories of evaluation; the experiences provided first-hand knowledge of the evolving field while at the same time informing the investigators' decisions on what to do and how to do it. The experiences with stakeholders added an element of practical realism to the theoretical aspects of the work strengthening the robustness of the research process. Table 7-8 charts the key outcomes from the analysis of study results according to CF categories based on stakeholder engagement.

Finally, in analysing both the written and visual aspects of the research results, the experience also informed the development of the Design-in-Government model being prototyped in the next Phase of the research. As the task of visualizing the research results for application to government and related stakeholders is a research aim, validation of the model's components by the target audience and insights given into how to communicate the information effectively by users, allows for the final product to be appropriate in its construction.

Table 7-8Summary of the application of stakeholder input according to categories of research results.

Category of Results and related Descriptor	Summary of the application of stakeholder input
Context relating to the design-in-government scope/framing	• The Design-in-Government context was an interesting perspective to allow the reader/viewer to situate themselves into. • The research question has not been explored fully therefore what the capabilities are may change. • Develop conceptual framework further (in application) in order to understand context clearly including how it operates. • A more general term as a themed heading will be used to communicate the various kinds of design strategies which exist. • "The high-level perspective is novel"
Concepts relating to the ideas imbedded within the DIG context	• What design is includes more than simply it's conceptual dimensions. • "The concept of a dam is strong analogy to capture the abstract dimensions of design as capacity" • The concept of a *dam* will be maintained but used only as an analogy. Varying methods of communicating it will be explored in future iterations.
Content referring to the specific information/knowledge within the DIG framing as organized under themed headings.	• A great deal of detailed information to present all at once. • Additional areas of need as identified in the scoping stage, have not been analyzed and prototyped. • Location of knowledge transfer is accurate – upfront in "policy" process • A more general term as a themed heading will be used to communicate the various kinds of design strategies which exist. • Stakeholder input was an effective tool to successfully evaluate and make sense of the study results from Phase One of the research. The feedback validated the importance of integrating these important considerations into the research as a way to clarify context and understand elements foundational to answering the research question by addressing key terminology • Reservoir: initial Checklist of *capabilities* not comprehensive and needs to more generalized. • "There are additional modes of integration besides the policy route. Consider adding those as these findings research evolves."
Communication relating to communication goals, objectives, tools specific to the DIG Context.	• the requirement to show results in a way that demonstrate its application. • A great deal of detailed information to present all at once. • The use of colour is effective in the modelling. • Consider highlighting the qualitative data in the visual presentation. • As a result, a checklist may not be the most effective tool and a tool may not be the most appropriate construction. Consider prototyping after results from *"what design is"* are complete • Additional areas of need as identified in the scoping stage, have not been analyzed and prototyped.
Other • **research direction**	• A great deal of detailed information to present all at once. • Stakeholder input was an effective tool to successfully evaluate and make sense of the study results from Phase One of the research. The feedback validated the importance of integrating these important considerations into the research as a way to clarify context and understand elements foundational to answering the research question by addressing key terminology • Exploring *what design is* should inform what needs to be communicated. • theoretical findings be validated with practitioners suggests the requirement for an appropriate method to explore the phenomena from an empirical perspective. • The modelling is based solely on theoretical evidence. Consider examining what the findings look like from a practice perspective.

8 PROTOTYPING THE DESIGN-IN-GOVERNMENT MODEL

"The role of design is….to demystify what design means and to make real and tangible what is possible."

Mollie Ruskin, 2016

8.1 Overview

This chapter focuses on the development of the design-in-government model; a task that addresses the research aim concerned with formatting the study results for application to government and related stakeholders. In terms of the wider research investigation, it represents Phase Six of that process (Figure 8-1).

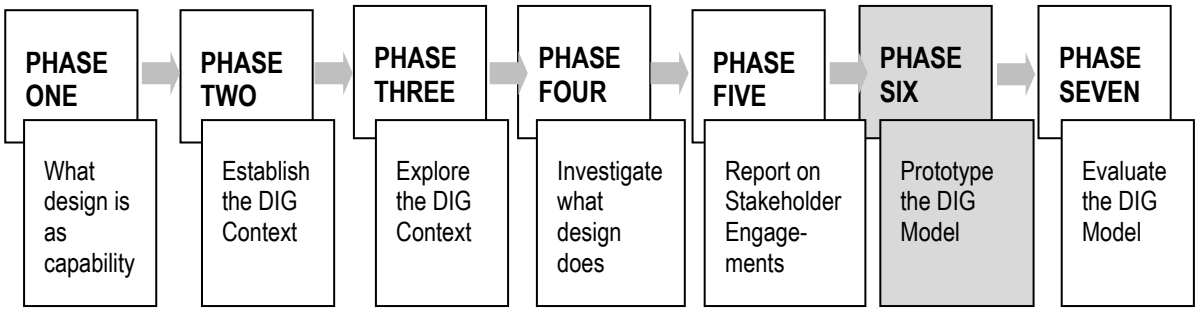


Figure 8-1 Phases of the research investigation. Phase Six highlighted.

The prototyping endeavour is achieved through the visual synthesis of cumulative study results from Phases One through Five (Chapters 2 through 6) of the thesis culminating in the finalized Design-in-Government model construct. The results reported in this chapter are organized according to the study outcomes from these phases. Each is expressed as a visualization to identify what was known during each Phase of the research and utilized at that time as sense-making exercises to inform the investigator of what was yet to be explored in the wider research. The visualisations also functioned as summarized representations for use at engagements with stakeholders to garner feedback and validate findings according to specific criteria of elements of the Model's construction including its

concepts, context, content and communication. As such these recommendations are included in the narrative of the results to capture the logic of the analysis of cumulative findings which occurred as part of the prototyping exercise during this phase of the research. It also reinforces the importance of the experiences of the researcher and the target audience in the research process (Armitage, 2007). It is understood that the synthesized visualizations from logic model through to the Design-in-Government Model are carried out not for their graphic merit but simply to visualize the cumulative information into a single communication tool according to the specified criteria.

The chapter begins with a review and analysis of what type of construction to build followed by the presentation of study results as a prototyping exercise, and it concludes with the proposed model construct. The model is evaluated for its utility in Chapter 9.

8.2 Considering What to Build

The question of what to build in response to the target audience and in light of the design-related context was considered. Since the concern of language and precision were sub-issues in this research, guidelines for accurate identification and naming were referenced. The literature gave evidence of a range of representations.

Phaal et al. (2001) explores this issue of semantics with regards to management frameworks identifying the lack of “rigor or consistency in the literature in terms of definition, development and application of frameworks, and other related terms such as models, maps, methods, etc. (Phaal et al, 2001)”. In order to address this gap, he proposes a meta-framework by Shehabuddeen et al. (2000) that gives definition and criteria for analysis and use. Phaal et al. (2001) notes that the boundaries between the various forms of representations and approaches are not distinct, and hybrid forms exist (Figure 8-2).

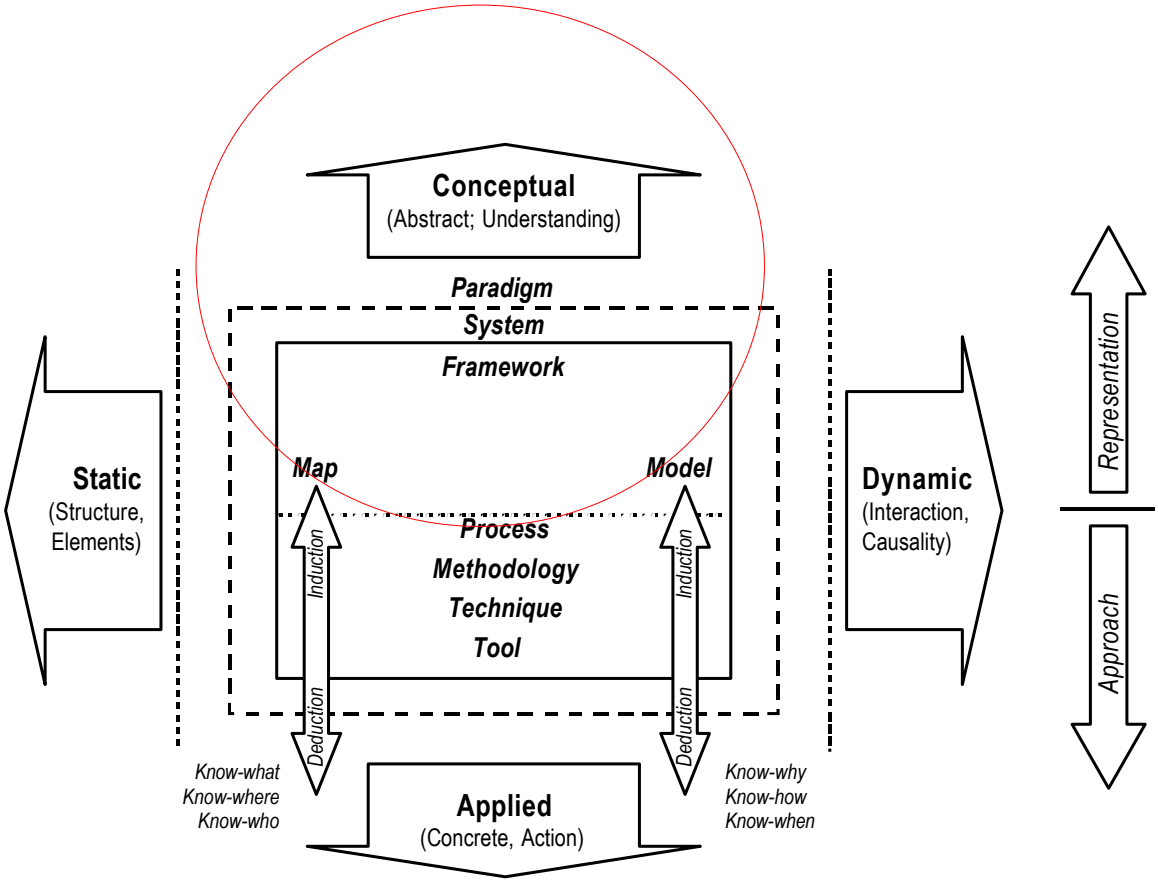


Figure 8-2 Meta-Framework: management representations and approaches (Shehabuddeen et al., 2000, in: Phaal et al., 2001)

Allied terms are organized to show their relationships in this framework according to the dimensions of applied-conceptual and static-dynamic. The authors define the terms as:

- ***Conceptual:*** concerned with the abstraction or understanding of a situation.
- ***Applied:*** concerned with concrete action in a practical environment.
- ***Static:*** concerned with the structure and position of elements within a system.
- ***Dynamic:*** concerned with causality and interaction between the elements of a system.

Their relationships are defined as follows:

- A ***paradigm*** describes the established assumptions and conventions that underpin a particular perspective on a management issue.

- A ***system*** defines a set of bounded interrelated elements and represents it within the context of a paradigm.
- A ***framework*** supports understanding and communication of structure and relationship within a system for a defined purpose.
- A ***map*** supports understanding of the static relationship between elements of a system.
- A ***model*** supports the understanding of the dynamic interaction between the elements of a system.
- A ***process*** is an approach for achieving a managerial objective, through the transformation of inputs into outputs.
- A ***procedure*** is a series of steps for operationalising a process.
- A ***technique*** is a structured way of completing part of a procedure.
- A ***tool*** facilitates the practical application of a technique.

(Shehabuddeen et al., 2000 in Phaal et al, 2001)

Finally, constraints or guiding principles for consideration in the construction of the prototype were identified. These include the core concepts of potentiality (reservoir/resource), impact (value, effectiveness) as derived from the literature review. User experience research considerations of simplicity and universality were also included as important considerations to facilitate understanding and ease of use.

In addition, design-related literature, and direct observation of the range of devices being used in practice provided evidence of several types of visual instruments used for communication to government. How they were used was also noted. The range of constructions included: reports, tools and tool kits, approaches (such as design thinking) frameworks, models, maps, reports, articles, and general graphic interpretations of charts, diagrams, and figures.

Based on the referenced terminology, the nature of the research evidence supporting the existence of a system therein and the dynamic elements related to its components, a model was selected as the most appropriate construct for this study.

8.3 Results

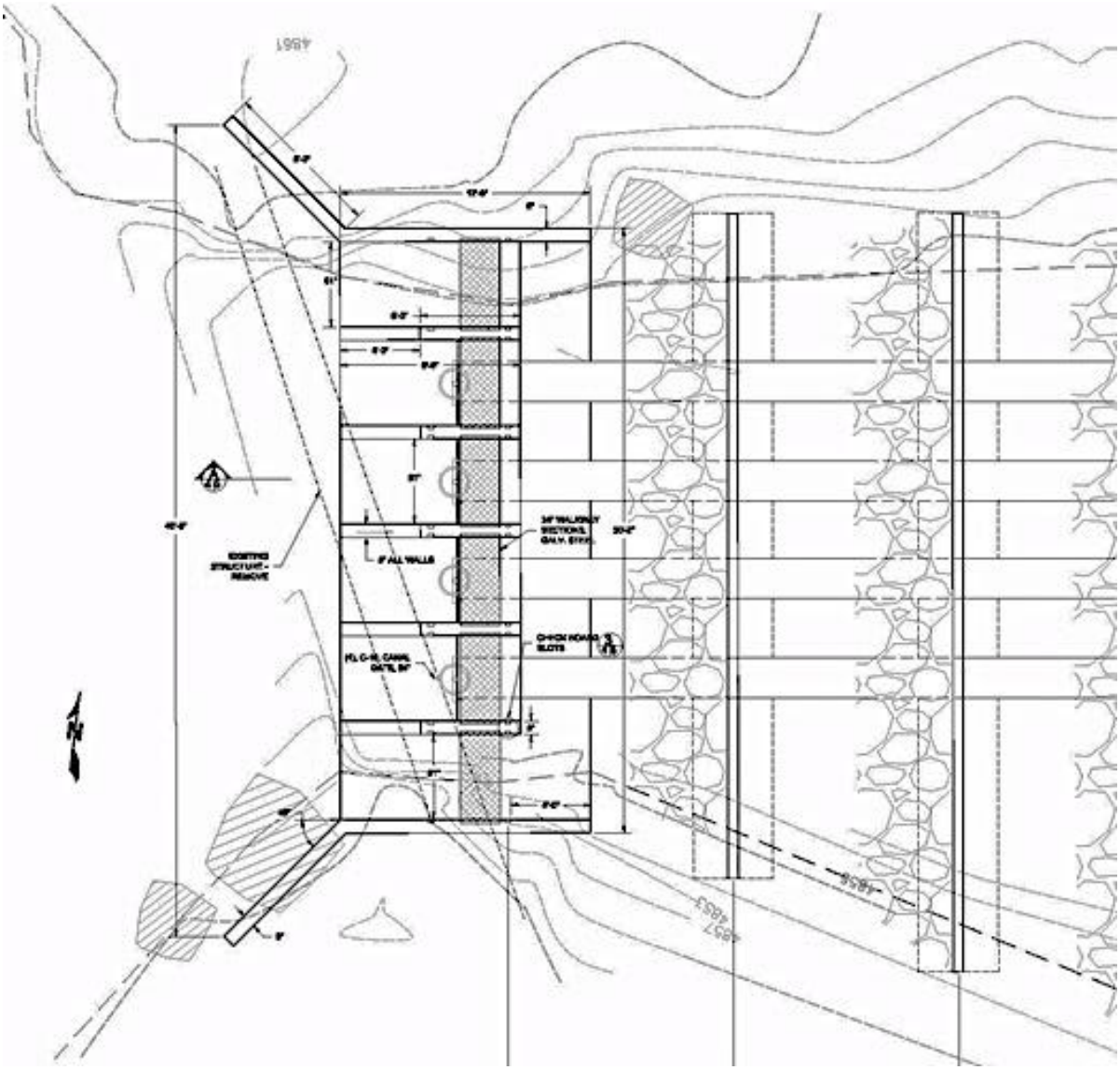
An approach towards modelling was adopted from Maxwell (2013). The process develops from concept and logic models to conceptual frameworks to more detailed constructions. The evolutionary process as it relates to this research and its outcomes is presented in this section.

8.3.1 The Conceptual Image

During the early stage of the research process, while scoping to understand the nature of the field and its diverse literature, an image of a dam was perceived as a visual representation appropriately capturing both the ideas and themes existent within the Design-in-Government context. The image facilitated the analysis and synthesis of findings during Phases One and Two of the study.

Shown in Figure 8-3 as an engineer's drawing in plan, the conceptual image functioned as a means of thinking through the diverse findings representing both the research context, concepts, thematic headings, and the nature of design within this context.

As a starting point in the analysis, the idea of a dam in its entirety, aptly captures the notions of capacity, potentiality, resource, and impact; all dimensions of what design is conceptually, as well as the nature of the context. Additionally, it encapsulates the functional relationship between the component parts of the context, understood as themes in the literature (envisioned in the vertical placements. In the analogy, the reservoir, penstock, generator, output channels etc. implies process or movement from one domain, in this case, design (on the left), to another, government (on the right).



Courtesy of Brockway Engineering

Figure 8-3 Engineer's drawing of a dam structure used as a conceptual image

8.3.2 The Logic Model

During this same stage of the research, as the literature was reviewed, thematic streams were clarified and operational components of the context became more evident, a second iteration of the visualization was conceptualized as part of the analysis and synthesis of findings. The Logic Model for Design-in-Government includes the consideration of thematic and operational elements. The logic also facilitated the classification or mapping of literature according to the identified themes. Finally, the clarified visualization of the context allowed the researcher

to identify thematic area of design as the functional domain within which the research question lies.

Employing the image of the dam as a side elevation (Figure 8-4), reading from left to right, the researcher was able to rationalize the logic that the potentiality of design rests within the 'input' domain of the design-in-government system. From this location, design moves as resource towards government where the short, medium and long-term impacts are seen.

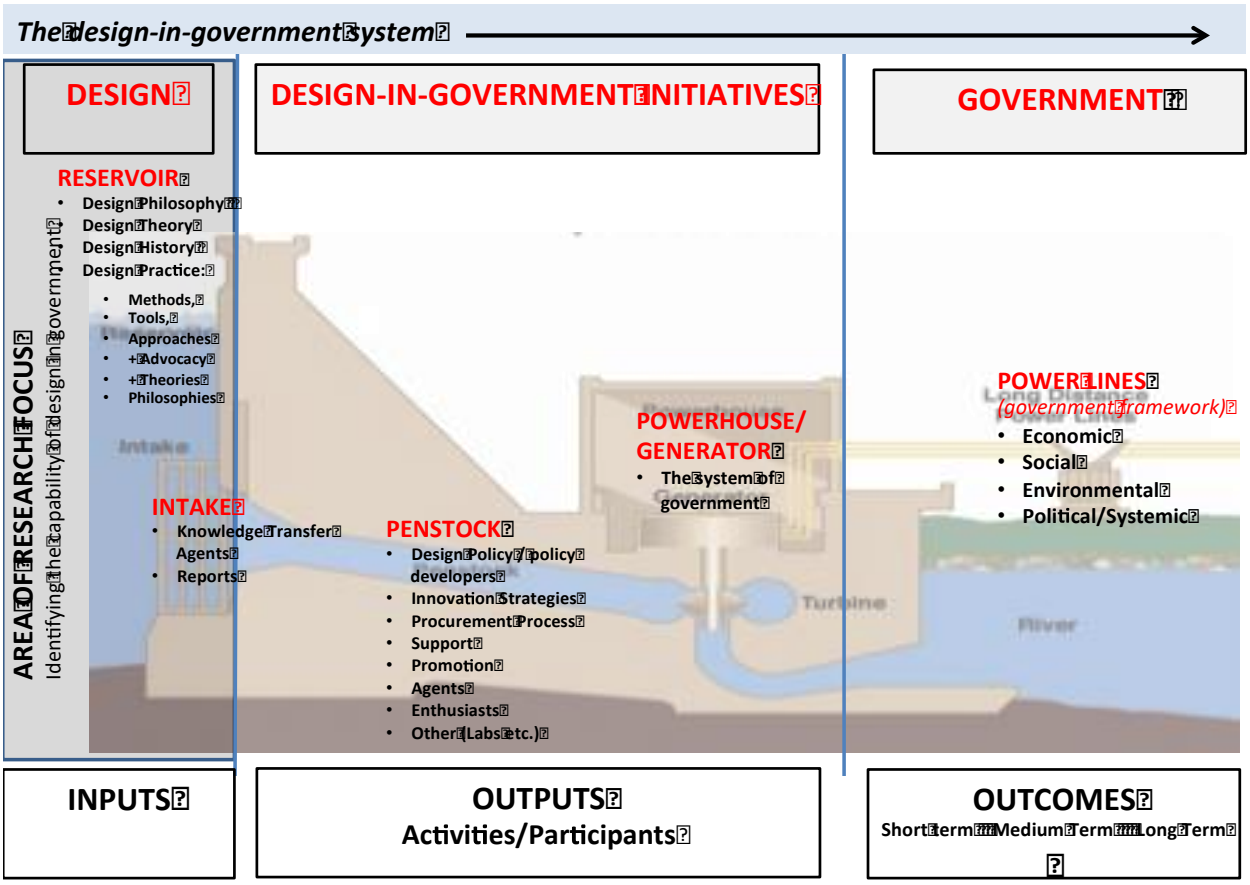


Figure 8-4 The Logic Model for Design-in-Government

The following simplified analogy delivered by the researcher to stakeholders and industry during a presentation of visualized results in 2015, highlights not only how the intended purpose of a *dam* (to transform latent energy into a usable power source) relates to the research findings, but also to the relevance of the system (process), the component parts, and the value of what is produced to the end users. Also, the suitability of the term *capability* defined as *potential* (Chapter

2) assumed for this research, mirrors logic of the analogy employed in this analysis – *'the ability of design to impact government'.*

> *Here the 'penstock' controls or channels this 'energy' from the 'intake' (Knowledge Transfer Sources) to the 'turbine/generator' (various design-in-government 'mechanisms' - activities and participants) through to the output areas/system of government. The energy is then converted into useable power as needed and distributed through the economic, social, environmental, and systemic domains of government to the end user measured in terms as short, medium and long-term impact.*
>
> Excerpt from the Researcher's Presentation Script, Design Principles and Practice Conference, Chicago, 2015

Maxwell (2013) contends that as a tool, concept and logic models preface the development of a conceptual framework. This was the experience in this research as the iterative process towards the study progressed.

8.3.3 The Conceptual Framework for Design-in-Government (CF)

The objective of Phases Two and Three of the research were concerned with the establishment and exploration of the novel research context respectively. The Conceptual Framework for Design-in-Government (CF) was the key outcome of these phases, developed theoretically during Phase Two (Chapter 4) and explored in practice during Phase Three (Chapter 5) of the research. The CF includes a synthesis of results related to the Thematic, Operational, Philosophical and Conceptual findings of the research and also includes the declared research problem as part of its construction. Maxwell (2013) stresses its inclusion partly "because it identifies something that is going on in the world but also because its formulation is a key task in the design of the overall study (ibid)."

Shown in Table 8-1 and

Table 8-2, the framework was prepared in both tabular and visualized forms to capture both its theoretical and practical dimensions. As a visualized summary

of the cumulative research results to the point, the construction was used as an analytical tool in the remaining Phases of the research.

Table 8-1 The Conceptual Framework (CF) for Design-in-Government (Principles)

The Conceptual Framework for Design-in-Government (Principles):
1. A holistic view of design as it operates in government. This includes thematic, philosophical, operational, and conceptual elements. **A.** Thematic**: includes thematic areas of *Design, Design Knowledge Transfer, Design-in-Government Modes of implementation*, and areas of *Government* impact. (Source, Author)** **B.** Operational: **identifies i) the placement of themes, ii) relationships between them, iii) reflects dynamics of interdisciplinary engagement** (Barry, Born and Weszkalnys, 2008; Kimbell, 2016)**, iv) Identifies the role each area plays as part of the design-in-government system of operations in term of *inputs, outputs* and *outcomes*. (Source, Author; (Malvido *et al.*, 2008; Moultrie, 2009; Moultrie and Livesey, 2009)** **C.** Philosophical: **involves areas of design meaning involving *What Design Is, What Design Does*, and *Communicating What Design is and Does.*** (Dilnot, 1982, 2018; Moholy-Nagy, 1991; Love, 2002) **D.** Conceptual: **reflects embedded concepts of *capacity, potentiality* and *impact* consistently echoed throughout design-in-government literature.** (The Design Council *et al.*, 2013)
2. Identifies the various dimensions of capacity that design exists as and its diverse applications. (Buchanan, 2001; Quartz + Co., 2011; The Design Council *et al.*, 2013; SEE Platform, 2015)

Table 8-2 The Conceptual Framework (CF) for Design-in-Government (Visualization)

Conceptual Framework for Design-in-Government (CF)				
Thematic Heading	**DESIGN**	**DESIGN KNOWLEDGE TRANSFER**	**DESIGN-IN-GOVERNMENT MECHANISMS**	Areas of **GOVERNMENT** Impact
Operations (DIG System)	*Inputs*	*Inputs*	*Outputs (Activities + Participants)*	*Outcomes (Short, Medium, Long-term impact)*
Philosophical Consideration	*What Design is*	*What Design is + What Design Does + Communicating What Design is and Does*	*What Design Does*	*What Design Does*
Concepts (DAM)	potentiality, resource, capacity, and impact			

In the visualization of the CF, the evolution from Concept and Logic models is evident with components retained including the thematic headings, concepts, operational and philosophical considerations. The element of colour was added to reinforce the ideas expressed through the *dam* analogy represented in an abstracted way. For example, the colour blue for the area of *design* represents a reservoir of potential, grey represents the functional utility of *knowledge transfer*, and yellow/gold connotes value or impact.

8.3.4 What Design Is as Capability

In addition to the Concept and Logic models, the results from Phase One of the research which represented a deep dive into the thematic area of design also included categories of attributes clarifying what design is as capability in the

context of government. These findings are charted in Table 8-3 identifiably against a blue hue consistent with its graphic relationship to the CF.

Table 8-3 Design as Capability in the Literature

design is:

identified as a:	*produces outcomes that are:*	*manifested as:*	*exists as:*	*utilizing:*	*to produce:*	*that by nature have the following qualities:*
NOUN + VERB	**TANGIBLE** **INTANGIBLE**	**COMMUNICATION** (Signs & Words) **CONSTRUCTION** (Things) **STRATEGIC PLANNING** (Action) **SYSTEMIC INTEGRATION** Thought)	**PROFESSIONAL SECTOR** *field, industry, services* **ABILITIES** *Thinking, Being* **APPROACH/PROCESS**	**SKILLS** **TOOLS** **(Methods)** **KNOWLEDGE** **(Theories)**	**TANGIBLE** **INTANGIBLE**	**IMPACTFUL** **HUMAN CENTERED** **PROBLEM SOLVING** **COLLABORATIVE** **USER CENTERED** **SUSTAINABLE** *ETC.*
Oxford Miriam Webster		Buchanan, 1995, 1998 SEE, 2011, 2012,	Various **Ability**: Roger Martin, Richard Florida, Silent Design **The Design Process:** Donald Schon			**Impactful:** Buchanan, 1995, 1998 **Human Centered:** **Problem Solving:** Buchanan, 1995, 1998 Horst Rittel **Collaborataive**: **User Centered:** Donald Norman, **Sustainable:** Victor Papanek

Summary and working definition:

"Design gives shape and makes change by producing tangible and tangilbe outcomes that are manifested as communication, construction, strategic planning or systemic integration. Design exists as a field, ability or process utilizing knowledge (theory), skills or tools (methods) to produce a desired outcome."

Conclusions:

The categories of findings in this area provide a clarified understanding of the dimensions of design available as resource to government. The synthesis of these attributes together into a paragraph represents a written definition of what design is in this context. The need for this responds to an identified gap of knowledge related to the research, and stakeholder feedback validating this requirement (Table 7-4). As a result, the information will be included in the final model construction.

8.3.5 The Holistic Paradigm

The recognition that all dimensions of design as capacity can operate in all areas of government simultaneously was the primary finding from Phase Four (Chapter 6) of the research. This understanding of the flow of design's capacity represents the crore learning of the research as it directly answers the research question. As such, the perspective needs to be represented in the visualization of results of the finalized model.

8.4 The Design-in-Government Model

To guide the process towards prototyping the finalized model, Coral and Bokelmann's (2017) study on The Role of Analytical Frameworks for Systemic Research Design was referenced. The authors highlight the benefits of utilizing frameworks in model building as an approach noting that,

- a framework is a platform in which theories and models can be constructed.
- frameworks help to organize research and provide a general list of areas or variables that will be used in any type of analysis.
- frameworks contribute meta-theoretical language, which enables scholars to discuss any particular theory or to compare theories.

Ostrom in Coral and Bokelmann (2017)

Hence, using the Conceptual Framework for Design-in-Government as a starting point as well as a guide towards prototyping was employed.

Each thematic area was mapped vertically according to the broad findings from each study. The thematic areas also represented the operational dimensions of the design-in-government field of practice (Figure 8-5). Shown as a black arrow across the base of the model the operational dimensions represent inputs, outputs (activities and participants) and outcomes (short medium- and long-term impact) in the system. The philosophical descriptors were included in the prototyped graphic to understand what was to be considered in each area. As shown horizontally beneath the thematic headings in Figure 8-5, these descriptors are noted as, *what design is, communicating what design i*s and does, and *what design does* within this context.

Consistent with the CF, the element of colour was used to differentiate between each thematic area and to represent the conceptual aspects of the context. The symbol of an arrow was employed as a distinct, directional aid to inform the viewer of the starting point of the graphic and of the intended flow of information from left to right.

Finally, to communicate the concept of the holistic paradigm, a blue line stretching from the left to the right of the model was added to show the directional flow of design as resource through to all areas of government. Figure 8-5 shows the application of all of these strategic visual considerations into the final prototyped Design-in-Government Model.

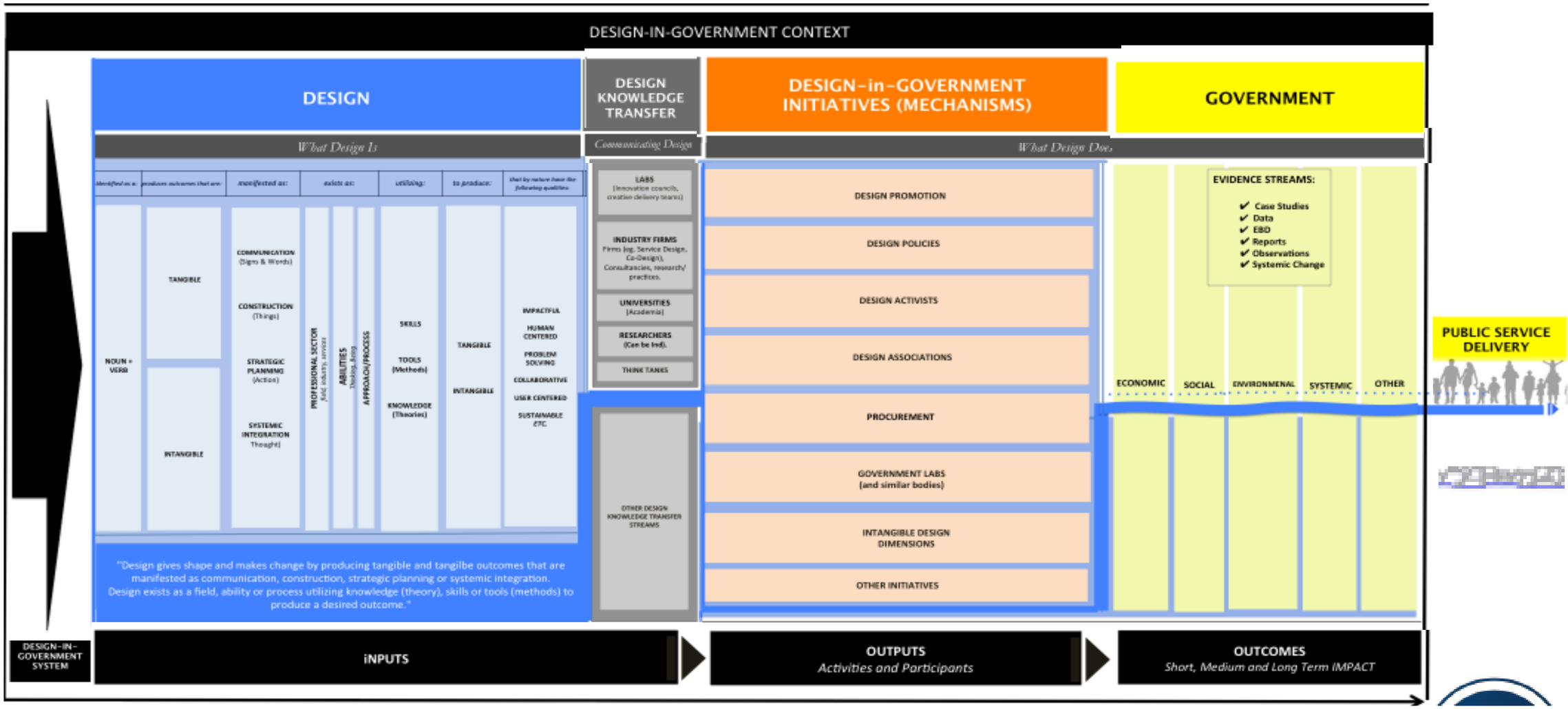


Figure 8-5 The Design-n-Government Model

8.5 Chapter Summary

In this study, the process of prototyping was carried out as a rationalized exercise of consolidating cumulative research findings from the overall study. As a visualization exercise it resulted in a crude mapping of the research results in visual form to graphically support the information contained. The investigator recognizes the limits of the graphic resources available and the technical abilities of the researcher to refine the model to a high level.

The model's components, however, successfully reflect the thematic, conceptual, philosophical, and operational principles which exist within the design in government context. The model as a tool, serves to clarify the understanding of what design is within the context of government. In this regard it directly answers the research question fulfilling the primary research gap, and also the research aim to format the research results for communication to government and related stakeholders.

As an entity the Model also represents the consolidation of diverse components of a field of research and practice into one collectivised unit. The high-level view allows for a visual point of reference for stakeholders providing knowledge of placements, related theories, propositions, and application. Additionally, common language is presented with the rigor to support its origins and use. The collectivization of the field and the visualization of same is a contribution to both theory and practice.

The model's thematic area of design displayed within this contextualization is equally a contribution to knowledge. The visualization displays design's capabilities, in the thematic area of design, with the graphic illustrating its reach into all areas of government. The visualization represents the communication of the novel holistic paradigm which currently does not exist in this area of research and practice.

The model will be evaluated for its utility through interviews with targeted stakeholders in the next final Phase of the study (Chapter 9).

9 EVALUATING THE DESIGN-IN-GOVERNMENT MODEL

"Clearly then, both the understanding of design and its public communication are not only necessary professional demands, but also urgent social needs."

Dilnot, 1984

9.1 Overview

This chapter focuses on the evaluation of the Design-in-Government Model. The study addresses the research aim concerned with communicating the cumulative research results to stakeholders. Here the prototyped model is evaluated for its utility as a communication tool through targeted interviews with 6 stakeholders. The results form the basis of recommendations toward future modifications to the model and suggest its wider implication and benefit to multiple audiences. The study represents Phase Seven, the final phase of the wider research process (Figure 9-1).

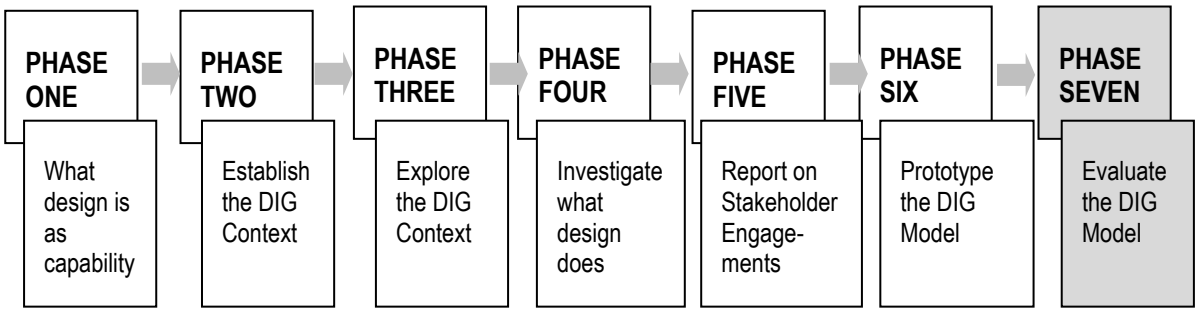


Figure 9-1 Phases of the research investigation. Phase Seven highlighted.

The chapter reports on a series of semi-structured interviews with 6 Design-in-Government practitioners spanning, policy making, public service delivery, governance, design education, design research, design promotion, design industry, design knowledge transfer in Canada and in Brazil at the local, regional, national and international levels. The participants each represented multiple sectors and fields therefore, varied perspectives were drawn from each during the interview process.

The analysis of results is based on a structure for Content Analysis proposed by Krippendorff (2004) which involves a process including:

1. The analysis of data identifying common themes, phrases/text, words.
2. Summarizing and tabulating of the findings.
3. Reflecting on groupings.
4. Considering the implications for model layout and design. Discussion.

The reporting of results inclusive of these considerations is presented in Chapter 9.2 as a narrative with supporting tables summarizing the synthesized raw data.

Considerations related to the implications for the model layout and design are discussed in Chapter 9.3 as part of the chapter summary.

9.2 Results

The text from the transcribed interviews was reviewed and analysed for recurring themes which reflected common viewpoints and important recommendations from the targeted user group.

The analysis of data identified the following common themes, phrases, and text. The data is charted below according to the 4 questions posed during the interviews.

Question 1: ***Is the information formatted appropriately for communication to government?***

The following results were recorded (Table 9-1).

Table 9-1 Results: Question 1

Results: Question 1 *Is the information formatted appropriately for communication to government?*		
Participant	**(Scale 1-5, 5 being the most appropriate)**	**Comments**
P4	-	Not hearing and seeing properly
P6	4.5	
P7	4.5	- no additional comments given
P9	2.5	"2.5 as a static diagram, 5 if it were animated"
P12	5	"I think it's really clear" but needs a narrative to accompany it.
P13	4	"Requires graphic enhancements"

Based on the 1-5 scale used by the respondents the model rated 4.1 out of 5 for appropriate formatting (5 being the most appropriate for the target audience).

The following common words and themes were noted from the responses (Table 9-2).

Table 9-2 Question 1 - Common words and themes

Common Words/Themes	**Response from Participants**
Clarity	"I think is really clear and easy to understand" [P12]
Viewed differently by different audiences	"It's easier to understand if you are a design researcher. It will be more difficult for government practitioners" [P9]
	"If you're talking to designers or design managers, they would find all of this really, really interesting and could get right into it. I think about the government people I know

Common Words/Themes	Response from Participants
	who aren't involved in design at all; I'm wondering if there might be a simpler form for them?" [P4]
	"I'm not sure if it's clear to me because I'm a designer. It makes a lot of sense in terms of the process and the output that design can have for government. [P9]
The need to animate the model when presenting to the target audience	"As a static communication to government would be difficult for them understand." [P9]
	"This is a very important input for your research because statically it works for an insider, but for an outsider, [animation] would help a lot to explain the bits of it, the parts of it." [P9]
	"[The model formatting needs} to be augmented and enhanced in terms of the flow of graphics to show that it is an active organism" [P13]

The findings through the ratings suggest that the formatting is appropriate for the target audience however the qualifying comments given directly following the ratings suggest otherwise, differentiating between its formatting for a design audience versus an audience of government practitioners. For the former, the formatting is appropriate with the words 'it's clear' being used by one respondent. but for the latter target group, modifications would be necessary. Suggestions include an animated model to show that it is dynamic, or to include case studies to show design application and impact. Producing a simplified model for government practitioners was another recommendation.

All respondents have backgrounds in design as well as working with government, so their dual perspectives were noteworthy.

Question 2: ***What are the most effective elements of the format?***

The following common words and themes were noted from the responses (Table 9-3).

Table 9-3 Question 2 - Common words and themes

Common Words/Themes	Response from Participants
Ease of use	"Very simple format, not too much information to drag your eye or distract. The narration speaks to each point clearly." [P7]
Organized	"The groupings and the sequencing of the information. Taking a lot of complex layers and organizing hem into a logical sequence and flow." [P13]
	"The ability to emphasize all that information into a easy explanation that was easy to understand. Government officials need something to see – the bottom line. If they had something to see how design has helped to influence plan 'z' when they picture the graphic, that would be more appropriate." [P12]
Presentation of Content	"When you split all these concepts into parts, explaining every single part of this it makes it more effective. I was so excited with the first part, with the whole part. The design definition, the way you put it, I think it's very good." [P9]

The results indicate that although the format as presented is organized well and easy to understand in terms of the layout of information, the narration is required to clarify each individual point shown visually.

The comments suggest that there is a lot of detailed but valuable information contained in the model visualization.

Question 3: ***How can the formatting of this tool be improved?***

The following common words and themes were noted from the responses (Table 9-4).

Table 9-4 Question 3 - Common words and themes

Common Words/Themes	Response from Participants
Dynamic format preferred for government practitioners	See Q1
Larger sized text required	"Larger size needed. Must be legible. What size will the final product be?" [P7]
	"I would add to this that in the specific formatting when you are labelling each component because there is such a lot of information in small print, that perhaps each of the words you introduce them can expand and shrink back as you introduce them so they are legible and can make a visual impact in the mind of the viewer; so that we can follow back at a specific point" [P13]
	"t's important to have both the whole picture as well as the text. I was trying to read it but it was difficult." [P9]
Consider multiple versions	"Consider a few variations of the model. Perhaps one at entry level. It's see-able at high level but it might be simpler to get them to these [more detailed] sections. Either without all the detail, because if it's too complicated they might find that a turn off if you're initially trying to engage them and then there can hopefully be an opportunity for more of the complexity later on. If you want to get the initial buy in, maybe there's a top level of this map that is somehow simplified." [P4]

Considerations for improvement included multiple versions of the model for government ranging from simplified to more detailed. The suggestion of a dynamic format with narration and larger sized font for the audience to clearly read the detailed information was also highlighted. Currently smaller that 8pt font is used in some areas.

Question 4: *What are your overall impressions of the model or general comments?*

The following common words and themes were noted from the responses (Table 9-5).

Table 9-5 Question 4 - Common words and themes

Common Words/Themes	Response from Participants
Requires Narration	"Requires narration to explain terminology "[P12]
Organized	"The groupings and the sequencing of the information. Taking a lot of complex layers and organizing hem into a logical sequence and flow." [P13]
Targets multiple audiences as product, process and in terms of specific content	"I can see a very direct use of this model. In a way you did what I'm trying to do in an eight-class workshop for my [business management] students. You have a very good abstract of what design is, what design can do, what would be the outcomes. When you bring it together it will be a fantastic tool." [P9]
	"I think it takes a lot of information and targets a lot of different industry and design aspects in government. And it helps the user locate their position in the scheme of things. It helps people find her accurate place where they function or trance back where they function specific industry position or government. Government position perhaps. It really helps give a comprehensive polar view of a complete system. It helps orient the users one to another and understand their role in the scheme of a wider, international dynamic." [P13]
	"if you're talking to designers or design managers, they would find all of this really, really interesting and could get right into it." [P4]

9.3 Chapter Summary

A number of key insights were gleaned from this study. The findings also highlight important implications for the model's refinement. Of note:

- The findings from this study suggest that the formatting is appropriate for an audience of designers however modifications need to be considered for the audience of government practitioners.
- Including participants spanning various areas within the design-in-government domain was valuable. Although it was a small sampling of participants, the responses reflected a wide range of professions and therefore showed the applicability of the model to multiple use groups.
- Of importance was the value of not only the model as a product but also the process by which the information was presented and the individual component parts which are if value to different audiences.

A summary of the key findings is presented in Table 9-6.

Table 9-6 Summary of Findings from Model Evaluation

Key Finding	Reference
Clarity	"Information is clear and easy to understand."
A Valuable Approach	"The approach taken for the model development is equally valuable."
Definition of Design is valuable to Design Educators	"The design component can be used in many inter-disciplinary contexts for design educators."
A versatile communication tool	"The Model speaks to different audiences simultaneously: design practice, public servants, design educators, researchers."
Model is of immediate use	"A valuable tool that can be used right now."
The model needs to be explained	"The model needs to be explained"

Key Finding	Reference
The model needs to be larger	"The model needs to be a larger size to be read"
A dynamic format more appropriate for government.	"The model would be more valuable to government practice in a dynamic format."

In terms of the wider research, this final study was not only significant in terms of addressing the final research aim (to graphically communicate research results to stakeholders) but also in terms of obtaining formalized targeted feedback from the intended user groups. This reciprocated experience speaks to the ability for the emerging design-in-government practice to created modes of targeted communication to other disciplines specific to their communication needs.

The evaluation of the model's utility reveals not only the importance of the content of what's being communicated but the requirement for that information to be presented in a simplified way for it to be understood and later applied according to its intended purpose.

As an exercise, the interview process revealed its limitations contingent on technology and time. The use of a script was helpful to systematize the process and to keep the time frame of each interview short. The script functioned as more of guide during the process as both the interview and interviewees took liberties to expand on and clarify ideas and their impressions of the model. It was a valuable process from which a large amount of rich information was gathered.

The study allowed for a clear sight of the model's strengths, weakness, and areas for improvement from multiple perspectives.

The results help to understand more accurately, areas of the model's contribution to knowledge. These aspects are discussed in the final chapter of this thesis (Chapter 10).

10 DISCUSSION AND CONCLUSIONS

"The reductionist approach to design has significantly contributed to the global problems we face today, and it is the synthetic or holistic view which offers a way out of our dire predicament."

John Broadbent, 2003

10.1 Overview

This chapter presents conclusions of the research. It commences with an illustration of how the research findings from the Seven Phases of investigations directly addressed the research question, aims and objectives. Section 10.2 highlights contributions to knowledge and the transferability of concepts to wider contexts. The value and limitations of the research are discussed in Section 10.3 providing a deeper understanding of the capability of design within the context of government based on insights gained through the research findings. This section also puts forth the authors reflections on strengths and limitations of the research process. The chapter concludes with considerations for future research based on the study outcomes.

Addressing the Research Question, Aims and Objectives

Explored in the research was the question, *what is the capability of design in government* by putting in place two strategic aims which directly support the emphasis on theory in the research. The first aim directly answers the research question and the second formats the results for application to government. To address the question and aims, seven objectives were set and were aligned with Seven Phases of investigations as part of the research process (Table 10-1).

Phase One clarified key terminology and identified what design is as capability for the study. Phases Two and Three established the research context for the emerging interdisciplinary field of research and practice. This provided the investigator with established parameters within which to situate the research. With that context established, Phase Four identified what design does within the

context. Each phase shows the outcomes as results in the respective chapters. The incremental study results were evaluated through stakeholder and industry engagement. This informed the appropriateness of findings to the context, content, conceptual and communication objectives of the study as well as its relevance to practice actualities.

Table 10-1 Thesis organization to address objectives and answer research question and aims

		PHASE OF INVESTIGATION	TASK	OBJECTIVES	METHOD
Research Question	Research Aim 1	**ONE**	Examine and Define What Design is as Capability	Examine evidence that shows "What design is" as capability through a systematic review of literature. Synthesize this information into a written definition of design for use in this context.	Focused Review of Literature on the area of Design
		TWO	Establish the Design-in-Government Context	Map the interdisciplinary area of Design-in-Government including related literature, evidence, and key concepts. Based on this information, to construct a Conceptual Framework (CF) in visual and written form, the need for the research and list gaps in the existing literature.	Scoping Review of Literature on the area of Design-in-Government
		THREE	Explore the Design-in-Government Context	Report on the development of the CF through insights gained on its components based on an embedded three-month engagement with related stakeholders.	3 Month Exploratory Case Study (ECS) within a design-in-government research-practice
		FOUR	Investigate What Design Does within the context of Government	Map "what design does" in the context of government according to identify themes from 30 secondary case studies and the CF.	Secondary Case Studies
		FIVE	Evaluation of Study Results through	Report on the model's concept, context, and content considerations from studies one through four based on feedback	Stakeholder Engagements

			Stakeholder Engagements	from international research and practice-based audiences.	
	Research Aim 2	**SIX**	Prototype the Design-in-Government Model	To produce a prototype of the Design-in-Government Model through the visual synthesis of study evidence from chapters 2 through 6.	Prototyping of synthesized research evidence
		SEVEN	Evaluate the Design-in-Government Model	To report on the evaluation of the model's utility as a communication tool from presentations and discussions with related stakeholders.	Evaluation of the Model through Interviews and questionnaires with stakeholders

10.2 Contributions of the Study

The study resulted in the identification of significant contributions to knowledge discussed here according to data, method, and theory as well as the transferability of key ideas to wider contexts.

A definition of design in the context of government

> *Design gives shape and makes changes by producing tangible and intangible outcomes that are manifested as communication, construction, strategic planning, and systemic integration. Design exists as a field of practice, ability or process utilizing knowledge (theory), skills or tools (methods) to produce a desired outcome (Chapter 2, Section 2.8).*

Through the study, a definition of design in this context has been developed addressing the need to isolate the broad term for use by government practitioners in this context (European Commission 2009).

The demarcation of the design-in-government context

> *Design-in-government represents a high-level contextualization of the layers and components of a complex evolving interdisciplinary domain of research and practice (Chapter 5, Section 5.3).*

The research articulated clarified boundaries for the interdisciplinary area of research and practice necessary for practitioners to operate within. This need

was expressed within practice (European Commission, 2009; APDIG, 2013). By naming, contextualizing, and consolidating its components, common language, common terminology (or categories to order the various terms in use), are put in place to reduce confusion and facilitate common understanding which is currently a barrier to its efficient operation.

The development of a design-in-government conceptual framework

> *As a conceptual framework, design-in-government orders related, diverse theoretical, operational, structural, and conceptual components for universal referencing and orientation between stakeholders. It also identifies the various dimensions of capacity that design exists as and its diverse applications. Insights from a critical review of related literature, empirical evidence from an exploratory case study within this unique field, and stakeholder engagement, inform its development. The visualization serves as the foundational structure for a design-in-government model developed to bring understanding of the scope of design as resource to government (Chapter 5, Section 5.3).*

Mapping the emerging field of research and practice in terms of related themes, philosophical, operational, and conceptual definers accordingly, and empirically validating the findings in practice, contributed to the development of a conceptual framework for design-in-government. The above statement articulates the finalized contextualization including its framework dimensions.

Scoping Review Methodology

In the quest to explore the emerging design-in-government field, its boundaries, key concepts and definitions, this study in its approach has demonstrated conformance to and the advancement of the fundamentals of scoping review methodological protocol. The process revealed from this research contributes to the theoretical evolution of the methodology.

Table 10-2 Summary of scoping review phases and outcomes for design-in-government

SCOPING REVIEW PHASES		AIM	PURPOSE	FINDINGS (Identified knowledge gaps)	OUTCOMES	Evaluation of study concepts, content, proposed context, and visual communication to target audience **(Through stakeholder engagement)**
1	**PRELIMINARY SCOPE**	Identify the research question Identify the parameters of the research scope	To direct the research investigation Explore the novel area of research and gather insights from which to direct other phases of the review investigation	Driving research question too broad. A scoping question needs to be established.	Q: "What is the D.I.G context?	
3	**SEARCH**	Identify relevant literature and sources. Identify conceptual themes. Isolate and group relevant literature (Chart the data)	Sift, search through in more detail and organize the diverse and varied literature identified in the Scoping phase. Map the data	Gaps identified and addressed: -undefined scope - no universal name for the scope - confusing and inconsistent terminology used within the scope Core issues and concepts identified Nature of literature identified along with some key publications and authors to drive search phase Identified: Themes in the literature A system of operations (a functional relationship amongst the themes.	Research scope defined Research Scope named: "Design-in-Government" The need to engage with industry as part of evidence gathering. Logic Model	- Symposium Paper: WIRAD Emerging Researchers Symposium, Sept 11-12, 2014 Cardiff, UK – "Design Capability in Government" -Poster: Cambridge Academic Design Management Conference, September 2013 - "D.A.M. Political Reform: An Integrative Structural Tool for Comprehensive Design Policy Development"
2	**GENERAL REVIEW OF LITERATURE**	Discover related insights and gaps	A general review of available knowledge in the area of design within government according to themed headings in order to gain sight of the bigger picture within which the research resides and identify gaps in the literature	Identified knowledge gaps from literature	Emerging Conceptual Framework Validated Research Question, established research aims and objectives	Conference Paper (Draft)- Conference Presentation: Design Principles and Practices Journal and Conference March 2015 "Design-in-Government: A Proposed Conceptual Framework
4	**IDENTIFICATION OF KNOWLEDGE GAPS**	Summary of identified gaps				
5	**STAKEHOLDER ENGAGEMENT**	Validate review outcomes Direct the study Identify gaps not considered Obtain and empirical perspective		Clarified need for the research. Identified knowledge gaps from industry experts		

Highlighted in Table 10-2, the process from this scoping review is shown to include the “identification of knowledge gaps” and “stakeholder engagement” (Phases 4 and 5), furthering the existing methodological process shown in Phases 1-3. Firstly, it acknowledges the identification of knowledge gaps consistent with the exploratory approach towards examining a novel field and secondly, the inclusion of stakeholder engagement, necessary for the theoretical relevance to practice. Outcomes from each phase have been included in Table 10-2 to understand the logic.

Contributing to theory, the methodology also addresses a need in the literature for theoretical constructs to be developed for the design-in-government domain through the mapping of available literature (Moultrie, 2013). Here, charted according to its identified themes, the task leaves room for further classification of its literature and knowledge as the field continues to evolve.

Finally, as a study in and of itself, the results of the scoping review (i.e., the information – the conceptual framework and its contents), can also inform decision making in practice (Peters et al, 2015).

Design-in-government: A holistic paradigm

Results from this research show that all dimensions of design as capability can impact all dimensions of government simultaneously. Holistic perspectives of design are not new (Broadbent, 2003), however in the context of design-in-government it is. Implementation of this new knowledge requires a shift in perspective from both the design field and from within government in terms of understanding what design is and its potential.

Currently in design-in-government practice, there are limits placed on design use in and by government. This is usually driven by a specific outcome required by government (an economic or social impact), a particular design dimension being endorsed by design support or design promotion bodies, such as graphic design or service design, or government definers of what the design industry comprises (Moultrie, 2009).

Shifts in these current practices requires necessary vehicles in place to manage and direct design holistically and strategically in government. It also requires government to consider new definitions for the design industry in their indexes to consider broader classifications, interdisciplinarity and intangible dimensions of design at play. Finally, it requires changes in the design industry itself to acknowledge the evolution of the industry beyond disciplinary classifications and embrace these broader design classifications such as design-in-government which encompass all fields and all competencies.

These insights represent potential areas for future study.

10.2.1 The transferable use of ideas

Transferability here refers to an approach which explores and identifies the nuances of the scope, philosophical, operational, and conceptual dimensions of design. Using this method to understand other disciplinary contexts is transferable for other developing fields of study.

Design in other contexts

An expanded view of what design is as capability uncovered in this research which led to the reality of design's relevance to government as a holistic resource, is an indicator of the contributions it can make to other fields of practice. See further in Section 10.4.

10.3 Value, Limitations, and Implications for Further Work

A clarified perspective of design is one of the valuable outcomes of this research. It fills the gap of knowledge which was identified in the literature to be a barrier to design use in government. However, exploring the area of design proved to be a limitation simply due to the nature of the obscure term which in and of itself has various meanings, applications and is attached to many contexts. Such a complex term also brings with it firmly, pre-established meanings and perspectives which made the task of conveying clarified understanding that much more challenging.

Prototyping the visualized research results into a model to aid in the understanding of the range of design's capabilities, was identified to be a limitation of the study in terms of the investigator's technical ability to produce quality, dynamic graphics. Additional resources to develop higher quality graphics could be considered for further work being done in this area of research.

Placing attention on the value of human experience is a tenant of the pragmatic paradigm and is regarded as a strength of this research. As the research involved addressing various cumulative elements, the continuous interaction with practitioners throughout the research process allowed for the incremental evaluation of study results throughout the research. This also ensured that he results were grounded in practical realism.

Researcher reflection was a valuable tool used in the analysis of study results as it engaged the background experience of the investigator including tacit knowledge as a part of the sensemaking process. Practitioner engagement and researcher reflection would benefit future research being done in this field.

A conceptual framework although challenging, was created and served as a valuable means to understand the context, its components, and principles. As a conceptual framework for this field didn't exist previously, the value of this construct extends beyond this research to facilitate understanding for other researchers associated with the field of design-in-government.

A limitation of the research was that the scope of the research proved to be a challenge. It was required to define key terms, then to identify and delineate the scope within which to locate the research before the task of answering the research question could be addressed. After this, the development of the model was required. The formatting of research results for communication to government could have been the focus of future research. As expressed in the comments from direct interviews with industry in the final study, the model from this research was trying to communicate all the results at the same time to all stakeholder audiences. In terms of further research, there is an opportunity for simplified versions of the model to be developed for various audiences including government practitioners.

Managing the vast amounts of qualitative data generated during the research process was determined to be another limitation in the research. Future research designs of this sort would benefit from the use of appropriate software to collect, sort, and map the large quantities of qualitative data.

Another limitation of the research is the need to link examples of how design is used to specific design dimensions for government practitioners to understand the application of a specific capability. The use of secondary case studies was valuable in the research to identify the various facets of design in its application to government. An opportunity presents itself for further research, to link digital case study libraries of design use and impact, from other researchers to its corresponding design competence, from this study, to reinforce the required links of design's application for practitioners.

Each of the thematic areas identified in this research could also benefit from this approach towards the inclusion of technology to provide integrated digital links to related resources, research, practitioners, exemplars that are classified within each area.

10.4 Developing this Research Further

Advancing the Scoping Review Methodology

Scoping Reviews are becoming increasingly popular due to the expansion of evidence-based practice fields and the "rapid increase in the availability of primary research (Peters et. Al., 2015)." The methodology continues to develop from its roots in 2005 with Arksey and O'Malley's first published framework for conducting scoping studies. This established the foundation for the methodology which continues to be extended and refined (Levac, Colquhoun and O'Brien, 2010; Peters et al.,2015). Researchers and clinicians from all fields are encouraged to engage in advancing the methodology through further research (Arksey and O'Malley, 2005).

Although carried out for its relevance to this study, findings from the scoping review in this research contribute to the advancement of the methodology in

terms of its approach and theoretical insights (Table 10-2). The implications support the formatting of the related findings from this research into a methodological paper.

Design Industry and Design Education

Increased design use in government implies a commensurate requirement on design practice and design education to meet this need.

Results from this research provide a snapshot of an emerging design discipline. Design-in-government is inclusive of other current sectoral terms being used in the industry (design policy, public sector design, design for policy, design-led government, etc.). Traditional design disciplines operate within silos of specialization for the most part. A multi-disciplinary model of service offerings and inclusive of design research, as evidenced in this research is one approach to meeting future demand in the public sector. However, the field of design-in-government is multi-disciplinary, trans-disciplinary and interdisciplinary encompassing all design competencies in both tangible and intangible dimensions. Further research is required towards government industry classification for this novel industry.

Further research is also needed to identify the competencies, skills and knowledge required for practice within the design-in-government industry. This would be a useful contribution to the advancement of design education and to the evolution of the design-in-government practice domain.

The Practice of Design-in-Government

Results of the research also illustrate a prototype for an emerging design practice in terms of its organization and processes.

In addition to understanding the operations of the design-policy team and their interplay with both the public and private sector, a greater understanding of the pivotal role those relationships play in supporting the seven other design teams within the practice was discovered. By assisting government and business to understand about design, it's capacity and relevance to their specific field, the

policy team facilitated pathways for the other design teams to deliver services to the public and private sector. This was achieved by providing insights to design teams of industry operations and best practices, sharing networking connections and assisting in the writing of funding applications.

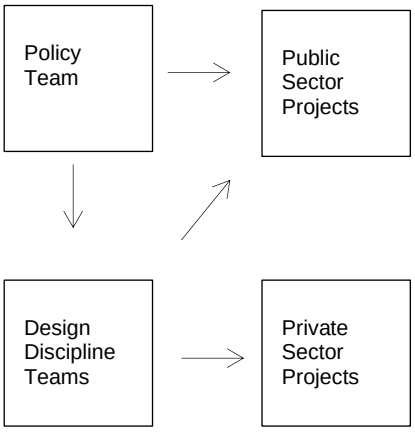


Figure 10-1 Practice operations for strategic project procurement. Source, Author

Figure 10-1 illustrates this functional interplay between the design teams towards procurement as observed from within the design policy team.

A greater understanding of the role of the wider practice plays towards government became equally apparent. Although the policy team was the primary liaison with government in terms of design support and knowledge transfer it also acted as a facilitator for the delivery of services from the other design disciplines to government.

Finally, the ability to transfer design knowledge through workshops and assist government practitioners in crafting design policies and support initiatives demonstrated their role as change agents embedding problem-solving values and skills on a systemic level.

Consideration of these unique operational, functional and systemic insights into the future development of the practice of design-in-government beyond this research is critical.

A Future for Design in Government

In reflecting upon this research, its perspectives, and future directions, two significant outputs are considered:

1. The identification of what *design* is as capability
2. The articulation of the *design-in-government* context

For both, and in light of "a world committed to more complex systems (Broadbent, 2004)", this research embraces the complexities of design as a vital component of its dimensionality which together represents the scope of its capabilities. This broadened perspective along with the complexity of the design-in-government context and system, expands designs usefulness and amenability to address the intricate problems which increasingly plague our world (ibid.). It also facilitates design's ability to evolve, create impact and engage in other interdisciplinary systems-oriented pursuits (ibid.). Indeed "design has a huge role to play in tackling some of the world's most urgent issues (Kester in Livesey and Moultrie, 2009)." This research positions design for such a task.

Through the development of the design-in-government context, this research created architectural constructs for the evolving field of research and practice. The field, already validated by its rich history of use and impact, comprised of robust evidence, inclusive of actors, initiatives, and processes, required and now has these constructs, to consolidate its varied elements. The contextualization also provides the necessary naming, common language and required definers for identification, classification, and unification of the profession. Finally, the contextualization brings with it an awareness of the philosophical, conceptual, operational, and functional elements dynamically at play therein.

The necessary collectivization of the field (Moultrie, 2013), of existing and future knowledge, the practice and its practitioners, and the forceful deployment of its resources can now commence.

REFERENCES

ACEM (2010) “Training and Examination Handbook,” pp. 461–492. Available at: http://www.acem.org.au/media/training/Handbook.pdf.

Ackoff, R.L. (1989) “From data to wisdom,” Journal of Applied Systems Analysis, pp. 3–9. doi:citeulike-article-id:6930744.

Adelman, C. (1993) “Kurt Lewin and the Origins of Action Research,” Educational Action Research, 1(1), pp. 7–24. doi:10.1080/0965079930010102.

Akademie, E., Wissenschaft, D. and Künste, U. (2009) “European Year of Creativity and Innovation 2009,” p. 1.

Aklin, M. and Urpelainen, J. (2013) “Political competition, path dependence, and the strategy of sustainable energy transitions,” American Journal of Political Science, 57(3), pp. 643–658. doi:10.1111/ajps.12002.

Amir, S. (2004) “Rethinking Design Policy in the Third World,” Design Issues, 20(4), pp. 68–75.

André, B., Clegg, L. and Rethel, L. (2012) “Global Governance and the Politics of Crisis,” Global Society, 26(1), pp. 3–17. doi:10.1080/13600826.2011.629992.

Andruchow, R. (no date) “Defining design: Why definition is important for design educators & practitioners.” Alberta: University of Alberta, p. 27.

A.P.C.I (2011) Design Management, Management.

APDIG (2012) A Design Policy for Europe? Available at: http://www.policyconnect.org.uk/apdig/sites/site_apdig/files/report/290/fieldreportdownload/apdigtermpaperfeb2013-adesignpolicyforeurope.pdf (Accessed: March 29, 2017).

APDIG (2013a) Buying Design: Where are We Now? Available at: http://www.policyconnect.org.uk/apdig/sites/site_apdig/files/report/390/fieldreportdownload/apdigtermpapersept2013v2-procurement.pdf (Accessed: March 29, 2017).

APDIG (2013b) Buying Design: Where are we Now? London, UK.

APDIG (2013c) Defining Design: The Debate. Available at: http://www.policyconnect.org.uk/apdig/sites/site_apdig/files/report/428/fieldreportdownload/apdigtermpaperdec2013-definingdesign.pdf (Accessed: March 29, 2017).

APDIG (2014) Design Research and Public Policy: Current Practice Working to Intersect with Government. London. Available at: http://www.policyconnect.org.uk/apdig/sites/site_apdig/files/report/475/fieldreportdownload/termpaperdesignresearchsummer2014.pdf (Accessed: February 7, 2018).

APDIG (2015) Thinking, Testing, Making: A Manifesto for Design. London. Available at: http://www.policyconnect.org.uk/apdig/sites/site_apdig/files/report/514/fieldreportdownload/manifestofordesign.pdf (Accessed: February 7, 2018).

APDIG and DBA (no date) Design and the Public Good: Creativity Vs the Procurement Process. London, UK. Available at: http://www.policyconnect.org.uk/apdig/sites/site_apdig/files/report/303/fieldreportdownload/designandthepublicgood-creativityandtheprocurementprocess.pdf (Accessed: March 29, 2017).

Arksey, H. and O'Malley, L. (2005) "Scoping studies: towards a methodological framework," International Journal of Social Research Methodology, 8(1), pp. 19–32. doi:10.1080/1364557032000119616.

Armitage, A. (2007) "Mutual Research Designs: Redefining Mixed Methods Research Design," in The British Educational Research Association Annual Conference. London, UK, p. 10. Available at: https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=12&cad=rja&uact=8&ved=0ahUKEwi0gpX5-I7aAhVeGsAKHaAcAtwQFgheMAs&url=http%3A%2F%2Fwww.leeds.ac.uk%2Feducol%2Fdocuments%2F167799.doc&usg=AOvVaw2GZuR0tyKI9mPV90oeDmnr.

Arts Council of Finland and Finnish Ministry of Education (2000) Design 2005! Helsinki:

Ashton, P. (2007) “Transferring and Transforming Design Knowledge,” in Proceedings of the Experiential Knowledge Conference. Bath, pp. 1–9.

Baber, Z. et al. (1995) The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies., Contemporary Sociology. doi:10.2307/2076669.

Bailey, B. (2013) “Paper Prototypes Work as Well as Software Prototypes.” Department of Health and Human Services. Available at: https://www.usability.gov/get-involved/blog/2005/06/paper-prototypes-and-software-prototypes.html (Accessed: February 21, 2017).

Bailey, J. (2014) Design Research: Political Evolution.

Balaram, S. (2009) “Design in India: The importance of the Ahmedabad declaration,” Design Issues, 25(4), pp. 54–79. doi:10.1162/desi.2009.25.4.54.

Baldwin, D.L., Daubs, M.S. and Tomasino, J.M. (2005) “Infusing traditional storytelling and design techniques into multimedia interface design,” in 3rd International Conference on Education and Information Systems: Technologies and Applications, EISTA 2005. Affiliation: School of Informatics, Indiana University, Indianapolis, IN 46202, United States: International Institute of Informatics and Systemics, IIIS, pp. 308–313. Available at: http://www.scopus.com/inward/record.url?eid=2-s2.0-84896991877&partnerID=40&md5=56af6d9b81ab579c8646a6b434f1b238.

Bannan, B. (2003) “The role of design in research: The integrative learning design framework,” Educational Researcher, 32(1), pp. 21–24. Available at: http://www.academia.edu/1913105/The_role_of_design_in_research_The_integrative_learning_design_framework (Accessed: March 25, 2013).

Barry, A., Born, G. and Weszkalnys, G. (2008) “Logics of interdisciplinarity,” Economy and Society, 37(1), pp. 20–49. doi:10.1080/03085140701760841.

Bason, C. (2010) Leading Public Sector Innovation: Co-creating for a better society. Edited by Policy Press. Bristol.

Bason, C. (2012) “Public managers as designers: Can design-led approaches lead to new models for public service provision?,” Ledelse & Erhvervsøkonomi, 4, pp. 47–69. Available at: https://www.djoef-forlag.dk/services/djm/ledelsedocs/2012/2012_4/le_2012_4_4.pdf (Accessed: May 25, 2017).

Bason, C. (2013) Design-Led Innovation in Government, Stanford Social Innovation Review. Available at: https://ssir.org/articles/entry/design_led_innovation_in_government (Accessed: February 15, 2018).

Bason, C. (2014) Design for Policy: Design for Social Responsibility. 1st edn. Routledge.

Bason, C. (2017) Leading Public Design: Shaping the Next Governance Model. Policy Press.

Beissel-Durrant, G. (2004) “A typology of research methods within the Social Sciences,” National Centre for Research Methods Working Paper, pp. 1–22. Available at: http://eprints.soton.ac.uk/34817/.

Bell, M. (1982) “Design Policy: an international debate.,” Design Studies, 3(4), pp. 243–245.

Bell, S.J. (2008) “Design Thinking,” American Libraries, 39(1/2), pp. 44–49. Available at: https://scholarshare.temple.edu/bitstream/handle/20.500.12613/125/Bell-JournalArticle-2008-01.pdf?sequence=1.

Bellinger, G., Castro, D. and Mills, A. (no date) “Data, Information, Knowledge, and Wisdom,” p. 4. Available at: http://courseweb.ischool.illinois.edu/~katewill/spring2011-502/502 and other readings/bellinger on ackoff data info know wisdom.pdf (Accessed: April 3, 2017).

Berger, G. (2005) Benchmarking for Innovation Policy-Making – A Literature Review. Brussels, Belgium.

Berry, S.R. (2013) “Transformational role of Lochiel Park Green village,” Smart Innovation, Systems and Technologies. Edited by H. A. et al. Affiliation: Barbara Hardy Institute, University of South Australia, Mawson Lakes, SA 5095, Australia; Correspondence Address: Berry, S. R.; Barbara Hardy Institute, University of South Australia, Mawson Lakes, SA 5095, Australia, pp. 1–13. doi:10.1007/978-3-642-36645-1_1.

Best, K. (2012) Design as an Enabler of Change, Design Management Institute News & Views. Design Management Institute News & Views. Available at: http://www.dmi.org/dmi/html/publications/news/viewpoints/nv_vp_kb.htm.

Bholat, D. and Gray, J. (2013) “Organizational form as a source of systemic risk,” Economics, 7. doi:10.5018/economics-ejournal.ja.2013-27.

Bischoff, S. et al. (2015) “Understanding Continuous Use of Business Intelligence Systems: A Mixed Methods Investigation,” JITTA: Journal of Information Technology Theory and Application, 16(2), pp. 5–37.

Bjogvinsson, E., Ehn, P. and Hillgren, P.A. (2012) “Design Things and Design Thinking: Contemporary Participatory Design Challenges,” Design Issues, 28(3), pp. 101–116. doi:10.1162/DESI_a_00165.

Blevis Lim, Y. K., and Stolterman, E. 2006, E. (2006) “Regarding Software as a Material of Design,” Proceedings of Wonderground, Design Research Society [Preprint].

B-N Sanders, E. and Kwok Chan, P. (2007) “Emerging Trends in Design Research,” IASDR07 International Association of Societies of Design Research. Colombus: International Association of Societies of Design Research, p. 1.

Boehnert, J. (2001) “Design vs. The Design Industry: Conflicts in Emergent Orders,” p. 24. Available at: http://www.academia.edu/1815850/Design_vs._The_Design_Industry_Conflicts_in_Emergent_Orders (Accessed: March 25, 2013).

Boland Jr., R.J. and Collopy, F. (eds) (2004) Managing as Designing. Stanford, CA: Stanford University Press. Available at: http://www.sup.org/books/title/?id=1448.

Bom, M. (2008) “National Design Policy Improves Competitiveness,” Mind Design, October, pp. 1–3.

Bonsiepe, G. (1995) “The Chain of Innovation,” Design Issues, 11(3), pp. 33–36.

Booth, A., Papaioannou, D. and Sutton, A. (2012) Systematic Approaches to a Successful Literature Review. SAGE Publications.

Borja de Mozota, B. (2003) “Design and competitive edge: A model for design management excellence in European SMEs,” Design Management Journal, 2, pp. 88–103.

Boud, D. and Walker, D. (1998) “Promoting Reflection in Professional Courses: the challenge of context,” Studies in Higher Education, 23(2), pp. 191–206.

Boyatzis, R.E. (1998) Transforming qualitative information: Thematic analysis and code development. Sage Publications, Inc.

Breznitz, D. and Ornston, D. (2013) “The Revolutionary Power of Peripheral Agencies: Explaining Radical Policy Innovation in Finland and Israel,” Comparative Political Studies, 46(10), pp. 1219–1245. doi:10.1177/0010414012472466.

Broadbent, J. (2002) “Design and Sociocultural Evolution: Theoretical and Practical Considerations,” World Futures, 58(2–3), pp. 213–228. doi:10.1080/02604020210683.

Broadbent, J. (2003) “Book Review: The Design Way.” John Wiley and Sons Ltd., p. 3. doi:10.1002/sres.567.

Broadbent, J. (2004) “A Future for Design Science?,” Chaoyang Journal of Design, 5, pp. 27–42. doi:10.7048/CJD.200412.0027.

Brodwin, P. (no date) “Explanatory models of illness Basic framework Applications for care of people with FGIDs.” Milwaukee.

Brown, B. et al. (2008) “Introduction (Richard Buchanan Design Issues),” Design Issues, p. 1. Available at: http://search.ebscohost.com/login.aspx?direct=true&db=edswah&AN=000251882000001&site=eds-live.

Brown, B. et al. (2011) “Design Issues: Forms of Inquiry,” Design Issues, 27(1), pp. 1–2. Available at: http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=57201406&site=eds-live.

Brown, J.S. and Duguid, P. (1998) “Organizing Knowledge,” California Management Review, 40(3), pp. 90–111. Available at: https://www.ischool.utexas.edu/~i385q/spring2005/readings/Brown_Duguid_1998_Organizing Knowledge.pdf.

Brown, T. (2008a) “Design thinking,” Harvard business review, 86(6), pp. 84-92+141. Available at: http://www.scopus.com/inward/record.url?eid=2-s2.0-46749127039&partnerID=40&md5=1037ea2f49975106b2f4aa365f82c124.

Brown, T. (2008b) “Design Thinking,” Harvard business review, June, pp. 84–92.

Brown, T. (2009) Change by design – How design thinking transforms organizations and inspires innovation. New York, USA: HarperCollins.

Browning, T.R. (2001) “Applying the design structure matrix to system decomposition and integration problems: A review and new directions,” IEEE Transactions on Engineering Management, 48(3), pp. 292–306. doi:10.1109/17.946528.

Bruce, M., Cooper, R. and Vasques, D. (1999) “Effective design management for small businesses,” Design Studies, 20(3), pp. 297–315.

Bucciarelli, L.L. (1996) Designing Engineers: Inside Technology. The MIT Press.

Buchanan, R. (1992a) “Wicked Problems in Design Thinking,” Design Issues, 8(2), pp. 5–21. Available at: http://www.jstor.org/stable/1511637 (Accessed: March 30, 2017).

Buchanan, R. (1992b) “Wicked Problems Thinking in Design,” Design Issues, 8(2), pp. 5–21.

Buchanan, Richard (1998) “Branzi’s Dilemma: Design in Contemporary Culture,” Design Issues, 14(1), p. 18.

Buchanan, R (1998) “Branzi’s dilemma: design in contemporary culture,” Design Issues, 14(1), pp. 3–20.

Buchanan, R. (2001) “Design Research and the New Learning,” Design Issues, 17(4), pp. 3–23. doi:10.1162/07479360152681056.

Burron, N. (2011) “Curbing ‘Anti-Systemic’ Tendencies in Peru: Democracy promotion and the US contribution to producing neoliberal hegemony,” Third World Quarterly, 32(9), pp. 1655–1672. doi:10.1080/01436597.2011.618651.

CABE (2005) Making design policy work. London. Available at: www.cabe.gov.uk (Accessed: April 21, 2019).

Camacho, M. (2016) “In Conversation David Kelley: From Design to Design Thinking at Stanford and IDEO,” The Journal of Design, Economics, and Innovation. Swinburne: Shi Ji, The Journal of Design, Economics and Innovation. doi:10.1016/j.sheji.2016.01.009.

Carlile, P.R. (2004) “Transferring, Translating, and Transforming: An Integrative Framework for Managing Knowledge Across Boundaries,” Organization Science, 15(5), pp. 555–568. doi:10.1287/orsc.1040.0094.

Cassen, R.H. (1987) “Review of: Our Common Future.” Oxford: International Development Centre, Oxford, p. 1.

Charalambous, G., Fletcher, S. and Webb, P. (2015) “Identifying the key organisational human factors for introducing human-robot collaboration in industry: an exploratory study,” International Journal of Advanced Manufacturing Technology [Preprint]. Industrial Psychology and Human Factors Group, Centre for Advanced Systems, School of Engineering, Cranfield University, Cranfield, United Kingdom: Springer-Verlag London Ltd. doi:10.1007/s00170-015-7335-4.

Chatterjee, A. (2005) “Design in India: The Experience of Transition,” Design Issues, 21(4), pp. 4–10.

Chen, C.J., Hai, F. and Yu, D.J. (2014) “Construction of evaluation index system for Finnish design policy,” 4th International Conference on Materials Science and Information Technology, MSIT 2014. Affiliation: School of Art and Design, Guangdong University of Technology, Guangzhou 510000, China: Trans Tech Publications Ltd, pp. 5373–5377. doi:10.4028/www.scientific.net/AMR.989-994.5373.

Cherney, A. and Head, B. (2011) “Supporting the knowledge-to-action process: A systems-thinking approach,” Evidence and Policy, 7(4), pp. 471–488. doi:10.1332/174426411X603461.

Cho, H. (2015) “Task dependency effects of collaboration in learners’ corpus consultation: An exploratory case study,” ReCALL [Preprint]. Hankuk University of Foreign Studies, Republic of Korea): Cambridge University Press. doi:10.1017/S0958344015000130.

Choi, Y. et al. (2011) “The Relationship Between National Policy and Industrial Development in the UK and South Korea, 1940s – 2000s.,” Design Issues, 27(1), p. 70.

Choi, Y., Cooper, R. and Lim, S. (2007) “Dancing with Design. A study of the National Design Policy and Design Support Programmes in South Korea,” in EAD07 - 7th Conference Dancing with Disorder: Design, Discourse & Disaster. Izmir, Turkey: Faculty of Fine Arts and Design, Izmir University of Economics.

Choi, Y., Lim, S. and Evans, M. (2012) “Supporting Design: National Business Support Programmes in the UK and South Korea,” Design Journal, 15(1), pp. 79–104. doi:10.2752/175630612X13192035508589.

Chorev, N. (2013) “Restructuring neoliberalism at the World Health Organization,” Review of International Political Economy, 20(4), pp. 627–666. doi:10.1080/09692290.2012.690774.

Clark, H. and Brody, D. (2009) “The current state of design history,” Journal of Design History [Preprint]. doi:10.1093/jdh/epp042.

Clemens, R. (2009) “Environmental scanning and scenario planning: A 12-month perspective on applying the viable systems model to developing public sector foresight,” Systemic Practice and Action Research, 22(4), pp. 249–274. doi:10.1007/s11213-009-9127-y.

Cleveland, H. (1982) “Information as Resource,” The Futurist, pp. 34–39.

Clune, S.J. and Lockrey, S. (2014) “Developing environmental sustainability strategies, the Double Diamond method of LCA and design thinking: A case study from aged care,” Journal of Cleaner Production, 85, pp. 67–82. doi:10.1016/j.jclepro.2014.02.003.

Coelho, P. et al. (2010) “A framework for regional sustainability assessment: Developing indicators for a Portuguese region,” Sustainable Development, 18(4), pp. 211–219. doi:10.1002/sd.488.

Cokins, G. (2007) “Performance Management: Creating Economic Value,” Enterprise and Corporate Performance Management, 49, pp. 14–19.

Collopy, F. (2004) Managing as Designing, Stanford University Press.

Colville, I. and Carter, M. (2013) “Innovation as the practice of change in the public sector,” Handbook of Innovation in Public Services. Affiliation: University of Bath, United Kingdom; Correspondence Address: Colville, I.; University of Bath United Kingdom: Edward Elgar Publishing Ltd., pp. 91–106. doi:10.4337/9781849809740.00015.

Commission of the European Communities (2009a) Design as a Driver of User-Centered Innovation, Commission Staff Working Document. Brussels, Belgium.

Commission of the European Communities (2009b) Design as a Driver of User-Centred Innovation. Brussels, Belgium.

Common Ground Publishing (2015) “Eighth International Conference on Design Principles and Practices,” in Industrial, Post-Industrial, Neo-Industrial Design: Reflecting on the Transformation of Production in the Project. Chicago, Illinois: Common Grould Publishing, p. 69.

Cooley, M. (1987) Architect or Bee? The Human Price of Technology. Langley Technical Services.

Coral, C. and Bokelmann, W. (2017) “The Role of Analytical Frameworks for Systemic Research Design, Explained in the Analysis of Drivers of Historic Land-Use Changes,” Systems, 5(20). doi:10.3390/systems5010020.

Council, T.D. (2007) The Value of Design Factfinder Report, Design. Available at: http://www.designfactfinder.co.uk.

Cox, G.S. (2005) Cox review of creativity in business: building on the UK’s strengths. Available at: http://www.hm-treasury.gov.uk/d/Cox_review-foreword-definition-terms-exec-summary.pdf (Accessed: March 29, 2017).

Creswell, J.W. (2003) Research design: Qualitative, quantitative, and mixed methods approaches. 2nd edn. Thousand Oaks, California: Sage.

Creswell, J.W. (2012) Qualitative Inquiry and Research Design: Choosing Among Five Approaches. 3rd Edition. Thousand Oaks, California: SAGE Publications.

Cross, N. (2006) Designerly ways of knowing, Designerly Ways of Knowing. Springer London.

Cross, N. (2013) “Design Research: A Disciplined Conversation,” Design Issues, 15, pp. 5–10. Available at: http://www.jstor.org/stable/1511837?origin=crossref.

Crowther, J. (1983) “Practitioner Lead Action Research.” Edinburgh, p. 1.

Cunha, L., Kaizer, F. and de Souza Leite, J. (2018a) “National Design and Desenho Industrial: Brazilian Issues in Historical Perspective,” in Sopena, M. and Fidalgo, L. (eds) Back to the Future, The Future in the Past. Barcelona: ICDHS 10TH +1 Conference, pp. 10–11.

Cunha, L., Kaizer, F. and de Souza Leite, J. (2018b) “National Design and Desenho Industrial: Brazilian Issues in Historical Perspective,” International Conference on Design History and Studies (ICDHS), At Barcelona, p. 7. Available at: https://www.researchgate.net/publication/328875755_National_Design_and_Desenho_Industrial_Brazilian_Issues_in_Historical_Perspective (Accessed: April 10, 2019).

Cunningham, P. (2008) National and regional policies for design creativity and user-driven innovation. Brussels, Belgium.

Danish Design Committee (2011) The Vision of the Danish Design 2020 Committee. Copenhagen, Denmark. Available at: https://designmanifestos.files.wordpress.com/2020/04/the-vision-of-the-danish-design2020_0.pdf (Accessed: April 10, 2019).

Davies, D., Howe, A. and Haywood, S. (2004) “Building a Creative Ecosystem – The Young Designers on Location Project,” International Journal of Art and Design Education, 23(3), pp. 278–289. doi: DOI:10.1111/j.1476-8070.2004.00407.x.

DCMS (2009) Creative Industries Economic Estimates Statistical Bulletin, Department for Culture, Media and Sport.

DeEP (2013a) DeEP Glossary. Available at: https://issuu.com/deep_initiative/docs/deep_glossary.

DeEP (2013b) “Towards a Taxonomy: Classifying Design Innovation Policies in Europe,” 2nd Cambridge Academic Design Management Conference. Cambridge, Massachusetts: Design in European Policy, p. 26. Available at:

http://www.ifm.eng.cam.ac.uk/uploads/Resources/Conference/CADMC_presentations/Chisholm__Towards_a_Taxonomy.pdf (Accessed: April 25, 2017).

DeEP (2014a) DeEP Brochure. https://issuu.com/deep_initiative/docs/deep_brochure.

DeEP (2014b) DeEP Final Publication. doi: ISBN 978-1-86220-321-4.

DeEP (2014c) DeEP Policy Issues 1. Available at: https://issuu.com/deep_initiative/docs/deep_brochure.

DeEP (2014d) DeEP Policy Issues 2. Available at: https://issuu.com/deep_initiative/docs/design_policy_issues_-_no_2_-_pages.

DeEP (2014e) DeEP Policy Issues 3. Available at: https://issuu.com/deep_initiative/docs/deep_design_policy_issues_3.

DeEP (2014f) DeEP Policy Issues 4. Available at: https://issuu.com/deep_initiative/docs/booklet_4_web/1.

Delft University (no date) The Chair | Design as Politics. Available at: http://designaspolitics.wordpress.com/about/the-chair/# (Accessed: September 4, 2012).

Denzin, N. and Giardina, M. (2009) Qualitative Inquiry and Social Justice: Toward a Politics of Hope. Bibliovault OAI Repository, the University of Chicago Press.

Department for Business Innovation and Skills (2010a) Annual Innovation Report 2010. London, UK. Available at: http://www.bis.gov.uk/assets/biscore/innovation/docs/a/11-p188-annual-innovation-report-2010.pdf.

Department for Business Innovation and Skills (2010b) The economic rationale for a national design policy. London, UK. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/32096/10-1112-bis-occasional-paper-02.pdf (Accessed: April 10, 2019).

Department for Business Innovation and Skills (2011) Innovation and Research Strategy for Growth. London. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/229028/8239.pdf (Accessed: April 6, 2017).

Department for Innovation Universities and Skills (2008) Innovation Nation, The Secretary of State for Innovation, Universities and Skills. Norwich.

Department of Trade and Industry (2005a) Department of Trade and Industry: Departmental Report 2005. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/272133/6536.pdf (Accessed: March 29, 2017).

Department of Trade and Industry (2005b) DTI Economics Paper No. 15: Creativity, Design and Business Performance. Available at: http://www.dti.gov.uk/files/file13654.pdf (Accessed: February 9, 2017).

Design Commission (2015a) “Design and behaviour in the built environment.” London: Design Commission.

Design Commission (2015b) Designing Democracy. London. Available at: www.policyconnect.org.uk/apdig (Accessed: February 7, 2018).

Design Commission (2017) People and Places: Design of the Built Environment. Available at: www.policyconnect.org.uk/apdig/design-commission (Accessed: March 29, 2017).

Design Council (2005) Futureproofed. London. Available at: http://static.justinmagee.com/mdes/futureproofed_9380.pdf (Accessed: February 28, 2017).

Design Council (2021) Using design to improve policy. Available at: https://www.designcouncil.org.uk/news-opinion/using-design-improve-policy (Accessed: October 28, 2021).

Design Exchange (2011a) “Creating a National Design Policy for Canada.” Toronto: Design Exchange.

Design Exchange (2011b) “Design Exchange Program Guide.” Toronto: Design Exchange, p. 35.

Design Finland (2013) “Design Finland Programme,” in Proposals for Strategy and Actions. Helsinki: Design Finland, p. 544.

Dewey, J. (1938) Logic: The theory of Inquiry. New York: Holt, Rinehart, and Winston.

Dewey, J. (1998) How we think: a restatement of the relation of reflective thinking to the educative process. Boston: Houghton Mifflin.

DIAC (2004) Design Matters: DIAC Design Industry Study Final Report. Toronto.

Diamond, S. and Lewis, L. (2011) “Innovation by Design: Differentiator in the Digital Age,” Options Politiques, pp. 60–65. Available at: http://irpp.org/wp-content/uploads/assets/po/innovation-nation/diamond-lewis.pdf (Accessed: April 6, 2017).

Dilnot, C. (1982a) “Design as a socially significant activity,” Design Studies, 3(3), pp. 139–146. doi:10.1016/0142-694X(82)90006-0.

Dilnot, C. (1982b) “Design as a socially significant activity: an introduction,” 3(3), pp. 139–146.

Dilnot, C. (1984) “The State of Design History, Part 1: Mapping the Field,” Design Issues, 1. Available at: https://www.academia.edu/447812/The_State_of_Design_History_Part_I_Mapping_the_Field?auto=download (Accessed: April 11, 2017).

Dilnot, C. (2004) Ethics? Design?, Archeworks. Chicago, Illinois: Archeworks.

Dilnot, C. (2018) “Thinking design: A personal perspective on the development of the Design Research Society,” Design Studies, 54, pp. 142–145. doi:10.1016/j.destud.2017.11.002.

DMI (2020) Design as an Enabler of Change, DMI News and Views. Available at: http://www.dmi.org/dmi/html/publications/news/viewpoints/nv_vp_kb.htm (Accessed: August 19, 2012).

Doak, D.F. et al. (2008) “Understanding and Predicting Ecological Dynamics: Are Major Surprises Inevitable?,” Ecology, 89(4), pp. 952–961. doi:10.1890/07-0965.1.

Doblinger, C. and Soppe, B. (2013) “Change-actors in the U.S. electric energy system: The role of environmental groups in utility adoption and diffusion of wind power,” Energy Policy, 61, pp. 274–284. doi:10.1016/j.enpol.2013.07.028.

Domingues, A.R. et al. (2015) “Defining criteria and indicators for a sustainability label of local public services,” Ecological Indicators, 57, pp. 452–464. doi:10.1016/j.ecolind.2015.05.016.

Dorst, K. and Dijkhuis, J. (1995) “Comparing paradigms for describing design activity,” Design Studies, 16(2), pp. 261–274. Available at: http://en.wikipedia.org/wiki/Design (Accessed: July 25, 2012).

Dröll, P. (2011) The European Design Innovation Initiative, Policy, Innovation and Design Conference. Brussels, Belgium.

Dunne, D. (2009) “User-Centered Design and Design-Centered Business Schools.”

Dunne, D. and Martin, R. (2006) “Design Thinking and How it Will Change Management Education: An Interview and Discussion,” Academy of Management Learning & Education, 5(4), pp. 512–523. Available at: http://www.jstor.org/stable/40214410.

Eccleston, R. (2013) “The Dynamics of Global Economic Governance: The Financial Crisis, the OECD, and the Politics of International Tax Cooperation [Preprint].” Affiliation: University of Tasmania, Australia; Edward Elgar Publishing Ltd. doi:10.4337/9781849805988.

Eikmeier, D.C. (2010) “Design for Napoleon’s Corporal,” Small Wars Journal, (March), pp. 1–11.

Elden, M. and Chisholm, R.E. (1993) “Emerging varieties of action research,” Human Relations, pp. 121–42.

Electronic, N. and Collection, T. (2019) “Press Information Bureau Government of India Ministry of Road Transport & Highways,” pp. 3–4.

Elmansy, R. (2014a) “Leading Economy Through Design,” p. 6.

Elmansy, R. (2014b) Leading Economy Through Design: Applying National Design Policies, Designorate. Available at: https://www.designorate.com/leading-through-design-policies/ (Accessed: April 10, 2019).

Enders, J. and Westerheijden, D.F. (2014) “Quality assurance in the European policy arena,” Policy and Society [Preprint]. doi:10.1016/j.polsoc.2014.09.004.

Ennals, R. (2004) “Europe as a knowledge society: Integrating universities, corporations, and government,” Systemic Practice and Action Research, 17(3), pp. 237–248. doi:10.1023/B:SPAA.0000031699.88384.6b.

Estwick, D.-A. et al. (2015) “Volume 1 Ministry of Design - From Cottage Industry to State Enterprise,” in Noel, L.-A. and Lee Poy, M. (eds) Volume 1 Ministry of Design - From Cottage Industry to State Enterprise. Port of Spain: Department of Creative and Festival Arts, p. 27. Available at: https://www.academia.edu/15462049/Volume_1_Ministry_of_Design_-_From_Cottage_Industry_to_State_Enterprise (Accessed: September 23, 2019).

European Commission (2009a) Design as a Driver of User-Centered Innovation. Brussels, Belgium.

European Commission (2009b) European Innovation Progress Report 2009. Brussels, Belgium.

European Commission (2010) Europe 2020 Flagship Initiative Innovation Union. Brussels, Belgium. Available at: https://ec.europa.eu/research/innovation-union/pdf/innovation-union-communication_en.pdf (Accessed: February 25, 2018).

European Design Leadership Board (2012) Design for Growth & Prosperity. Helsinki.

European Union (2009) “European Ambassadors for Creativity and Innovation,” p. 8. Available at: http://create2009.europa.eu.

European Union (2015) “Design for Europe,” in European Growth by Design. Brussels, Belgium: European Commission.

Evenson, S. and Dubberly, H. (2009) “Designing for Service: Creating an Experience Advantage,” pp. 1–9. Available at: http://www.dubberly.com/wp-content/uploads/2010/03/ddo_article_designing_service.pdf.

Fairholm, M.R. and Card, M. (2009) “Perspectives of strategic thinking: From controlling chaos to embracing it,” Journal of Management and Organization, 15(1), pp. 17–30. doi:10.5172/jmo.837.15.1.17.

Farson, R.E. (2008) The Power of Design: A force for Transforming Everything. Norcross, USA: Greenway Communications.

Fernández-Mesa, A. et al. (2013) “Design management capability and product innovation in SMEs,” Management Decision, 51(3), pp. 547–565. doi:10.1108/00251741311309652.

Fletcher, R.H. et al. (1997) “Case study as a research method,” Academy of Management Review, 5(2), pp. 301–316. doi:10.1177/15222302004003007.

Florida, R. (2002a) The Rise of the Creative Class. New York: Basic Books. doi:10.1111/j.1467-8691.2006.00398.x.

Florida, R. (2002b) The Rise of the Creative Class: and how it’s transforming work, leisure, community and everyday life. New York: Basic Books. doi:10.1111/ecge.12029.

Florida, R. (2004) Cities and the Creative Class. Routledge. doi:10.1017/CBO9781107415324.004.

Friedman, Ken (2000) “Creating design knowledge: from research into practice,” IDATER 2000 Conference. Loughborough: Loughborough University, pp. 5–32. Available at: https://dspace.lboro.ac.uk/2134/1360 (Accessed: April 11, 2017).

Friedman, K (2000) “Design research in a knowledge economy: context, content and continuity,” in Design Plus Research: Proceeding of the Politecnico di Milano Conference. Milan, Italy.

Fry, T. (2009) Design Futuring: sustainability, ethics, and new practice. Berg. Available at: https://www.bloomsbury.com/uk/design-futuring-9781847882172/# (Accessed: February 26, 2018).

Fry, T. (2011) Design as politics. Bloomsbury. Available at: https://www.bloomsbury.com/uk/design-as-politics-9781847887061/ (Accessed: February 26, 2018).

Fry, T. (2017) Remaking Cities: An Introduction to Urban Metrofitting. 1st edn. Bloomsbury Publishing. Available at: https://www.bloomsbury.com/uk/remaking-cities-9781474224154/ (Accessed: February 26, 2018).

Fry, Tony., Dilnot, Clive. and Stewart, S.C. (Susan C.H. (2015) Design and the question of history. Blackwell Publishing Ltd. Available at: https://www.bloomsbury.com/uk/design-and-the-question-of-history-9780857854773/ (Accessed: February 26, 2018).

Fuchs, M. et al. (2013) “A Knowledge Destination Framework for tourism sustainability: A Business Intelligence application from Sweden,” Tourism, 61(2), pp. 121–148. Available at: http://www.scopus.com/inward/record.url?eid=2-s2.0-84882397099&partnerID=40&md5=33adc2b3b809627339c8580fb0e9094c.

Gadamer, H.-G. (1960) Truth and Method. 2nd Revise. Bloomsbury Academic.

Galle, P. (2002) “Philosophy of Design: An Editorial Introduction,” Design Studies, 23(3), pp. 211–218. Available at: http://www.elsevier.com/locate/destud.

Galle, P. (2009) “The ontology of Gero’s FBS model of designing,” Design Studies, 30(4), pp. 321–339. doi:10.1016/j.destud.2009.02.002.

Gero, J.S. (1990) “Design prototypes: A knowledge representation schema for design,” AI Magazine, 11(4), pp. 26–36. Available at: http://www.scopus.com/inward/record.url?eid=2-s2.0-0025544968&partnerID=40&md5=2706bfcd4bbb634aef4fdf3af11408d8.

Gertler, M.S. and Vinodrai, T. (2006) “Better by Design? Capturing the Role of Design in Innovation,” Blue Sky II: What Indicators for Science, Technology, and Innovation Policies in the 21st Century? Ottawa, Canada: OECD and Statistics Canada, p. 21. Available at: http://www.oecd.org/sti/inno/37450179.pdf (Accessed: April 6, 2017).

Gibbons, M. et al. (2010) The new production of knowledge. SAGE Publications Ltd. doi:https://dx.doi.org/10.4135/9781446221853.

Gillespie, S. et al. (2013) “The politics of reducing malnutrition: Building commitment and accelerating progress,” The Lancet, 382(9891), pp. 552–569. doi:10.1016/S0140-6736(13)60842-9.

Girasek, D.C. (2011) “Evaluation of a brief intervention designed to increase CPR training among pregnant pool owners,” Health Education Research, 26(4), pp. 689–697. doi:10.1093/her/cyr028.

Glaser, B.G. and Strauss, A.L. (1999) The Discovery of Grounded Theory: Strategies for Qualitative Research. 1st edn. Edited by Aldine de Gruyter. New York: Routledge.

Gorb, P. and Dumas, A. (1987) “Silent Design,” Design Studies, 8(3), pp. 150–156. doi:10.1016/0142-694X(87)90037-8.

Government, D. (2007) Design Denmark. Copenhagen, Denmark.

Government Digital Service (GDS) (2017) “Design in Government: The Environment Agency.” Available at: https://designnotes.blog.gov.uk/2017/10/11/design-in-government-the-environment-agency/ (Accessed: February 25, 2018).

Graham, Ian D. et al. (2006) “Lost in Knowledge Translation: Time for a Map?” The Journal of Continuing Education in the Health Professions, 26(26), pp. 13–24. doi:10.1002/chp.47.

Gryszkiewicz, L., Lykourentzou, I. and Toivonen, T. (2016) “Innovation Labs: Leveraging Openness for Radical Innovation?”, SSRN Electronic Journal [Preprint]. doi:10.2139/SSRN.2556692.

Guo, S. and Shan, H. (2013) “The politics of recognition: critical discourse analysis of recent PLAR policies for immigrant professionals in Canada,” International Journal of Lifelong Education, 32(4), pp. 464–480. doi:10.1080/02601370.2013.778073.

Hakio, K. and Mattelmäki, T. (2011) “Design Adventures in the Public Sector,” 2011 Conference on Designing Pleasurable Products and Interfaces, DPPI 2011 [Preprint]. doi:10.1145/2347504.2347570.

Hall, P. (2011) “IDEO Takes on the Government,” Metropolis, June, p. 12.

Hanbury, A., Farley, K. and Thompson, C. (2015) “Cost and feasibility: An exploratory case study comparing use of a literature review method with questionnaires, interviews and focus groups to identify barriers for a behaviour-change intervention,” BMC Health Services Research, 15(1). doi:10.1186/s12913-015-0877-1.

Hannan, M. (2012) “Interview: Richard Florida - Parks, Community Attachment, and the Knowledge Economy,” Parks & Recreation, May, p. 2. Available at: http://880cities.org/images/resource/park-space-arti/richard-florida-parks-community.pdf.

Hart, C. (1998) Doing a Literature Review: Releasing the Social Science Research Imagination. London, UK: Sage Publications, 1998. Available at:

http://search.ebscohost.com/login.aspx?direct=true&db=cat00164a&AN=cran.333344&site=eds-live.

Hart, C. (2001) Doing A Literature Search: A Comprehensive Guide for The Social Sciences. First. Sage Publishing.

Hatchuel, A. (2001) “Towards Design Theory and Expandable Rationality: The Unfinished Program of Herbert Simon,” Journal of Management and Governance, 10(3), pp. 260–273. Available at: https://doi.org/10.1023/A:1014044305704.

Head, B. (2010) “From knowledge transfer to knowledge sharing? Towards better links between research, policy, and practice,” in Bammer, G., Michaux, A., and Sanson, A. (eds) Bridging the “Know-Do” Gap: Knowledge brokering to improve child wellbeing. The Australian National University, pp. 109–123.

Heap, D., Jerrard, B. and Burns, K. (2007) “Design Capacity and Capability: Mapping Design in Motion in the UK’s Furniture Manufacturing Sector.” ISADOR07 International Association of Societies of Design Research, pp. 1–21. Available at: https://www.sd.polyu.edu.hk/iasdr/proceeding/papers/Design Capacity and Capability_ Mapping Design in Motion.pdf.

Heron de Villefosse, R. (1955) Histoire de Paris. Edited by Grasset. Broché.

Heskett, J. (2001) “Past, Present, and Future in Design for Industry,” Design Issues, 17(1), pp. 18–26.

Heskett, J. (2002) Toothpicks and Logos - Design in Everyday Life. Oxford: Oxford University Press.

Heskett, J. (2005) Design: A Very Short Introduction. Oxford: Oxford University Press.

Heskett, J. (2008) “Creating economic value by design,” International Journal of Design, 3(1), pp. 71–84. Available at: www.ijdesign.org.

Heskett, J. (2009) “Creating Economic Value by Space Brand System,” Aerospace, 3(1), pp. 8526–8526.

Heskett, J. (2017) Design and the Creation of Value. Edited by C. Dilnot and S. Boztepe. London, UK: Bloomsbury. Available at: https://www.bloomsbury.com/uk/design-and-the-creation-of-value-9781474274296/ (Accessed: February 16, 2018).

Hobday, M., Boddington, A. and Grantham, A. (2011) “An Innovation Perspective on Design: Part 1,” Design Issues, 27(4), pp. 5–15.

Hobday, M., Boddington, A. and Grantham, A. (2012) “Policies for Design and Policies for Innovation: Contrasting Perspectives and Remaining Challenges,” Technovation, 32(1), pp. 272–281. doi:10.1016/j.technovation.2011.12.002.

van den Hove, S. et al. (2011) “The Innovation Union: a perfect means to confused ends?”, environmental science & policy, 16, pp. 73–80. doi:10.1016/j.envsci.2011.11.006.

Howlett, M. (2000) “Policy Design: What, Who, How and Why?”, in L’instrumentation de l’action publique. Controverses, résistance, effets. Paris: Presses de Sciences Po, pp. 281–315. doi:10.3917/scpo.halpe.2014.01.0281.

Hunter, M. (no date) “Human Centred Design.” IDEO, p. 49.

ICO-D Work Group (2017) “National Design Policy from both ends of the spectrum.” Montreal: ICO-D. Available at: https://www.ico-d.org/2017/09/12/national-design-policy-.php.

ICSID (no date) Creating a National Design Policy for Canada. Available at: http://www.icsid.org/feature/current/articles1335.htm (Accessed: August 19, 2012).

Idea Couture Inc. (2012) Strategic Innovation: What We Do. Available at: http://www.ideacouture.com/our-services/strategic-innovation (Accessed: September 4, 2012).

Ilmola-Sheppard, L. and Kuusi, O. (2013) “Information filters as one of the means of managing strategic fit in a complex environment,” Foresight, 15(2), pp. 132–151. doi:10.1108/14636681311321130.

Inno-Grips (2008) Mini Study 05 – Design as a tool for Innovation.

Innovate UK (2020) Design in Innovation Stategy 2020-2024.

Ison, R. et al. (2011) “Sustainable Catchment Managing in a Climate Changing World: New Integrative Modalities for Connecting Policy Makers, Scientists and Other Stakeholders,” Water Resources Management, 25(15), pp. 3977–3992. doi:10.1007/s11269-011-9880-4.

Janda, K.B. and Parag, Y. (2013) “A middle-out approach for improving energy performance in buildings,” Building Research and Information, 41(1), pp. 39–50. doi:10.1080/09613218.2013.743396.

Jensen, E. (2012) “Combining Methods and Research Paradigms.” Coventry, UK: Warwick University, p. 41. Available at: https://warwick.ac.uk/fac/cross_fac/esrcdtc/core2012/practice/combining_research_methods_dtc_psr_module_wk_4_handover_2012-13.pdf.

Jesson, J.K., Matheson, L. and Lacey, F.M. (2011) Doing your literature review: traditional and systematic techniques. Los Angeles, Calif.; London: SAGE, 2011. Available at: http://search.ebscohost.com/login.aspx?direct=true&db=cat00164a&AN=cran.564105&site=eds-live.

Jewell, C.J. and Bero, L.A. (2008) “‘Developing good taste in evidence’: Facilitators of and hindrances to evidence-informed health policymaking in state government,” Milbank Quarterly, 86(2), pp. 177–208. doi:10.1111/j.1468-0009.2008.00519.x.

Johansson, M. and Arvola, M. (2007) “A case study of how user interface sketches, scenarios and computer prototype’s structure stakeholder meetings,” Proceedings of the 21st British HCI Group Annual Conference on People and Computers: HCI... but not as we know it, 1(XXI), pp. 177–184. Available at: http://portal.acm.org/citation.cfm?id=1531318.

Johansson-Sköldberg, U. et al. (2013) “Design Thinking: Past, Present and Possible Futures,” Creativity and Innovation Management, 22(2), pp. 121–146. doi:10.1111/caim.12023.

Jonas, W. and Boutin, A.M. (2015) “Design as Strategy,” Harvard Business Review. Agence Pour La Promotion de la Creation Industrielle, p. 202.

Jones, J.C. (1992) Design Methods, Design. Edited by G.T. Houlsby and A.N. Schofield. Wiley (Architecture Series). doi:10.1111/j.1476-8070.1990.tb00752.x.

Jones, P.H. (2014) “Systemic Design Principles for Complex Social Systems,” Chapter 4 in: Social Systems and Design, pp. 91–128.

Joyce, Y., White, H. and Lindsey, L. (2015) “Valuing Design in Public and Third Sector Organisations,” p. 62. Available at: http://valuingdesign.org/Valuing_design_EAD2015_YeeWhiteLennon.pdf.

Kelley, D. (2006) “Design Thinking.” Retrieved from http://www.extrememediastudies.org/extreme_media/1navigating/pdf/navigating_design_thinking.pdf

Kelley, D. and VanPatter, G. (2005) “Design as Glue.” NextD Journal. Available at: journal@nextd.org.

Kelly, T. (2001) “The Art of Innovation: Lessons in Creativity from IDEO, America’s Leading Design Firm.” Crown Publishing Group.

Kimbell, L. (2003) “Design practices in design thinking.” Oxford: Said Business School, p. 14.

Kimbell, L. (2009) “Beyond design thinking: Design-as-practice and designs-in-practice,” CRESC Conference, (May), pp. 1–15. doi:10.1108/02756660910942454.

Kimbell, L. (2011) “Rethinking Design Thinking: Part I,” Design and Culture, 3(3), pp. 285–306. doi:10.2752/175470811X13071166525216.

Kimbell, L. (2012) “Rethinking Design Thinking: Part 2,” Design and Culture, 4(2), pp. 129–148.

Kimbell, L. (2016) “Design in the Time of Policy Problems,” Proceedings of DRS 2016, Design Research Society 50th Anniversary Conference., (November), pp. 1–14. doi:10.21606/drs.2016.498.

Königk, R. (2010) Interior design as architecture’s “other.” Master’s Thesis. University of Pretoria.

Koskela, L.J. and Ballard, G. (2013) “The Two Pillars of Design Theory: Method of Analysis and Rhetoric,” International Conference on Engineering Design ICED13, p. 11.

Koskinen, I. et al. (2012) “Design Research Through Practice,” Design Research Through Practice [Preprint]. Correspondence Address: Koskinen, I.: Elsevier Inc. Available at: http://www.scopus.com/inward/record.url?eid=2-s2.0-84882761621&partnerID=40&md5=88c029dc88847d6106ce3c31c519d734.

Kostelanetz, R. (ed.) (1970) “Moholy Nagy: An Anthology,” in. New York: Da Capo Press. Available at: https://monoskop.org/images/b/bc/Moholy-Nagy_Laszlo_1940_Make_a_Light_Modulator.pdf.

Krippendorff, K. (1995) “Redesigning Design; An Invitation to a Responsible Future.” Annenberg: University of Pennsylvania. Available at: Architecture Interior design Normative theory Ontology Professions The „Other".

Krippendorff, K. (2004) Content Analysis: An Introduction to Its Methodology. Second. Thousand Oaks, California: Sage Publications, Inc.

Kroll, C. and Delhey, J. (2013) “A Happy Nation? Opportunities and Challenges of Using Subjective Indicators in Policymaking,” Social Indicators Research, 114(1), pp. 13–28. doi:10.1007/s11205-013-0380-1.

Kuckhartz, U. (2014) “Analysing Qualitative Data – But How?,” in Qualitative Text Analysis: A Guide to Methods, Practice & Using Software. 1 Oliver’s Yard, 55 City Road, London EC1Y 1SP United Kingdom: SAGE Publications Ltd, pp. 1–14. doi:10.4135/9781446288719.n1.

Kwon, M., Berry, F.S. and Jang, H.S. (2013) “A Theoretical Framework on the Determinants of Strategic Cities: Empirical Results from Florida City Governments,” American Review of Public Administration, 43(4), pp. 438–459. doi:10.1177/0275074012445308.

Lam, A. (1997) “Embedded firms, embedded knowledge: Problems of collaboration and knowledge transfer in global cooperative ventures,” Organization Studies, 18(6), pp. 973–996. Available at: http://www.scopus.com/inward/record.url?eid=2-s2.0-0040058608&partnerID=40&md5=a0d47917e0dea7af2ddb8c10be54c65d.

Lang, C. (2011) “In Design, We Trust,” Architect the AIA Magazine, May, p. 74,76,78,80,82,84.

Laranja, M., Uyarra, E. and Flanagan, K. (2008) “Policies for science, technology and innovation: Translating rationales into regional policies in a multi-level setting,” Research Policy, 37(5), pp. 823–835. doi:10.1016/j.respol.2008.03.006.

Lenihan, H. (2011) “Enterprise policy evaluation: Is there a ‘new’ way of doing it?,” Evaluation and program planning, 34(4), pp. 323–332. doi:10.1016/j.evalprogplan.2011.03.006.

de Leon, N. (2013) Design: an essential tool for government. London, UK.

Levac, D., Colquhoun, H. and O’Brien, K.K. (2010) “Scoping studies: advancing the methodology,” Implementation Science: IS, 5, p. 9. doi:10.1186/1748-5908-5-69.

Locher, P., Overbeeke, K. and Wensveen, S. (2010) “Aesthetic Interaction: A Framework,” Design Issues, 26(2), pp. 70–79. Available at: http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=50883286&site=eds-live.

Lockton, D. (2017) Design with Intent: Methods, and Patterns for Behavioural Design. 1st edn. Windsor: O’Reilly Media.

Love, T. (2000) “Philosophy of Design: A Meta-Theoretical Structure for Design Theory,” Design Studies, 21(3), pp. 293–313. Available at: http://www.elsevier.com/locate/destud.

Love, T. (2002) “Constructing a Coherent Cross-Disciplinary Body of Theory About Designing and Designs: Some Philosophical Issues,” Design Studies, 23(3), pp. 345–361. Available at: http://www.elsevier.com/locate/destud.

Love, Terence (2007a) “Design Infrastructures: The Key To Design - Driven Socio - Economic,” International Association of Societies of Design Research [Preprint].

Love, Terence (2007b) “National Design Infrastructures: The Key to Design-Driven Socio-Economic Outcomes and Innovative Knowledge Economies,” International Association of Societies of Design Research [Preprint]. Available at: https://www.sd.polyu.edu.hk/iasdr/proceeding/papers/National design infrastructures.pdf (Accessed: February 26, 2018).

Love, Terrance (2007) “National Design Infrastructures: the key to design-driven socio-economic outcomes and innovative knowledge economies,” IASDR07 International Association of Societies of Design Research. Hong Kong Polytechnic University, p. 22.

Luck, R. (2018) “Inclusive design and making in practice: Bringing bodily experience into closer contact with making,” Design Studies, 54, pp. 96–119. doi:10.1016/j.destud.2017.11.003.

Macleod, D. et al. (2007) Design as an Instrument of Public Policy in Singapore and South Korea. Asia Pacific Foundation of Canada. Available at: http://www.dx.org/site/design_exchange/assets/pdf/Design_Policy_Singapore__South_Korea.pdf (Accessed: May 31, 2017).

Madano Partnership (2012) Scoping Study on Service Design.

Madge, P. (2011) “Ecological Design: A New Critique,” Design Issues, 13(2), pp. 44–54.

Maffei, S. et al. (2014) DeEP. Available at: www.designpolicy.eu (Accessed: April 10, 2019).

Maffei, S., Mortati, M. and Villari, B. (2013) “Making/Design Policies Together,” 10th European Academy of Design Conference, pp. 1–14. Available at: https://www.researchgate.net/publication/269996144_MakingDesign_Policies_Together.

Mahdjoubi, D. (2007) “Design Methodology as a Migration from Analytic Methodology,” Design Management Review, 18(4), pp. 50–57. doi:10.1111/j.1948-7169.2007.tb00094.x.

Malvido, C. et al. (2008) “Towards a National Design Scoreboard: A model to enable comparison of performance between countries,” PICMET: Portland International Center for Management of Engineering and Technology, Proceedings, (c), pp. 126–137. doi:10.1109/PICMET.2008.4599617.

Manzini, E. (2009) “New Design Knowledge,” Design Studies, 30(1), pp. 4–12. Available at: http://www.elsevier.com/locate/destud.

Margolin, V. (1995) “Design History or Design Studies: Subject Matter and Methods.,” Design Issues, 11(1), pp. 4–15.

Margolin, V. (2007) “Design for Development: Towards a History,” Design Studies, 28(2), pp. 111–115.

Margolin, Victor (2007) “Design, the Future and the Human Spirit,” Design Issues, 23(3), pp. 4–14.

Margolin, V. (2010) “Doctoral Education in Design: Problems and Prospects,” Design Issues [Preprint]. doi:10.1162/DESI_a_00031.

Margolin, V. and Margolin, S. (2002a) “A ‘Social Model’ of Design: Issues of Practice and Research,” Design Issues, 18(4), pp. 24–30. doi:10.1162/074793602320827406.

Margolin, V. and Margolin, S. (2002b) “A Social Model of Design: Issues of Practice and Research,” Design Issues, 18(4), p. 7. Available at:

https://www.mitpressjournals.org/doi/pdf/10.1162/074793602320827406 (Accessed: April 14, 2019).

Marjanovic, D. (2003) “About the need for the design policy,” in 2003 ASME Design Engineering Technical Conference and Computers and Information in Engineering Conference. Affiliation: University of Zagreb, Fac. of Mech. Eng./Nav. Architecture, Department of Design Theory, l. Lucica 5, 10000 Zagreb, Croatia; Correspondence Address: Marjanovic, D.; University of Zagreb, Fac. of Mech. Eng./Nav. Architecture, Department of Des, pp. 919–924. Available at: http://www.scopus.com/inward/record.url?eid=2-s2.0-1842787574&partnerID=40&md5=8d59616dd201dcf5b4a4084e69827021.

Markwell, S. and Leigh-Hunt, N. (2016) The impact of political, economic, socio-cultural, environmental, and other external influences, Health Knowledge. Available at: https://www.healthknowledge.org.uk/public-health-textbook/organisation-management/5b-understanding-ofs/assessing-impact-external-influences (Accessed: September 19, 2019).

Martin, R. (2009) The Design of Business: Why Design Thinking is the Next Competitive Advantage. Harvard Business Press.

Martin, R. (2012) Design Thinking. Available at: http://rogerlmartin.com/devotions/design-thinking/ (Accessed: August 30, 2012).

Martin, R. (no date a) “Helping managers think as successful leaders do.” rogerlmaritin.com, p. 1.

Martin, R. (no date b) “Using new organizations and approaches to produce social good.” RogerLMartin.com, p. 1.

Martin, R.L. (2007) The Opposable Mind: How Successful Leaders Win Through Integrative Thinking. Boston, Massachusetts: Harvard Business School Press.

Martin, R.L. (no date) “Strategic Choice Architecture: Helping Executives Make High-Payoff Strategic Decisions.” RogerLMartin.com, p. 1. Available at: rogermartin.com.

Martin Skibsted, J. (2013) “Governments Need a Design Policy,” Huffington Post.com. Huffington Post, p. 3. Available at: http://www.huffingtonpost.com/jens-martin-skibsted/governments-need-a-design-policy_b_4115385.htmlTHE BLOG.

Maxwell, J. (2005) Qualitative research design: An interactive approach. 2nd Ed. Thousand Oaks, California: SAGE Publications.

Maxwell, Joseph. A. (2013) Qualitative Research Design an Interactive Approach. 3rd edn. Sage Publications. Available at: https://www.sagepub.com/sites/default/files/upm-binaries/48274_ch_3.pdf (Accessed: April 2, 2019).

McGann, J.G. (2005) Think Tanks and Policy Advice in the US. Philadelphia, PA.

McKee, A.J. (2018) Broken Windows Theory, Encyclopaedia Britannica. Available at: https://www.britannica.com/topic/broken-windows-theory (Accessed: September 8, 2012).

Meld Studios (no date) What service design is, and what it is not. Available at: http://www.meldstudios.com.au/2016/08/31/what-service-design-is-and-what-it-is-not/.

Meroni, A. and Sangiorgi, D. (no date) “Design for Services: From Service Design to Designing for Services as a ‘mean’ for society transformation,” p. 42.

Meyer, M.W. and Norman, D. (2020) “Changing Design Education for the 21st Century,” She Ji: The Journal of Design, Economics, and Innovation, 6(1), pp. 13–49. Available at: https://reader.elsevier.com/reader/sd/pii/S2405872620300046?token=0453285A5A4B01970093A5F249DCF85FDEDED480D5FABD1AE3DDCAA85E68EFB50B3F7251FC9700DF4ACB5E406F949633&originRegion=eu-west-1&originCreation=20211115140024 (Accessed: November 14, 2021).

Miles Huberman, Michael A., M.B. (1994) Qualitative Data Analysis - An Expanded Sourcebook. 2nd Edition. Sage Publications, Inc.

Moholy-Nagy, L. (1947) Vision in Motion. Paul Theobald & Co (June 1, 1947). Available at: http://www.dailyicon.net/2009/12/books-vision-in-motion-by-laszlo-moholy-nagy/.

Moholy-Nagy, L. (1991) “Design Potentialities,” in Kostelanetz, R. (ed.) Moholy-Nagy: An Anthology. New York: Da Capo Press, pp. 81–89.

Molineux, J. (2013) “Enabling organizational cultural change using systemic strategic human resource management - a longitudinal case study,” International Journal of Human Resource Management, 24(8), pp. 1588–1612. doi:10.1080/09585192.2012.723022.

Mollenhauer, K. and Korvenmaa, P. (2007) “Designing the designer: The responsibilities of education in the national/regional systems of design,” in 10th International Conference on Engineering and Product Design Education, E and PDE 2008. Affiliation: School of Design, University of Barcelona, Spain; Affiliation: Strategic Design and Culture, School of Design, Metropolitan University of Technology - UTEM, Dieciocho 390, Santiago de Chile, Chile; Affiliation: Design and Culture, School of D, pp. 613–618. Available at: http://www.scopus.com/inward/record.url?eid=2-s2.0-84859245297&partnerID=40&md5=2533d0a53f1d58758d551da787e0c764.

Mootee, I. (2012) Innovation playground Idris Mootee. Available at: http://mootee.typepad.com/innovation_playground/2012/03/index.html (Accessed: August 19, 2012).

Morehen, J., Wrigley, C. and Wright, N. (2014) “Teaching design thinking and design led innovation to non-designers: A tertiary facilitator multidisciplinary study,” in 2013 IEEE-Tsinghua International Design Management Symposium: Design-Driven Business Innovation, TIDMS 2013 - Proceedings. doi:10.1109/TIDMS.2013.6981215.

Mortati, M. (2015) “A Framework for Design Innovation: Present and Future Discussions,” Design Issues, 31(4), pp. 4–16. doi:10.1162/DESI_a_00347.

Moultrie, J. et al. (2008) “Developing a National Design Scoreboard,” Undisciplined 2008! Design Research Society Conference. Sheffield, UK: Sheffield Hallam University., pp. 1–16.

Moultrie, J. (2009) “Developing an International Design Scoreboard,” PDR-National Centre for Product Design & Development Research, (1), pp. 3–5.

Moultrie, J. (2013) Why Might We Need to Give Thought To How We Classify Design?

Moultrie, J. and Livesey, T.F. (2009) International Design Scoreboard: Initial indicators of international design capabilities., University of Cambridge. Great Britain: IfM and University of Cambridge. Available at: http://www.designcouncil.org.uk/sites/default/files/asset/document/InternationalDesignScoreboard.pdf.

Mozota, B.B. (2010) “The Four Powers of Design: A Value Model in Design Management,” Design Management Review, 17(2), pp. 44–53. doi:10.1111/j.1948-7169.2006.tb00038.x.

Mutanen, U.M. (2008) “Developing organisational design capability in a Finland-based engineering corporation: the case of Metso,” Design Studies, 29(5), pp. 500–520. doi:10.1016/j.destud.2008.03.005.

Nadler, G. (1980) “A timeline theory of planning and design,” Design Studies, 1(5), pp. 299–307. doi:10.1016/0142-694X(80)90064-2.

Nasim, S., and Sushil (2010) “Managing continuity and change: A new approach for strategizing in e-government,” Transforming Government: People, Process and Policy, 4(4), pp. 338–364. doi:10.1108/17506161011081327.

NatCen Learning (2015) “The Framework Approach to Qualitative Data Analysis.” Available at: https://www.surrey.ac.uk/sociology/research/researchcentres/caqdas/files/Session 1 Introduction to Framework.pdf.

N.E.A (1994) A Proposal for a White House Council on Design Strategy to Harness the Power of Design.

Neill, M.D.M.O. (2015) “Four Areas for Scaffolding a Design Mindset Towards a National Design Policy.”

NESTA (2014) Design in public and social innovation. London, UK. Available at: nesta.org.uk.

NESTA and IDEO (no date) “Designing for Public Services: a practical guide.” Available at: https://www.nesta.org.uk/toolkit/designing-for-public-services-a-practical-guide/ (Accessed: September 25, 2019).

Noel, L.-A. and Lee Poy, M. (2015) “Ministry of Design from Cottage Industry to State Enterprise,” in Proceedings of the Ministry of Design - From Cottage Industry to Sate Enterprise Symposium. St. Augustine: Department of Creative and Festival Arts, p. 145.

Norman, D. (1988) The Design of Everyday Things, MIT Press.

Norman, D. (2013) The Design of Everyday Things. New York: Basic Books. Available at: www.basickbooks.com (Accessed: November 15, 2021).

Norman, D.A. (2005) “Human-centered design considered harmful Design View project,” Interactions, pp. 14–19. doi:10.1145/1070960.1070976.

Oakley, A. (2002) “Social Science and Evidence-based Everything: The case of education,” Educational Review, 54(3), pp. 277–286. doi:10.1080/0013191022000016329.

Osborne, S.P. and Brown, K. (2005) Managing Change and Innovation in Public Service Organizations. New York: Routledge.

Oxford Dictionary (2016) “Mode,” Oxford Dictionaries. Available at: https://en.oxforddictionaries.com/definition/mode.

Papaioannou, D. et al. (2009) “Literature searching for social science systematic reviews; consideration of a range of search techniques,” Health Information and Libraries Journal, 27(Journal compilation), pp. 114–122.

Papanek, V. (1972) Design for the Real World. New York: Bantam Books.

Papanek, V. (1995) Design for the Real World; Human Ecology and Social Change. 2nd edn. Chicago: Academy Chicago.

Patrocinio, G. (2011) “Design Policies | Políticas de Design.” Available at: http://designpolicies.blogspot.ca/ (Accessed: September 4, 2012).

PDR The National Centre for Product Design + Development Research (2014) Service Design & Innovation Knowledge Transfer Project for Wales. Cardiff, Wales. Available at: pdronline.co.uk.

Peters, M.D. et al. (2015) “Guidance for conducting systematic scoping reviews,” Int J Evid Based Health, 13, pp. 141–146. doi:10.1097/XEB.0000000000000050.

Petticrew, M. and Roberts, H. (2006) Systematic reviews in the social sciences. Malden, MA: Blackwell Publishing Ltd. doi:10.1080/14733140600986250.

Petticrew, M. and Roberts, H. (no date) “Why Do We Need Systematic Reviews?,” in Systematic Reviews in the Social Sciences. Blackwell Publishing Ltd, pp. 1–26. doi:10.1002/9780470754887.ch1.

Phaal, R., Farrukh, C.J.P. and Probert, D.R. (2001) “A framework for supporting the management of technological innovation,” Engineering Department, University of Cambridge, pp. 1–14. doi:Doi 10.1504/Ijtm.2004.003878.

Polanyi, M. (1966) The Tacit Dimension. [1st ed.]. Garden City N.Y.: Doubleday. Available at: http://www.worldcat.org/title/tacit-dimension/oclc/374908 (Accessed: March 5, 2017).

Polanyi, M. and Sen, A. (2009) The Tacit Dimension. Univ. of Chicago Press.

Policy Connect (1962) Spotlight On Apprenticeships and Social Mobility. London, UK. Available at: policyconnect.org.uk.

Poon-McBrayer, K.F. and Wong, P.-M. (2013) “Inclusive education services for children and youth with disabilities: Values, roles and challenges of school

leaders," Children and Youth Services Review, 35(9), pp. 1520–1525. doi:10.1016/j.childyouth.2013.06.009.

Porter, M.E. (1998) Competitive Advantage: Creating and Sustaining Superior Performance. 2nd edn. New York: New York: Free Press. Available at: http://www.hbs.edu/faculty/Pages/item.aspx?num=191 (Accessed: March 29, 2017).

Power, D., Lindström, J. and Hallencreutz, D. (2004) The Future in Design. Available at: http://www.step.no/design/ (Accessed: April 10, 2019).

Premier's Technology Council (2008) The Industrial Design Advantage, British Columbia Premier's Technology Council - 11th Report 2008. Vancouver.

Public Works and Government Services Canada (2010) Innovation Canada: A Call to Action. Ottawa, Canada. Available at: www.publications.gc.ca%0AThis.

Quartz + Co. (2011) Mapping of International Design Policies and Strategies for leading Design Schools and Research Institutions. Helsinki.

Queensland Government (2008) Queensland Design Strategy 2020. Brisbane. Available at: https://www.ico-d.org/database/files/library/designstrat2020.pdf (Accessed: April 10, 2019).

Quevreux-, A. and Bitard, P. (2008) "Design as a Tool for Innovation Insights from the Mini-Study." Pro Inno Europe - INNO GRIPS, p. 11.

Ramos, T.B. et al. (2014) "An open participatory conceptual framework to support State of the Environment and Sustainability Reports," Journal of Cleaner Production, 64, pp. 158–172. doi:10.1016/j.jclepro.2013.08.038.

Rampley, M. (2010) "Design reform in the Habsburg empire: Technology, aesthetics and ideology," Journal of Design History, 23(3), pp. 247–264. doi:10.1093/jdh/epq021.

Raulik, G., Cawood, G. and Larsen, P. (2008) "National design strategies and country competitive economic advantage," Design Journal, 11(2), pp. 119–135. doi:10.2752/175630608X329217.

Raulik-Murphy, G. et al. (2008) “A comparative analysis of strategies for design in Finland and Brazil,” Design Research Society Conference, 5, pp. 0–16. Available at: http://shura.shu.ac.uk.

Raulik-Murphy, G. (2009) A Comparative Analysis of Strategies for Design Promotion, Design. Thesis resubmission. The University of Wales. doi:Raulik-Murphy_Thesis_resubmission_nov09.pdf.

Raulik-Murphy, G. (2010) A Comparative Analysis of Strategies for Design Promotion in Different National Contexts. University of Wales Institute, Cardiff. Available at: http://www.seeplatform.eu/images/A Comparative Analysis of Strategies for Design Promotion in Different National Contexts - ago2010 - FINAL.pdf (Accessed: March 29, 2017).

Raulik-Murphy, G., Cawood, G. and Lewis, A. (2010) “Design Policy: An Introduction to What Matters.,” Design Management Review, 21(4), p. 53.

Raulik-Murphy, Gisel; Cawood, Gavin; Larsen, Povi; Lewis, A. (2008) “A comparative analysis of strategies for design in Finland and Brazil,” in Proceedings of DRS2008, Design Research Society Biennial Conference. Sheffield, UK, p. 17.

Rawsthorn, A. (2013) “Expanding the Definitions of Design,” The New York Times, 15 July.

Relph-Knight, L. (no date) What is design?, Design for Europe. Available at: http://designforeurope.eu/what-design (Accessed: September 25, 2019).

Rickinson, M. and May, H. (2009) A comparative study of methodological approaches to reviewing literature. https://www.heacademy.ac.uk/sites/default/files/resources/Comparativestudy.pdf: The Higher Education Academy.

Rittel, H.W. (1972) “On the Planning Crisis: Systems Analysis of the ‘First and Second Generations’ Characteristics of the Systems Analyst and Designer,” Bedriftsokonomen, 8, pp. 390–396.

Rittel, H.W. and Webber, M.M. (1973) “Dilemmas in a General Theory of Planning,” Policy Sciences, 4(2), pp. 155–169. Available at: https://dbproxy.udallas.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=16620094&site=ehost-live&scope=site.

Roberts, J. (2002) “Hans-Georg Gadamer,” The Guardian, UK Ed., March. Available at: https://www.theguardian.com/news/2002/mar/18/guardianobituaries.obituaries.

Robson, C. and McCartan, K. (2015) Real World Research: A Resource for Users of Social Research Methods in Applied Settings. Edited by Wiley. Chichester, West Sussex: Wiley.

Rosiello, A., Avnimelech, G. and Teubal, M. (2011) “Towards a systemic and evolutionary framework for venture capital policy,” Journal of Evolutionary Economics, 21(1), pp. 167–189. doi:10.1007/s00191-010-0189-x.

Rosted, J. (2008) Design and Innovation, FORA. Marseille, France.

Rouse, W.B. (1991) Design for Success: A Human-Centered Approach to Designing Successful Products and Systems.

Rowe, P. (1987) Design Thinking, MIT Press. MIT Press.

Roxburg, M. (1999) “Negotiating Design.” Sydney: University of Western Sydney, p. 44. Available at: http://www.academia.edu/2119055/Negotiating_Design (Accessed: March 25, 2013).

Ruskin, M. and Teal, J. (2016) Designers’ Evolving Roles in Government, Stanford Social Innovation Review. Available at: https://ssir.org/book_reviews/entry/designers_evolving_roles_in_government (Accessed: May 26, 2017).

di Russo, S. (2013) A Brief History of Design from the 1960’s to the Present, Open Law Lab. Available at: http://www.openlawlab.com/2013/09/09/a-brief-history-of-design-thinking-2/.

Sadowska, N.M. and Laffy, D. (2011) “Learning Beyond the Comfort Zone,” p. 10.

Saha, P. (2010) Enterprise Architecture as a Platform for Connected Government: A Qualitative Analysis. Available at: http://unpan1.un.org/intradoc/groups/public/documents/unpan/unpan039390.pdf (Accessed: February 15, 2018).

Saha, P. et al. (2010) Enterprise Architecture as Platform for Connected Government. Available at: http://unpan1.un.org/intradoc/groups/public/documents/unpan/unpan039390.pdf .

Sanders, E. (2006) “Design Research in 2006,” Design Research Society, 1(1), p. 25. doi:ISSN 1752-8445.

Sanders, L. (2008) An Evolving Map of Design Practice and Design Research, Doubberly Design Office. Available at: http://www.dubberly.com/articles/an-evolving-map-of-design-practice-and-design-research.html (Accessed: September 6, 2012).

Sangiorgi, D. (2011) “Transformative Services and Transformative Design,” International Journal of Design, 5(5), pp. 29–40. doi:10.1080/21650349.2013.827103.

Scarzella, P. (2020) Victor Papanek, the pioneer of social and sustainable design for the real world. Available at: https://www.lifegate.com/victor-papanek-design-real-world (Accessed: November 1, 2021).

Schmiedgen, J. (2011) Innovating User Value. Thesis. Zeppelin University.

Schön, D. (1983) “The reflective practitioner: How professionals think in action,” Basic Books [Preprint].

Schön, D.A. (1983) The Reflective Practitioner: How Professionals Think in Action, Basic Books. New York: Basic Books. Available at: http://cranfield.eblib.com/patron/FullRecord.aspx?p=1113868&echo=1&userid=

%2BmG9iUYr0m7lqSqCTX7UhCv8W9g%3D&tstamp=1491225348&id=8b0c2aec896f0e9f03cdf5ae00a22d0e735d0072&extsrc=shib-pid&patrontype=member%40cranfield.ac.uk (Accessed: April 2, 2017).

Schön, D.A. (2017) The reflective practitioner: How professionals think in action, The Reflective Practitioner: How Professionals Think in Action. Taylor and Francis. doi:10.4324/9781315237473/REFLECTIVE-PRACTITIONER-DONALD-SCH.

Schulman, S. (2014) 7 Missing Links between Social Policy, Social Services, and Outcomes: An Argument for Grounded Change. Rotterdam. Available at: http://inwithforward.com/resources/introducing-grounded-change.

Schumacher College and Carnegie Mellon School of Design (2016) “Transition Design Symposium 2016,” pp. 1–13.

Science Technology and Innovation Council of Canada (2010) Imagination to Innovation. Ottawa.

Science Technology and Innovation Council Secretariat Canada (2010) State of the Nation 2010 - Canada’s Science, Technology, and Innovation System: Imagination to Innovation: Building Canadian Paths to Prosperity. Ottawa: Science, Technology, and Innovation Council.

SEE (2011) Reviewing Innovation and Design Policies across Europe. Cardiff, Wales.

SEE Platform (2012) SEE Platform Policy Booklet 5 European Design Systems and Innovation Policy. Cardiff.

SEE Platform (2013) SEE Platform Policy Booklet 7 An Overview of Service Design for the Public and Private Sectors. Cardiff.

SEE Platform (2014a) SEE Platform Bulletin Issue 11, Sharing Experience Europe Policy Innovation Design. Cardiff, Wales.

SEE Platform (2014b) SEE Platform Bulletin Issue 12. Cardiff, Wales.

SEE Platform (2015) Design Policy Monitor. Cardiff, Wales. Available at: https://www.academia.edu/18847897/Design_Policy_Monitor_2015.

Sharma, N. (2008) “The Origin of the Data Information Knowledge Wisdom Hierarchy,” ResearchGate, 10(April 2008). Available at: http://www.pitt.edu/~nis41/dikw_origin.htm.

Sibieta, L. and Simpson, H. (2008) Public services performance, Oxonomics. doi:10.1111/j.1752-5209.2008.00018.x.

Siegel, R. (2008) Getting a Design Job, IDSA.

Simon, H. (1969) The Sciences of the Artificial. MIT Press, Cambridge Mass.

Simon, H.A. (1973) “The Structure of Ill-Structured Problems,” Artificial Intelligence, 4, pp. 181–201. Available at: https://cschan.arch.iastate.edu/235/6_Simon_Ill_defined_problem.pdf.

Simon, H.A. (1996) The Sciences of the Artificial, MIT Press.

Sitra (no date) Global Futures and Foresight - how will the world look beyond 2020? Available at: http://www.sitra.fi/en/blog/2012/global-futures-and-foresight-how-will-world-look-beyond-2020 (Accessed: August 19, 2012).

Skibsted, J.M. (2014) Governments Need a Design Policy, The Huffington Post. Available at: http://www.huffingtonpost.com/jens-martin-skibsted/governments-need-a-design-policy_b_4115385.html (Accessed: February 27, 2017).

Smith, B.L. (2003) Public Policy and Public Participation Engaging Citizens and Community in the Development of Public Policy. Halifax.

Smith, C. et al. (2002) Connecting Practitioners and Researchers: An Evaluation of NCSALL’S Practitioner Dissemination and Research Network. Cambridge, Massachusetts.

Smith, J. and Firth, J. (2011) “Qualitative Data Analysis: The Framework Approach,” Narrative, Memory & Everyday Life, 18(2), pp. 52–62.

Snelders, D., Morel, K.P.N. and Havermans, P. (2011) “The cultural adaptation of web design to local industry styles: A comparative study,” Design Studies, 32(5), pp. 457–481. doi:10.1016/j.destud.2011.03.001.

Soares, L. et al. (2012) “Design & philosophy. Friedrich Nietzsche’s thought and the twentieth-century buildings design,” in 8th International Conference on Design and Emotion: Out of Control. Affiliation: Polytechnic Institute of Viana Do Castelo, Portuguese Foundation for Science and Technology, ID+ Research Institute for Design, Media and Culture, Portugal; Affiliation: Department of Architecture, Urbanism and Planning, Katholieke University. Available at: http://www.scopus.com/inward/record.url?eid=2-s2.0-84867145576&partnerID=40&md5=7a6363d144fc3f111a5a33c33e0bbe70.

Soo Meng, J.C. (2009) “Donald Schön, Herbert Simon and The Sciences of the Artificial,” Design Studies, 30(1), pp. 60–68. doi:10.1016/j.destud.2008.09.001.

Sotamaa, Y. (2008) “A Paradigm Shift in Design and Innovation,” p. 10.

Sparke, P. (2014) John Heskett obituary, The Guardian. Available at: https://www.theguardian.com/artanddesign/2014/mar/12/john-heskett (Accessed: September 26, 2019).

Spilsbury, M. (2013) How does government classify and measure the design industry today? And what could we do better?

Spinuzzi, C. (2005) “The Methodology of Participatory Design,” Technical Communication, 52(2), pp. 163–174. doi:10.1016/j.infsof.2008.09.005.

Standford DSchool (2017) Design Thinking Artifacts. Available at: https://dschool.stanford.edu/resources-collections/design-thinking-artifacts (Accessed: March 7, 2017).

Stanley, L. (2012) “The Difference between an Analytical Framework and a Theoretical Claim: A Reply to Martin Carstensen,” Political Studies, 60(2), pp. 474–482. doi:10.1111/j.1467-9248.2012.00960.x.

Stasinopoulos, P. (2008) Whole system design: an integrated approach to sustainable engineering. Routledge. Available at: http://search.ebscohost.com/login.aspx?direct=true&db=cat00164a&AN=cran.546250&site=eds-live.

Stevens, J.S. (2009) Design as a Strategic Resource. Cambridge.

Stolterman, E. (2016) “Transforming Grounds: The Death of Design Thinking - a few years later.” Available at: http://transground.blogspot.co.uk/2016/04/the-death-of-design-thinking-few-years.html (Accessed: February 28, 2017).

Streb, C.K. (2012) “Exploratory Case Study,” in Mills, A.J., Durepos, G., and Wiebe, E. (eds) Encyclopaedia of Case Study Research. Sage Publications, Inc, pp. 372–373. doi:10.4135/9781412957397.

Summers, A. (2008) “Design Policy in the UK,” p. 56.

Summers, P. (2011) “A systemic approach to improving project management performance,” in 55th Annual Meeting of the International Society for the Systems Sciences 2011. Affiliation: Department of Strategy and Business Systems, Portsmouth Business School, University of Portsmouth, Portland Street, Portsmouth PO1 3DE, United Kingdom; Correspondence Address: Summers, P.; Department of Strategy and Business Systems, Portsmou, pp. 965–977. Available at: http://www.scopus.com/inward/record.url?eid=2-s2.0-84865798454&partnerID=40&md5=60061286d762c3240392b7fee9059458.

Sun, Q. (2010) “Design Industries and Policies in the UK and China: A Comparison,” Design Management Review, 21(4), p. 71.

Swann, C. (2002) “Action Research and the Practice of Design,” Design issues, 2(18), pp. 63–66.

Swann, P. (2010) The Economic Rationale for a National Design Policy. Paper No.2. London, UK. Available at: http://www.dx.org/site/design_exchange/assets/pdf/Economic_Rationale_for_National_Design_Policy_UK.pdf.

Tan, L. (2010) “Understanding design methodology in the public and social sector: Seven roles of the designer in the Dott 07 public design commission projects and their relevance to sustainable development contexts.” Dott07, p. 1.

Tashakkori, A. and Teddlie, C. (2003) Handbook of Mixed Methods in Social and Behavioural Research. Thousand Oaks: Sage.

Team, T.M.S. (2011) “Getting Started with Mendeley,” Mendeley Desktop. London: Mendeley Ltd., pp. 1–16. Available at: http://www.mendeley.com.

Teknion (no date) Design Is Intelligence Made Visible: An Anthology of Essays. 3rd edn, Exchange Organizational Behavior Teaching Journal. 3rd edn. Toronto: Teknion.

Tether, B. (no date) “Design, Designers & Innovation.” London, UK: Imperial College and Design, p. 28.

Thackara, J. (2005a) “Doors of Perception weblog: Creativity in business.” Available at: http://thackara.com/archives/2005/12/creativity_in_b.php (Accessed: February 22, 2010).

Thackara, J. (2005b) In the Bubble, Designing in a Complex World. Cambridge, Massachusetts: Massachusetts Institute of Technology. Available at: http://www.witz.com.br/textos/John Thackara - In the Bubble Designing in a Complex World.pdf (Accessed: February 9, 2017).

Thackara, J. (2007) Wouldn’t it be great if we could live sustainably by design? London.

The Danish Enterprise & Construction (2011) The Vision of the Danish Design 2020 Committee. Copenhagen, Denmark. Available at: http://www.ebst.dk.

The Design Council et al. (2013) Design for Public Good. London. Available at: http://www.designcouncil.org.uk/sites/default/files/asset/document/Design for Public Good.pdf (Accessed: April 16, 2017).

The Design Exchange (2010) “The State Of Design In Canada, Creativity & Innovation, Design Policy, Bio Business , Strategic Design and Design Thinking,” in DX Business Forum. The Design Exchange.

The Design Exchange and Canadian Manufacturers & Exporters (2010) State of Design: The Canadian Report 2010.

The Ontario Business Report (2011) Amid the glittering towers of commerce and finance there is a place where creativity and practicality merge, The Ontario Business Report. Toronto. Available at: http://ontariobusinessreport.com/en/innovation/articles/innovation_article_18.asp (Accessed: May 27, 2012).

Thenint, H. (2008a) Design as a Tool for Innovation, Inno-Grips: Global Review of Innovation Intelligence and Policy Studies. Marseille.

Thenint, H. (2008b) “Global Review of Innovation Intelligence and Policy Studies”: A PRO INNO Europe project "Design as a tool for innovation " Report. Available at: http:///grips.proinno-europe.eu/knowledge_base/view/549/design-as-a-tool-for-innovation-workshop-report/.

Thompson, C. (2011) “Modernizing for trade: Institutionalizing design promotion in New Zealand, 1958-1967,” Journal of Design History, 24(3), pp. 223–229. doi:10.1093/jdh/epr021.

Thuasne (2015) “Design as Strategy.” Thuasne, p. 10.

Tim Bird (2012) Beyond Iconic Scissors and Glassware - Finland’s World Design Capital, Sitra. Helsinki. Available at: https://www.sitra.fi/en/articles/beyond-iconic-scissors-and-glassware-finlands-world-design-capital-looks-future/.

Tödtling, F. and Trippl, M. (2005) “One size fits all?: Towards a differentiated regional innovation policy approach,” Research Policy, 34(8), pp. 1203–1219. doi:10.1016/j.respol.2005.01.018.

Tse, H.M. et al. (2014) “Continuity and conflict in school design: a case study from Building Schools for the Future,” Intelligent Buildings International [Preprint]. Department of Education, University of Oxford, 15 Norham Gardens, Oxford OX26PY, UK. doi:10.1080/17508975.2014.927349.

Tunstall, E. (Dori) (2009a) Report of the U.S. National Design Policy Summit. Available at: http://www.designpolicy.org/ (Accessed: August 19, 2012).

Tunstall, E. (Dori) (2009b) Report of the U.S. National Design Policy Summit. Washington, DC. Available at: https://www.ico-d.org/database/files/library/usnatldesignpolicysummit_report.pdf (Accessed: April 10, 2019).

Uehira, T. and Kay, C. (2009) “Using Design Thinking to Improve Patient Experiences in Japanese Hospitals: A Case Study,” Journal of Business Strategy, 30(2/3), pp. 6–12. doi:10.1108/02756660910942418.

UK Government (2017) Building our Industrial Strategy. London, UK. Available at: ttps://beisgovuk.citizenspace.com/strategy/industrial-strategy/supporting_documents/buildingourindustrialstrategygreenpaper.pdf (Accessed: February 9, 2017).

United Nations (1987) Brundtland Report - Our Common Future. Available at: http://www.un-documents.net/wced-ocf.htm.

United Nations (2008) Creative Economy Report 2008. Available at: http://ssc.undp.org/creative_economy (Accessed: April 10, 2019).

United Nations (2012) The Future We Want.

usability.gov (2017) Benefits of Prototypes.

Valtonen, A. (2005) “Getting Attention, Resources and Money for Design - Linking Design to National Research Policy.,” in Proceedings of the International Design Congress-IASDR 2005. Taiwan: International Association of Societies of Design Research (IASDR).

Vanderbeeken, M. (2008) “The Best Design Policies Are Local: A review of the Shaping the Global Design Agenda Conference,” Core77, pp. 3–14. Available at: http://www.core77.com/blog/events/the_best_design_policies_are_local_a_review_of_the_s haping_the_global_design_agenda_conference_11798.asp.

Verganti, R. (2008) “Design, meanings, and radical innovation: A metamodel and a research agenda,” Journal of Product Innovation Management [Preprint]. doi:10.1111/j.1540-5885.2008.00313.x.

Vinodrai, T. (2009) The Place of Design: Exploring Ontario’s Design Economy. Toronto.

Waddell, S. (2012) “Global finance as an action research domain: Testing the boundaries,” Action Research, 10(1), pp. 40–60. doi:10.1177/1476750311414736.

Waks, L.J. (2001) “Donald Schon’s philosophy of design and design education,” International Journal of Technology and Design Education, 11(1), pp. 37–51. doi:10.1023/A:1011251801044.

Wallace, R. (2001) “Providing Our Value: Measuring Package Designs Return on Investment,” Design Management Journal, 12(3).

Wallis, P.J. and Ison, R.L. (2011) “Appreciating Institutional Complexity in Water Governance Dynamics: A Case from the Murray-Darling Basin, Australia,” Water Resources Management, 25(15), pp. 4081–4097. doi:10.1007/s11269-011-9885-z.

Walters, A., Whicher, A. and Cawood, G. (2012) “Research and Practice in Design and Innovation Policy.” Boston, Massachusetts: Design Management Institute. Available at: https://repository.cardiffmet.ac.uk/handle/10369/3529 (Accessed: April 2, 2017).

Van Wart, M. (2012) Leadership in Public Organizations. 2nd ed. Routledge.

Way, A. (1993) “The Government of Canada’s Federal Identity Program,” Design Management Journal, 4(3), pp. 55–62.

Whicher, A. (2014) “Mapping Design Innovation Ecosystems.” Cardiff, Wales: SEE Platform, pp. 2–3. Available at: https://www.academia.edu/10085428/Mapping_Design_Innovation_Ecosystems (Accessed: October 28, 2021).

Whicher, A. (2015) The value of design to the public sector, Design for Europe. Available at: http://www.designforeurope.eu/news-opinion/value-design-public-sector (Accessed: September 18, 2019).

Whicher, A. (2016) Benchmarking Design for Innovation Policy in Europe. Cardiff Metropolitan University. Available at: https://repository.cardiffmet.ac.uk/handle/10369/7999.

Whicher, A., Cawood, G. and Walters, A. (2013) Design Policy Monitor 2012.

Whicher, Anna, Cawood, G. and Walters, A. (2015) Design Policy Monitor 2015.

Whicher, A, Cawood, G. and Walters, A. (2015) “Design Policy Monitor 2015: Reviewing Policies Across Europe,” European Commission, (January), p. 49.

Whicher, A. and Crick, T. (2019) “Co-design, evaluation and the Northern Ireland Innovation Lab,” Public Money and Management, 39(4), pp. 290–299. doi:10.1080/09540962.2019.1592920.

Whicher, A., Swiatek, P. and Cawood, G. (2015) Design Policy Monitor 2015. Cardiff, Wales. Available at: https://adp.cat/web/wp-content/uploads/SEE_DPM_2015_Jan.pdf (Accessed: February 20, 2017).

Whicher, A. and Walters, A. (2017) “Mapping Design for Innovation Policy in Wales and Scotland,” The Design Journal, 20(1), pp. 109–129. doi:10.1080/14606925.2016.1233006.

Whiteley, N. (1994) Design for Society. London, UK: Realktion Books.

Windrum, P., Thompson, S. and Battisti, G. (2013) “Introduction to the special issue in honour of Peter Swann,” Economics of Innovation and New Technology, 22(3), pp. 219–221. doi:10.1080/10438599.2012.708131.

Woodham, J. (2011) “Formulating national design policies: An exchange of letters: Dear design issues editorial board,” Design Issues. Brighton: Design Issues, pp. 86–88. doi:10.1162/DESI_c_00059.

Woodham, J.M. (2010a) “Formulating National Design Policies in the United States: Recycling the ‘Emperor’s New Clothes’?,” Design Issues, 26(2), pp. 27–46.

Woodham, J.M. (2010b) “Formulating National Design Policies in the United States: Recycling the ‘Emperor’s New Clothes’?,” Design Issues, 26(2), pp. 27–46. doi:10.1162/DESI_a_00003.

World Bank (2008) World Development Indicators, World Development Indicators (WDI). Edited by (Mimas) ESDS International.

Xiao, A. et al. (2005) “Collaborative multidisciplinary decision-making using game theory and design capability indices,” Research in Engineering Design, 16(1–2), pp. 57–72. doi:10.1007/s00163-005-0007-x.

Yee, J.S.R. (2012) “Implications for Research Training and Examination for Design PHDS,” in Andrews, R., Borg, E., and Davis, S. (eds) The Sage Handbook of Digital Dissertations and Theses 462. SAGE Publications Ltd, pp. 461–492.

Yee, J.S.R. and White, H. (2016) “The Goldilocks Conundrum: The ‘Just Right’ conditions for design to achieve impact in public and third sector projects,” International Journal of Design [Preprint].

Yee, S. and Breslin, M.L. (2010) “Achieving accessible health care for people with disabilities: Why the ADA is only part of the solution,” Disability and Health Journal, 3(4), pp. 253–261. doi:10.1016/j.dhjo.2010.07.006.

Yin, R.K. (2009) Case Study Research: Design and Methods. Fourth. Thousand Oaks, California: Sage.

Yoshimoto, M. (2003) The Status of Creative Industries in Japan and Policy Recommendations for Their Promotion. Available at: https://www.ico-d.org/database/files/library/japan.pdf (Accessed: April 10, 2019).

Young, M. (2011) “The Continuous Improvement Grid: An Empirical Investigation into the Effectiveness of a Systems, and Action Research, Based Continuous Improvement Intervention, for ‘New’ Organisation Development,” Systemic Practice and Action Research, 24(5), pp. 453–478. doi:10.1007/s11213-011-9195-7.

Young, R.F. (2010) “The greening of Chicago: Environmental leaders and organisational learning in the transition toward a sustainable metropolitan region,” Journal of Environmental Planning and Management, 53(8), pp. 1051–1068. doi:10.1080/09640568.2010.508948.

Zainal, Z. (2007) “Case study as a research method,” Journal Kemanusiaan, 9.

Zeleny, M. (1987) “Integrated Knowledge Management,” Human Systems Management, 7(1), pp. 59–70. Available at: http://www.milanzeleny.com/Files/Content/Knowledge_X.pdf (Accessed: April 3, 2017).

Zitkus, E. et al. (2018) “Understanding How Design Action Plans Support the Strategic Use of Design,” DRS2018: Catalyst, 2, p. 12. doi:10.21606/drs.2018.538.

Zucker, P. (1944) “New Architecture and City Planning: A Symposium,” in Zucker, P. (ed.). New York: Philosophical Library Inc, p. 694. Available at: http://designtheory.fiu.edu/readings/giedion_new_monumentality.pdf (Accessed: March 30, 2017).

van Zyl, R. (2008) “Buchanan’s Design Thinking Matrix: Implications for SMMEs,” Design Issues [Preprint].

van Zyl, R. and Sauthoff, M. (2001) “Buchanan’s Matrix: A Framework for Strategic Alliance,” Mapping New Territories in Design Education [Preprint].

APPENDICES

Appendix A: Internet Search Profile

Adapted from the Centre for Reviews and Dissemination (CRD) at the University of York – crd.york.ac.uk

1. Background to Review

The nature of design in the context of government requires that both the context of design in government be explored and then what design is withing that context be explored. This is achieved through two reviews representing Phases One and Two of the research – a systematic review for the former as well as a scoping review for the latter. The literature search was conducted as one process to obtain literature for both endeavours.

Phase One of the research process examines what *design* is as capability within the context of government. The study helps to provide a clearer understanding of the definition of design and its scope in terms of its potential to contribute within this context. The task also serves to provide a base of understanding of this and related core concepts.

The study is carried out as a series of activities. First to contextualize the concept of *design*, the terms *capability* and *government* are examined to clarify meaning. The concept of *design capability* is then explored in the literature to identify the range of perspectives and their specific limits in order to orient the study. The task also seeks to identify the gap and opportunity space for this research. Finally, through a focused review of literature relating to the theory and practice of *design,* the term *design* is explored according to its various meanings as noun and verb to understand its identity and scope as capability within this context.

Phase Two of the research process is concerned with establishing the context for the research. The study reports on an examination of the design-in-government context through a scoping review of literature.

Research Question: "What is the capability of design in government?"

Aims

1. Identify the capability of design within the context of government, and to analyse and synthesize these findings in order to,
2. Develop an appropriate tool to communicate this information to government.

2. Specific Objectives

a. Examine and Define What Design is as Capability

Examine evidence that shows "what design is" as capability through a systematic review of literature. Synthesize this information into a written definition of design for use in this context.

b. Establish the Design-in-Government Context

Map the interdisciplinary area of Design-in-Government including related literature, evidence and key concepts. Based on this information, to construct a conceptual framework (CF) in graphic and written form. To document, in written form, the need for the research and list gaps in the existing literature.

3. Criteria for Including studies in the review	
a) Population or participants and conditions of interest	Studies not restricted to a particular country – will examine papers from all over the world
b) Interventions or exposures	Interventions should indicate a dimension of design as the driver specifically as it relates to the public sector.
c) Comparisons or control groups	Any comparison or control
d) Outcomes of interest	Design impact (short, medium, or long term)
e) Setting	Any setting
f) Study designs	Any study design

4. Criteria for excluding studies not covered in inclusion criteria

Any specific populations excluded, date range, language whether abstracts or full text available, etc.

The word design is employed as an "add-on' in many contexts therefore database searchers may result in many results not related to this specific study. Studies not associated with the practice of design for example, Engineering design, Mechanical Design, Fine Arts, Crafts, Construction (e.g., design-build).

5. Search methods	
Electronic databases	**Scopus** A huge index covering publications from 5,000 publishers in all areas of science, technology, medicine, and social sciences. It has several functions that allow searchers to personalise it to their own interests. **Google Scholar** Google Scholar has scholarly, peer reviewed articles on a range of topics. Accessible from off-campus.
Other methods used for identifying relevant research	• Reference checking and handsearching of these. • Industry related journals not listed in databases. • Contacting experts in the field • Field related publications/reports from organizations, governments, design firms, research groups

	• Identifying possible data from conferences and industry events attended dictionaries, thesauruses, grey literature, and some databases (where reports referenced specific articles and publications) were used as tools in the initial data mining phase to scope utilizing the scoping topic questions and key words.
Journals hand searched If any are to be hand searched, please list which journals.	• Design Issues • Design Studies • International Journal of Art and Design Education • Design Management Institute (DMI) • Design Science Journal • Design Society • Journal of Design Research • International Journal of Design Creativity and Innovation • Design Principles and Practices I have decided to hand search these journals as I found many articles about design in the context of government in them while doing my PhD research. None of these journals have shown up in the electronic data base searches.

6. Methods of review	
Details of methods	Following database search, determine data to be extracted Note if any specific themes are emerging
Quality assessment Tools or checklists used with references or URL's	Protocol will define the method of literature critique/ appraisal use
Data extraction What information is to be collected on each included study. If databases or forms on Word or Excel are used and how this is recorded and by how many reviewers	Data extraction to Mendeley reference manager digitally into folders representing themes emerging from the literature or grouped manually in hard copy form into thematic groups.
Narrative synthesis Details of what and how synthesis will be done	The results are concerned with issues relevant to 1. the nature of the field of design-in-government 2 the nature of what design is as capability with the field. Narrative synthesis will be carried out using a framework which consists of three elements; 1. The dimension of design in use according to broad categories according to Buchannan (1998) 2. Developing a preliminary synthesis of findings of included studies according to themes emerging from the literature relating to dimensions of what design is as well as themes related to the design-in-government context 3. Exploring relationships within and between studies

6. Methods of review	
Analysis	The scoping review is concerned with mapping the field and its literature and as such is not concerned with reviewing the qualitative and quantitative data from each study Themes related to what design is as well as themes related to the context of design in government are considered

Appendix B: Summary of Initial Search Results

Summary of Initial Search Results

Key Authors and Publications	Thematic Category
Journals Design Research Society Design Studies International Journal of Art and Design Education Design Management Institute (DMI) Design Science Journal Design Society Journal of Design Research International Journal of Design Creativity and Innovation Design Principles and Practices	**Design: Theory (and criticism), Practice, and Management** *The Practice of Design, Abilities that are part of designs capacity – reservoir-source)* *Design Theory and Philosophy* *Problematic issues in design practice* *Design Services* *Index (Canada & Europe)* *New areas of practice* *User Centred Design* *Design Strategy* *Methods* *Approaches* *Advocacy*
Conferences: Design Research Society Conference Design Management Institute (DMI) Design Principles and Practices	
Margolin, V. (2007). Design for Development: Towards a History. Design Studies, 28(2), pp.111- 115. Heskett, J. (2001b). Past, Present, and Future in Design for Industry. Design Issues, 17(1), pp.18-26. Heskett, J. (2002). Toothpicks & Logos - Design in Everyday Life. Oxford University Press.	
World Economic Forum's Global Competitiveness Report Cox, G. (2005). Cox Review of Creativity in Business: Building on the UK's Strengths. Design policies and reports by country: Design 2005! (2000). Helsinki: Arts Council of Finland and Finnish Ministry of Education	**Design: + Government, Policy, and Innovation**
Margolin, V. (2007). Design for Development: Towards a History. Design Studies, 28(2), pp.111- 115. Heskett, J. (2001b). Past, Present, and Future in Design for Industry. Design Issues, 17(1), pp.18-26. Heskett, J. (2002). Toothpicks & Logos - Design in Everyday Life. Oxford University Press. Murphy, 2010 SEE Bulletins	**Design in government strategies:** *Mechanisms through which design can move through government)* *What is it? Can be promotion, support, advocacy initiated by individuals, organized groups, or by government themselves* *Can include a variety of approaches including Design programs, support, agents, and policies*

Key Authors and Publications	Thematic Category
Moultrie, J. (2009, August). Developing an International Design Scoreboard. SEE Bulletin. PDR - National Centre for Product Design & Development Research, Issue 1, 3-5. Cardiff, UK. Moultrie, J. & Livesey, T.F. (2009). International Design Scoreboard - Initial indicators of international design capabilities. Great Britain: IfM and University of Cambridge. Moultrie, J., Livesey, T.F., Malvido, C., Riedel, J., Beltagui, A., Pawar, K., Nixon, B., MacBryde, J., Martinez, V., Demian, P. & Evans, S. (2008). Developing a National Design Scoreboard. In (Ed.) Undisciplined 2008! Design Research Society Conference. Sheffield, UK: Sheffield Hallam University Global Competitions Report	**Design Capability:** the potential for impact in government Economic Social Environmental Systemic (Design Management) Design value
Palab Sanah – Enterprise Architecture Whole System Design Peter Stasinopoulos, Charlie Hargroves, Cheryl Desha, Michael H. Smith	**Whole of Government Approach** **Systems approach**

Organizations/agencies	Country
IDEO	USA – International
Design Council	**UK**
Design for Europe	EU
SEE Platform	UK – EU
DeEP	UK – EU
NESTA	UK
Policy Connect	UK
Danish Design Centre	Denmark
MARS	Canada
DIAC	Canada
Think Public	Australia
United Nations	International
OECD	International
Lancaster University	UK
Cambridge University	UK
Politecnico Milano	Italy
Design Flanders	Brussels
Gensler	USA - International
IFI	International

Appendix C: Sample Draft Paper

Wales Institute of Research in Art & Design (WIRAD)
Emerging Researcher Symposium 2014

Examining the Concept of "Design Capability":
A Thematic Analysis

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WIRAD Wales Institute of Research in Art & Design
Emerging Researcher Symposium 2014

Abstract

This paper rests in the area of design in government looking specifically at the potential for design to positively impact the economic, social, environmental, and political domains of government.

What is the capability of design in government? The lack of understanding of the nature of design and its potential is cited as being the primary factor limiting the effective use of design in government[1]. Lack of common definitions and common language are also contributing factors to this confusion.

Design Capability is a term currently used inconsistently in this field of research. This paper presents a critical overview of existing literature in the area of design capability in government. A synthesis of these findings will aid in the identification of gaps in knowledge in this area. A summary of this review will help to consolidate language, constructs, and other important concepts, which will inform the development of a working definition of the term 'design capability' for use in the greater research work.

This paper contributes to a larger body of research *concerned with* identifying the capability of design in government**.** The information targets an audience of policy developers and other government officials responsible for placing design strategically in government at national and international inter-governmental levels. This research pivots on the axiom that design can aid in solving complex global problems. It is hoped that the new knowledge generated in this work with facilitate design-led government towards this end.

KEYWORDS: Design Capability, Design Knowledge, Government

Introduction

Countries around the world are becoming aware of design's tactical ability to positively impact social, economic, environmental, and political domains of government. As a result, governments are taking steps to integrate design in government strategies at various levels of government implicitly or explicitly. These strategies generally take the form of design promotion, support, or policy [2-6] and are implemented by various stakeholders through programs, design initiatives and design interventions [7] depending on the nature of the government structure. [8.]

Regardless of the vehicle used by governments the goal is to move the capabilities of design through a government system.[9] yet governments, policy developers and design knowledge transfer agents (KTA) do not have a clear idea of what these capabilities are. In addition, research has identified the direct relationship between the extent to which design is used and the level of a country's understanding of design.[10] Understanding the capability of design is critical therefore to the comprehensive use of design at national and global levels. The need for benchmarking common language and concepts is at the core of this issue.

This review of literature is undertaken to investigate available studies, theoretical ideas and identify knowledge gaps in the area of design capability. The content is organized under the sub-headings of introduction, design capability, summary, and conclusion. The objective of the summary is to inform the development of a consolidated definition of the term 'design capability' for use in the greater research. It is important to note that design capability exists in other fields of research and practice, most obviously in the area of information technology. It is important to note therefore that underpinning what is presented in this paper is an understanding of the research context, which is government. Government includes the economic, social, political, and environmental domains which Raulik-Murphy describes as being areas of design impact.

The nature of the scope of research recognizes that the potential for design in government exists in literature as well as in government and practice. As a result, the research was not restricted to academic publications but also includes government-initiated reports and articles from published conference proceedings. The content of material selected for this review was analyzed based on main findings, research methodology, level of analysis, type of study and area of design impact.

What is Design Capability?

This section examines the question 'What is design capability?' by first defining the word 'design', to establish a clear point of reference, and the word 'capability' to understand the constructs for analysis of the various uses of the term "design capability" as explored in the literature relating to government. At the core of this question is language, specifically the lack of common language or at the least, creation of space for consideration of multiple meanings that exist for the same term.

Understanding Design

Most theorists would agree that that design is a very complex word to define. Dilnot[11], Margolin[12]and Sparke[13] view "the tripartite relationship between history, understanding, and practice as being of central importance to design" as they constitute "an integral part in forming the philosophical and methodical basis for design as a whole."[14] These considerations are explored in the larger body of research to help inform the identification of the specific abilities that exist within the capability of design.

The etymology of the word design identifies it as both a noun and a verb.[15,16] This places design as a thing (object) or an action with context unspecified. Design in this regard can be seen as multi-faceted. Theorists from an array of disciplines have acknowledged design's relevance as not being restricted to primarily making material artifacts or signs and words (communication), but also action (strategic planning) and thought (systemic integration). [17,18]

A holistic understanding of design's multi-faceted nature is a critical foundation to understanding it's potential application in non-traditional ways and contexts. To explore the full scope of design's potential, this holistic or broad view of design will be taken in this research.

Understanding Capability

The noun capability, in the English language, has various dimensions of meaning and hence creates opportunities for many interpretations, which is the case in this instance. Capability can be used to mean Ability: natural ability (the quality or state of being capable) [19]; ***Potential:*** range of ability of doing or to do something[20] or ***Function*****:** (a facility to carry out a particular set of operations; the capacity to be used, treated, or developed for a specific purpose: e.g., nuclear capability. [21,22] (Table 1).

An analysis of design in government literature identifies references to all three interpretations when looking at design capability. These varying paradigms are discussed in the next section however, the important thing to note here is how the various understandings and uses of the same term provide the basis for confusion.

As previously mentioned, this paper exists within the context of a greater body of research, which seeks to examine the potential for design in government. For this reason, this research relates primarily to the definition of capability as potential – the range of ability of design to impact government. The wider definition is included however when addressing the individual abilities that lie within.

Table 1 – Source: Author

Capability Defined			
: noun			
Source	*Extract*		
	1. **Ability**	2. **Potential**	3. **Other**
Bing Dictionary	Natural ability: the power or practical ability necessary for doing something	**Range of ability: the potential ability of somebody or something to do something**	Function: a facility to carry out a particular set of operations
Merriam Webster	The quality or state of being capable; *also*: ability	a feature or faculty capable of development: potentiality	**The facility or potential for an indicated use or deployment**
Oxford Dictionary	The power or ability to do something	**Capability of doing/to do something**	
Collins English Dictionary	the quality of being capable; ability	(*Usually plural*) a characteristic that may be developed; potential aptitude	the quality of being susceptible to the use or treatment indicated: the capability of a metal to be fused.
The American Heritage Dictionary of the English Language	The quality of being capable; ability.	A talent or ability that has potential for development or use. Often used in the plural: a student of great capabilities.	**The capacity to be used, treated, or developed for a specific purpose: nuclear capability.**

Design Capability in the literature

The literature has shown that 'design capability' is generally interpreted in two ways: as a term or concept representing a unit or a collective or the components that exist within that unit. In addition, the components are identified as capabilities either before (latent) or after use. This research requires the need to distinguish between these levels of identification in order to arrive at an accurate working definition and to clarify the perspective for this research.

A distinction must be made therefore between the terms 'design capability', 'design's capabilities', the 'capability of design' and the 'capabilities of design'. The literature reveals the use of 'design capability' as a term to identify the collective or unit, and 'design's capabilities' and the 'capabilities of design' as the elements that exist within that unit or make up part of the whole.

Design in European Policy (DeEP) take their definition from Sen 2004 which focuses on what individuals are able to do. Capability here is defined as 'the ability of a subject to do something'. [24]

DeEP, in their research choose to focus mainly on enterprise and ecosystem capabilities referring to firms. Capability is defined as: the ability to integrate resources and competences to foster innovation. In particular [they] refer to dynamic capabilities as the tangible and intangible assets, and the knowledge and processes needed for recognizing new business opportunities an orchestrating its resource portfolio in conditions of change (Teece et al., 1997; Zahra & George, 2002).[24] Design capability is therefore referred to as term to identify a concept with reference to the abilities that lie within. DeEP also model a 'design capabilities set' which includes competencies needed to carry out design activities. "Competencies are recognized in three macro areas: Design Leadership, Design Management, and Design Execution."[25] As identified; these competencies are the capabilities that lie within the overall concept. DeEP measures these indicators through qualitative and quantitative means.

Similarly, Moultrie and Livesey in their seminal work on indicators of international design capabilities identify design capability as part of the enabling conditions in a national design system. The inputs are labelled as capabilities and defined as "the development of human capital relating to design, including design graduates, designers in the workforce and those working in the design sector. [26] Design capability in this example focuses on "*a talent or ability that has potential for development or use"* (Table 1). The

metrics in this research are limited to the design services sector in a region, and specifically, the total number of design students graduating from design subjects including architecture, product/industrial design, clothing/fashion design, digital/multimedia design, and graphic/communication design (Moultrie 2011).

Table 2 – Source: Author

Analysis of Sources			
Source	***Extract***	***Definition: (From Dictionary)***	**Notes:**
Moultrie	The development of human capital relating to design, including design graduates, designers in the workforce and those working in the design sector.		Those elements that generate economic impact
DeEP	The design capabilities set needed to carry out design activities. Competencies are recognised into three macro areas.	**Function: a facility to carry out a particular set of operations**	What individuals are able to do
			The approach, process regarding firms and innovation
SEE	"Design capability is the extent to which the private and public sectors use design".	**The quality of being susceptible to the use or treatment indicated: the capability of a metal to be fused.**	The benefits being received by others: impact
Other: Design Singapore	Enabling Singapore to use design for economic growth	**The capacity to be used, treated, or developed for a specific purpose: nuclear capability.**	Enabling tools that will facilitate the use of design in government.

The study focuses on national competitiveness and the need for a comprehensive collation of data to enable reliable comparison between nations for performance in design. It contrasts with the DeEP definition greatly in that it focuses solely on quantitative measures that have economic impact. However, it is similar in in the fact that, the term 'design capability' is used to describe an overarching concept. In each case though, unique limits are put in place, definers are used and 'abilities or components are articulated.

Finally, Sharing Experience Europe (SEE) in their Design Policy Monitor which provides a look at the provision for design support, promotion centres and policy in their European Member States, defines 'design capability' as "the extent to which the private and public sectors use design" [28] In contrast to the previous examples, design in this instance is recognized by its generated output ability. Table 2

Although the work being don in this area is limited, they are quite comprehensive. What is interesting to note is that the reviewed literature does not go outside of the parameters of the economic impact of design. None look at qualitative and quantitative measures from the view of all possible inputs (or abilities), and all none look at the possible impact on the entire system of government.

Capability implies potentiality and should consider all possible abilities as they relate to all possible areas of government impact. This viewpoint offers the scope of design necessary for government to see the potential for design use and impact.

Summary

The lack of understanding of design's capabilities is a barrier to its effective use in government [29] and the extent to which comprehensive or mature design in government initiatives are achieved, depends on the degree of a countries understanding of design's capabilities. [30]

The literature has shown that:

- The word 'design' exists as a noun and verb is multi-faceted and can vary to mean material artifacts, signs and words (communication), action (strategic planning) and thought (systemic integration).
- The word 'capability' has various dimensions of meaning and hence creates opportunities for many interpretations. It can be Capability used to mean ***ability***, ***potential or function.***

- The term ‘design capability’ is used in various ways with a variety of meaning within the context of design in government. This can cause confusion.
- Current use of the term is limited primarily to the economic benefit to government and does not include the social, environmental, or political benefits.
- The full scope of design’s abilities is not identified
- Capability as potential is not addressed
- Numerous capabilities of design exist.
- No literature exists that looks at the capability of all of design on all of government.

Conclusion

The design in government context draws reference to ‘design capability’ as a concept from a variety of conflicting perspectives each with unique constructs, limits, indicators, and measures that do not refer to the complete system of government.

‘Design’s Capabilities’ is used as term to mean the core competencies embedded in design.

As a result of this literature review it can be stated that common language exists, however common meaning does not. In addition, the language that is used does not represent the full context of the words, design, capability, or government. Finally, each reviewed report put forth a valid list of competencies that together contribute to a clearer picture of the overall capabilities of design. This information needs to be compiled for a clearer picture of the full scope of design’s abilities. It is evident that the identified gaps and deficiencies in this research area call for a better theoretical understanding of the concept of the capability of design in government.

The outcomes of this review will be used to inform the development of a working definition of design capability which will act as a foundation for the larger body of research.

A preliminary definition is proposed as follows:

Design capability represents the reservoir of abilities or competencies available within the domain of design in its fullest sense. These capabilities collectively represent the potential for impact within a government system, which includes social, economic, political, and environmental domains.

Appendix D: Selected Twentieth and Twenty-First Century National and International Design Initiatives

Source: (Woodham, 2010)

Year	Organizations, Institutions, and Reports	Nationality
1944	Establishment of the Council of Industrial Design (COID, restructured as Design Council, 1972) under the government's Board of Trade	Britain
1948	Establishment of National Design Council	Canada
1951	Establishment of the Ministry of International Trade and Industry (MITI)	Japan
1953	Establishment by Parliament of Rat für Formgebung (Design Council)	West Germany
1956	Establishment of the COID's Design Centre in central London	Britain
1958	Establishment of the Design Department (later known as the Design Policy Office) of the Ministry of International Trade and Industry (MITI)	Japan
1958	Industrial Design Council of Australia (IDCA) established, government funded (until 1976)	Australia
1958	*Eames Report*, also known as the *India Report*, commissioned by the Indian Government	India
1963	Design Council (NDC, Norsk Designråd) established under the Ministry of Trade and Industry	Norway
1964	Design Centre established in Belgium (closed in 1986)	Belgium
1964	Australian Design Centre opens in Melbourne	Australia
1969	Establishment of the Japan Industrial Design Promotion Organization (JIDPO).	Japan
1970	Korean Design Packaging Centre established	South Korea
1972	Federal Design Improvement Policy developed by Nancy Hanks, Chair of National Endowment for the Arts	
1973	Product Development and Design Center of the Philippines (PDDCP, formerly Design Centre Philippines) created by Presidential Decree. Reorganized 1987.	Philippines
1973	Barcelona Design Centre established, partially funded by government agencies	Spain
1978	Danish Design Centre established, working with Ministries of Industry and Education	Denmark
1979	A Product Design Division established under the Taiwan External Trade Development Council (TAITRA) and later expanded to become the Design promotion Center in 1990	Taiwan
1980	Establishment of the Oficina Nacional de Diseño (ONDi)	Cuba
1983	Agence pour la Promotion de la Création Industrielle established in response to the Ministries of Culture and Industry, becoming fully private in 1993	France
1987	Australian Design Council (ADC) replaces IDCA, following Government review	Australia
1989	Australian Design Summit, Canberra	Australia
1991	Design Vlaanderen (Design Flanders) is established under Flemish Minister for Economy	Belgium
1991	Slovak Design Centre (SDC) established by the Ministry of Culture	Slovakia
1992	International Design Center NAGOYA established as a quasi governmental corporation	Japan
1993	Publication by the Design Promotion Council of MITI of New Design Policy in Response to Changes in the Times	Japan
1993	First 5-year Design Plan initiated in South Korea (1993–97)	South Korea
1993	Malaysian Design Council established	Malaysia
1994	A Proposal for a Whitehouse Council on Design: A Strategy to Harness the Power of Design, Design Programme: National Endowment for the Arts, June 1994	USA
1995	Beijing Industrial Design Centre established	China
1995	Indonesian Design Centre established	Indonesia
1995	Competing by Design, National Design Review Report published	Australia
1995	Brazilian Design Program (Programa Brasileiro do Design - PBD) established by Government	Brazil
1997	Czech Trade Promotion Agency/CzechTrade established by the Ministry of Industry and Trade Czech Republic	Czech Republic
1998	Second 5-year Design Plan initiated in South Korea (1998–2002)	South Korea
2000	Metropolitan Design Center (CMD) established by the Government of the City of Buenos Aires	Argentina
2001	Japanese Ministry of Economy, Trade and Industry (METI) established 2001, successor to MITI	Japan
2001	Korean Design Centre established. Korean Institute of Design of Design Promotion (KIDP) renamed, previously Korean Design Packaging Centre	South Korea
2001	Hong Kong Design Centre established, funded by the Hong Kong Special Administrative Region (HKSAR)	China
2002	The Hungarian Design Council established as successor to the Hungarian Council for Industrial Designs and Ergonomics	Hungary
2002	Premsela, funded by the Dutch Ministry of Education, Culture and Science and the City of Amsterdam. Established to promote Dutch design activity.	Holland
2002	Plan Nacional de Disegno de la Secretaria de Industria y Comercio	Argentina
2002	Taiwanese Government's Cultural and Creative Industries Development Program Phase 1 (2002–7)	Taiwan
2003	Thailand Creative & Design Centre (TCDC) project approved by Government Cabinet	Thailand
2003	Third 5-year Design Plan initiated in South Korea (2003–7)	South Korea

Selected Twentieth and Twenty-first Century National and International Design Initiatives, Woodham (2010).

Year	Organizations, Institutions, and Reports	Nationality
2002	Taiwanese Government's Cultural and Creative Industries Development Program Phase 1 (2002–7)	Taiwan
2003	Thailand Creative & Design Centre (TCDC) project approved by Government Cabinet	Thailand
2003	Third 5-year Design Plan initiated in South Korea (2003–7)	South Korea
2003	Design Taskforce/New Zealand Government: A Report and Strategic Plan	New Zealand
2003	DesignSingapore Council for design promotion and development	Singapore
2003	International Design Alliance (IDA) established by the International Council of Societies of Industrial Design (Icsid) and International Council of Societies of Industrial Design (Icograda)	Global (Montreal)
2004	Taiwan Design Center (TDC), the national design promotion organization established in Taipei with support of the Industrial development Bureau, formerly the Design Promotion Center under the Taiwan External Trade Development Council	Taiwan
2005	Department for Trade & Industry Economics Paper no.15: Creativity, Design and Business Performance	United Kingdom
2005	Cox Review of Creativity in Business: building on the UK's strengths published by UK Design Council	United Kingdom
2005	Thailand Creative & Design Centre opened	Thailand
2006	Designium, the New Centre of Innovation in Design, established to promote national design policy, a cooperation between higher education and Tekes, the National Technology Agency	Finland
2007	National Design Policy launched	India
2008	Taiwanese Government's Cultural and Creative Industries Development Program Phase 2 (2002–7)	Taiwan

Appendix E: Summary of Stakeholder Engagements

Overview of Data Collection Experiences/engagements by year

		< 2013	2013	2014	2015	2016	2017
Conference Attendance	Industry Engagement	**Design Industry Advisory Committee,** Toronto Canada	September 4-5, 2013. Cambridge University, UK **Cambridge Academic Design Management Conference – CADMC** DMI, Institute for Manufacturing Design Management: Past, Present and Future	September 11-12, 2014, Cardiff, UK **Wales Institute of Research in Art and Design (WIRAD) Emerging Researchers Symposium**	March 12-15, 2015, Chicago, Illinois, USA **Design Principles and Practices 2015 Conference**	July 27-29, 2016, Boston, Mass. USA **Design Management Institute 2016 Conference**	March 2-3, 2017. Toronto, CANADA **Design Principles and Practices 2017 Conference**
			Industry Engagement: CADMC, (Design) Researchers, Government Policy Developers, Various practitioners from design + manufacturing	September 15-16, 2014, Jyvaskyla, Finland **SEE Conference: Academic–Industry Collaboration**	September 15-16, 2015. Bristol, UK University of Bristol, School for Policy Studies **Policy & Politics 2015 Conference** on Democracy, Inequality & Power		October 16-20, 2017, Montreal, Quebec, CANADA **World Design Summit (WDS)** **An international action plan for solving global issues through design.**
				September 24-26, 2014, Brussels, Belgium Microsoft Innovation Centre **European Regions Research and Innovation Network (ERRIN) EU Design Days**			
				September 2-5, 2014, London, UK **Unusual Suspects Festival:** *"Unlikely Connections for Social Change"* **The Leadership Centre presents: How do we better understand and lead the systems we work within to create better, more integrated person-centered public services?** Local Government Association, Smith Square London UK UAL DESIS Lab and Design Against Crime Research Centre, Centre St. Martins, 1 Granary Square, Kings Cross, London UK			

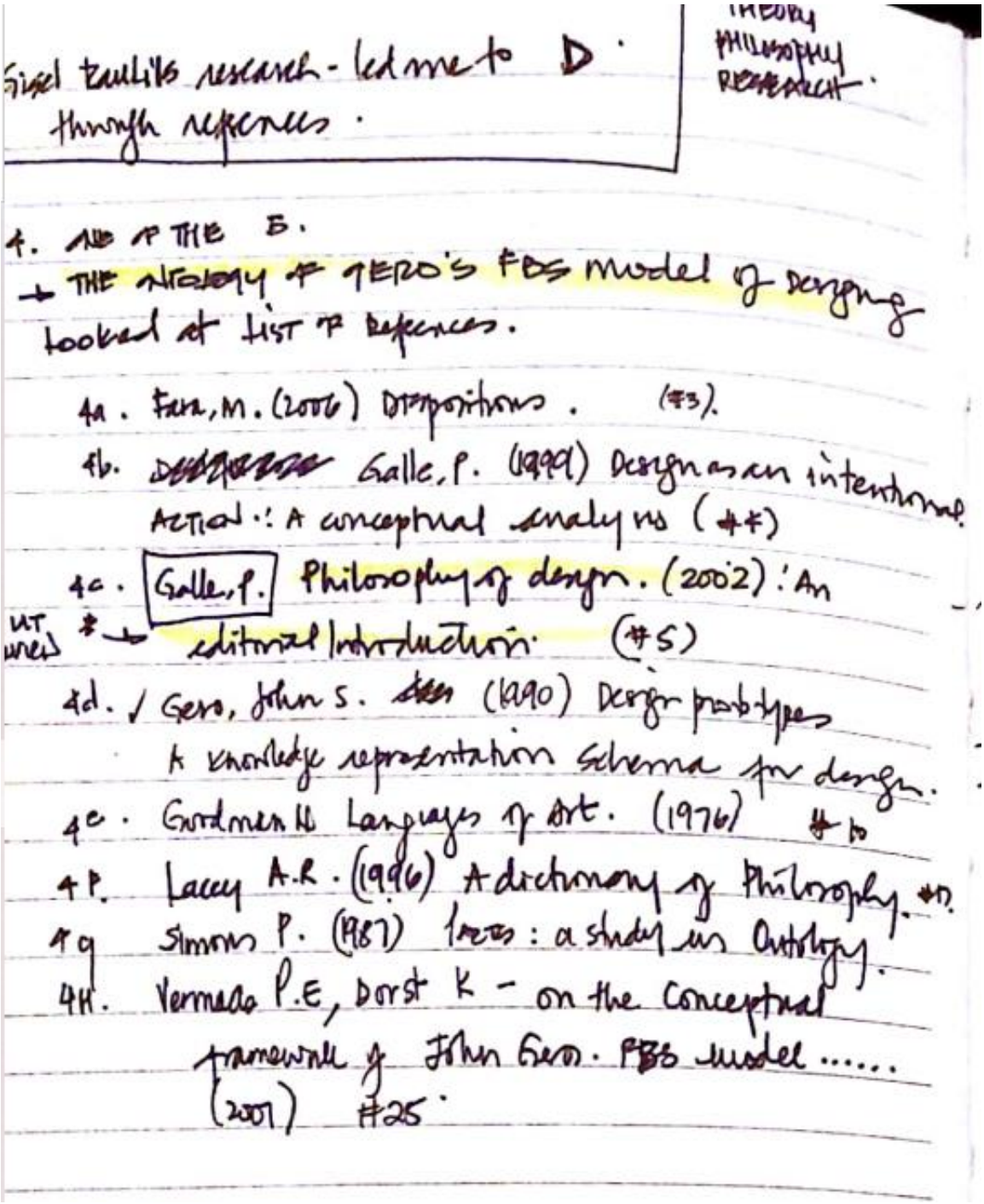
		< 2013	2013	2014	2015	2016	2017
				How is design useful in the creation of inclusive collaborative processes? **Value of Design at Different Levels of Government:** Design Council, Angel Building, 407 St John St. London UK **Building New Ecosystems of Collaboration and Creativity:** Benjamin Franklin Room, The RSA, John Adams Street, London UK			
Conference Presentations			September 4-5, 2013. Cambridge University, UK **Cambridge Academic Design Management Conference – CADMC** *Poster:* "D.A.M. Political Reform: An Integrative Structural Tool for Comprehensive Design Policy Development"	September 11-12, 2014, Cardiff, UK **Wales Institute of Research in Art and Design (WIRAD) Emerging Researchers Symposium**	March 12-15, 2015, Chicago, Illinois, USA **Design Principles and Practices 2015 Conference** "The Design in Government System' "Examining the Capability of Design in Government for the Development and Delivery of Public Services"	July 27-29, 2016 Boston, Mass. USA **Design Management Institute 2016 Conference** "Towards a Design-in-Government Framework: A Thematic Analysis of Case Studies Examining the Capability of Design in Government	March 2-3, 2017. Toronto, CANADA - **Design Principles and Practices 2017 Conference** "Local Project, Global Context: Exploring Implications of 'global mindednesses and 'community' in Local Institutional Projects
					September 15-16, 2015. Bristol, UK University of Bristol, School for Policy Studies **Policy &Politics 2015 Conference** on Democracy, Inequality & Power		October 16-20, 2017 Montreal, Quebec, CANADA **World Design Summit (WDS)** **An international action plan for solving global issues through design.** *"Understanding Design-in-Government"*
Industry Engagement				July 1 to October 2014, UK Design Research Practice Organization **Exploratory Case Study**			

		< 2013	2013	2014	2015	2016	2017
Talks/ Lectures/ Roundtable Discussions			November 4th, 2013 Rotman School of Business, University of Toronto Why Creativity is the New Economy: Richard Florida	May 7th, 2014, Global Webinar **When Government Meets Design** Design Council / National Endowment for the Arts (NEA)	Tuesday, 24 March 2015 from 7:30 AM to 9:30 AM Toronto, CANADA **University Presidential Roundtable Discussion on Academic Reform**		
				July 9th, 2014, 4-5:30 pm London, UK Room 55, Victoria and Albert Museum **Social Design Futures: HEI Research and the AHRC** Social Design Futures: HEI Research and the AHRC	May 2015 Toronto, CANADA Social Innovation Generation (SIG) - at Mars, Discovery District, Toronto **"Impact: Six Patterns to Spread Social Innovation" - Speaker: Al Etmanski**		
				January 29th, 2014, Toronto, Canada Rotman School of Business, University of Toronto **Solving the World's Problems Differently,** Don Tapscott			
				Thursday 3 July, 2014, 17:30-19:30 Cardiff, United Kingdom Sustainable Places Research Institute, University of Wales **Getting Research into Policy**: Case Studies, Dr. Harvard Prosser, Senior Research Associate, Cardiff School of Biosciences and former Chief Environmental Science Advisor, Welsh Government			
Workshops/ Training				January 2014 Toronto, Canada Executive Leadership Institute Intensive Leadership Training Module: **Political Leadership training**		December 8th, 2016, Toronto, Canada **Introduction to Innovation Labs and Units Workshop Series** **Innoweave, MaRs Solutions Lab and the McConnell Foundation**	
				April 10-11, 2014 Cambridge, University, UK IFM **21st Annual Research Methodology Workshop**			

		< 2013	2013	2014	2015	2016	2017
Professional Experience: - Practitioner/ Researcher		1993 – Present, Toronto, Canada **Sr. Interior Architect/Design Researcher/Strategist - Geraghty** and Associates, Global Design Research-Practice					
- Educator		1999 – 2011 Toronto, CANADA RCC Institute of Technology/International Academy of Design and Technology, Toronto, Ontario, CANADA Chair, Faculty of Interior Design **Professor Faculty of Interior Design**				July 2016 to present Toronto, ON CANADA **Ontario College of Art and Design University (OCADU)** Instructor, Design Research	
							September 2017 to present **Ontario College of Art and Design University (OCADU)** CANADA Design Research and Innovation
- Administrator		1999 - 2011 Toronto, Ontario CANADA **RCC Institute of Technology/International Academy of Design and Technology, Toronto, Ontario, CANADA** **Chair, Faculty of Interior Design 2010-2011; Coordinator Faculty of Interior Design 2008-2010;**					
- Associations			**IPSA/SOG, The International Political Science Association's Research Committee on the Structure and Organization of Government, Member** **Royal Society for the Arts and Enlightenment (RSA), UK**			October1st, 2016 Toronto, CANADA **Royal Society for the Arts and Enlightenment (RSA), Toronto, Chapter** University of Toronto, Annual AGM	

Appendix F: Study Protocol

Study protocol in the form of investigator's notes. Sample shown from research journal., 2014

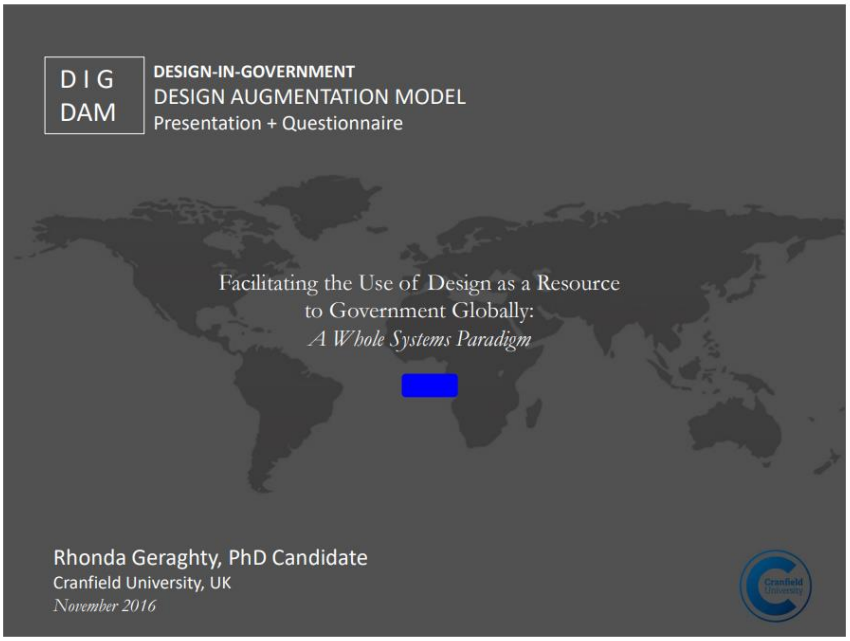


July 29. 2014.

From Galle. P. (2002) lit reviews)
- a list of key names of design philosophers and papers. + scrapes recommended readers.

- ✱ - Terrance Love. (2002) (design studies) Constructing a coherent cross-disciplinary body of Theory about designing and designs: some philosophical issues. 19 pages.
- - Love. T. philosophy of design: a meta-theoretical structure for design theory (2010) design studies.
- Manzini, Ezio, New design knowledge (2008) service design
- Galle, P. (2008). Candidate Worldviews for design theory
- Dorst, Kees. (2007) Design Research: a Revolution waiting to happen.
- Owen, Charles. (1998) Design research: building the knowledge base
- Carvalho, Lucilla et. al. Legitimizing Design (2006).

Appendix G: Interview Protocol – Study Seven



D I G
DAM

DESIGN-IN-GOVERNMENT
DESIGN AUGMENTATION MODEL

INTRODUCTION

As you may be aware, design is currently being used by governments globally to deal with various complex issues.

There's a great deal of data pointing to the **need, use, value and impact** of design however, studies show that design is underutilized by government because of a lack of understanding of it's **nature** and **potentia**l.

D I G
DAM

DESIGN-IN-GOVERNMENT
DESIGN AUGMENTATION MODEL

AIM The aim of the overall research is to fill this gap by exploring the capability of design within government and to format this information for communication to government.

The Design-in-Government Design Augmentation Model represents this consolidated research designed to communicate:

1. CONTEXT	2. WHAT DESIGN IS	3. WHAT DESIGN CAN DO
Present a framing of the design-in-government context	Communicate the nature of what design is within the context of government	Communicate the scope of what design can do within the context of government

D I G
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DESIGN-IN-GOVERNMENT
DESIGN AUGMENTATION MODEL

BACKGROUND

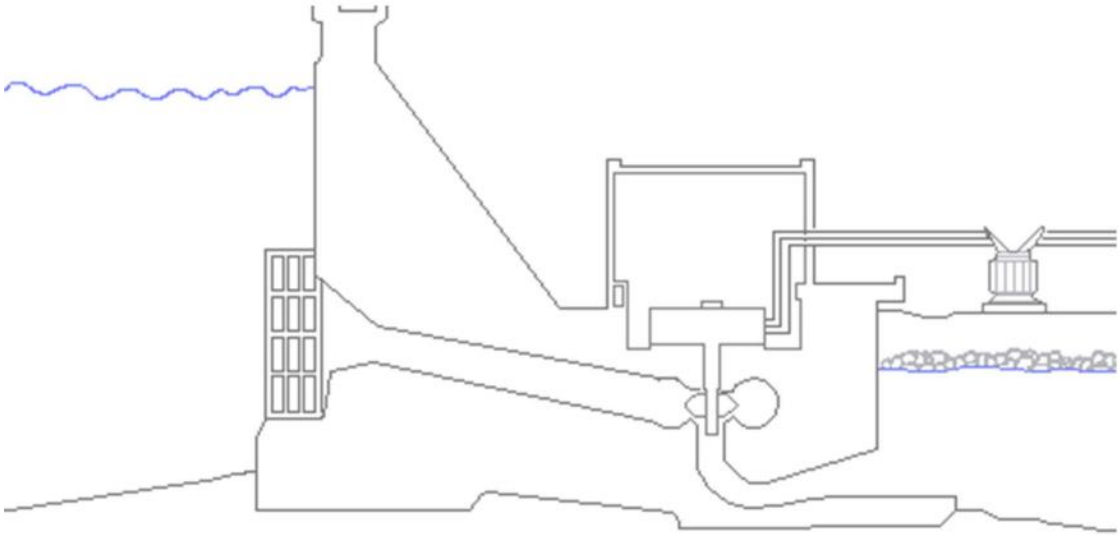
The model is intended to be used to:

- Inform of design's capability ("What Design is" and "What Design Does")
- Present the Design-in-Government Context
- Aid those who operate within this context to situate themselves
- Create common language internationally and amongst disciplines

Ideally it will be presented to government practitioners via Design Knowledge Transfer Agents as a static or dynamic model. As a dynamic model it will link to the relevant case studies, reports, maps, and theories that support each component and functionalize it's use as a potential tool.

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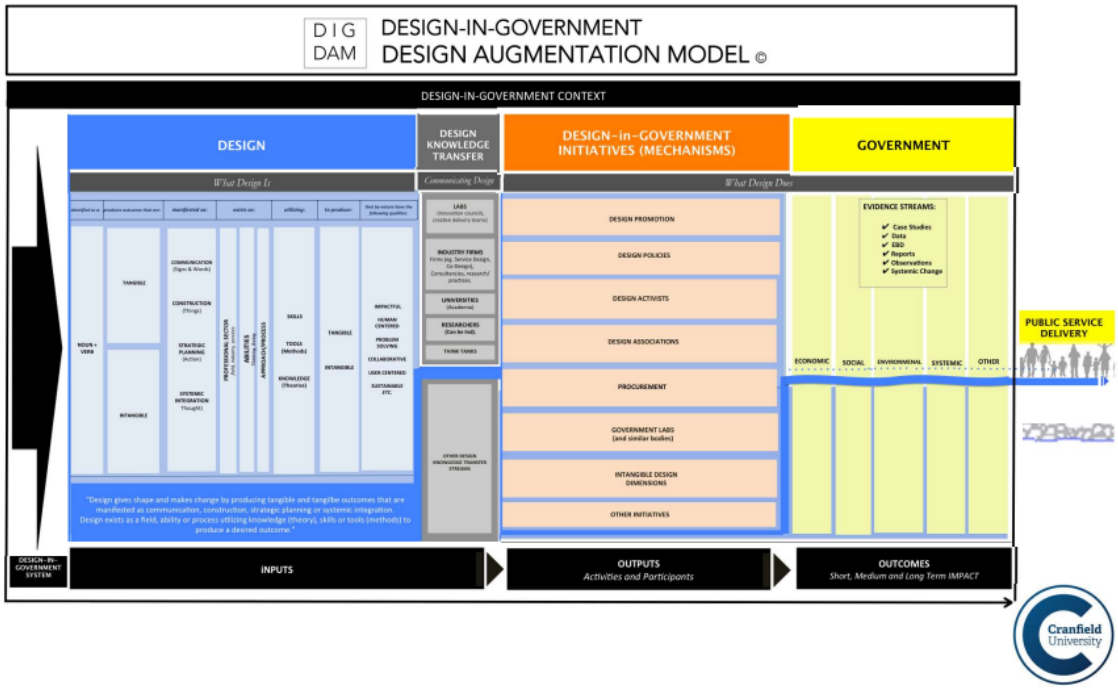
DESIGN-IN-GOVERNMENT
DESIGN AUGMENTATION MODEL



Cranfield University

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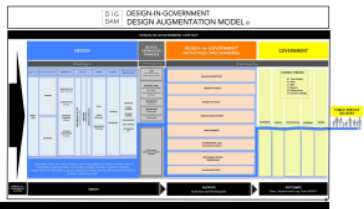
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DESIGN AUGMENTATION MODEL ©



Cranfield University

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DESIGN-IN-GOVERNMENT
DESIGN AUGMENTATION MODEL
Questionnaire



VISUAL COMMUNICATION: Appropriateness of Format

Q1:

Is the information formatted appropriately for communication to government?
Please rate on a scale of 1-5, (1 being least appropriate, 5 being most appropriate).

Q2:

What were most effective elements of the format?

Q3:

How can the formatting of this communication model be improved?

GENERAL/FEEDBACK

Q4: What are your overall impressions of the model or comments?

Appendix H: Curriculum Vitae of Investigator

RHONDA GERAGHTY

PhD Candidate (2020) M.F.A., B.A., A.F.A.
Academic Administrator. Educator. Practitioner. Researcher

PROFESSIONAL STATEMENT

Exemplary excellence in administrative, academic, and professional service centering on a belief that leadership involves a responsibility to change lives and impact systems through wisdom, innovation, and empathy. Holding degrees from Canada, France, and the UK (2021), I have approached my career from an international and inter-disciplinary perspective holding positions in Senior Design Management, the Chairing and Coordinating of a University program and rewarding faculty positions at Canadian Universities including OCADU.

As a practitioner I am well versed in all aspects of the design profession and have worked with esteemed clients including the Hilton and Delta Hotels, Revlon Canada, Sears Canada, World Vision for the U.N. and the Ministry of Health. In education administration, I have had the pleasure of developing programs and curriculum at the post-secondary level in Ontario, actively serving on numerous University committees and boards, and managing strategic priorities with great success. My hands-on approach to working with students, academic support, faculty, clients, project teams and trades internationally has produced successful outcomes and efficiency in management.

I bring a superior level of passion, excellence, and innovation to all aspects of life and look forward to partnering with an organization that will value the wealth of my capabilities.

Rhonda

EDUCATION + ASSOCIATIONS

PhD. Candidate (2021), Design Research - Cranfield University, Centre for Competitive, Creative Design. UK
M.F.A, Interior Architecture - P.A.A École Des Beaux Arts, Paris, France
A.F.A., Interior Architecture – P.A.A École Des Beaux Arts, Paris, France
B.A., Political Science/Art History – University of Toronto, CANADA
Certificate, Conversational French – University of Nice, FRANCE
NCIDQ, National Council for Interior Design Qualification (Part 1)

Memberships:

RSA, Royal Society for the Arts, Fellow
DRS, Design Research Society
DMI, Design Management Institute
IPSA/SOG, The International Political Science Association's Research Committee on the Structure and Organization of Government
Keynote Speakers Toastmasters Advanced Club
GLI, Global Leadership Interlink, Toronto - Chapter Management Team

Past Memberships:

ARIDO, Association of Registered Interior Designers of Ontario, IDC, Interior Designers of Canada, IDEC, Interior Design Educators Council, ACEID, Association of Canadian Educations in Interior Design.

RELATED SKILLS

- Strong leadership and advocacy skills.
- Committed to excellence in teaching and learning.
- Knowledge and understanding of university governance processes and structures.
- Extensive knowledge of accreditation standards.
- Knowledge of accessible delivery models, inclusive design, sustainability, interdisciplinary, student mobility, and experiential learning.
- Ability to lead, resource and evaluate faculty effectively.
- Strong background in curriculum development for both in residence and on-line courses.
- Extensive background teaching a variety of courses at the post-secondary level in Ontario.
- Strong ability to communicate conceptual and applied aspects of knowledge.
- Superior oral and written communication skills.
- Highly developed interpersonal, organizational, and problem-solving skills.
- Strong conflict resolution skills,
- Ability to administer policy.
- Ability to take initiative, work independently or in a team environment.
- Strong project management skills.
- Results driven, pragmatic and resourceful.
- Creative and innovative.
- Professional, tactful, and diplomatic; skilled at building confidence and interacting with individuals and groups at all levels.
- Excellent presentation skills.
- Collegial
- Compassionate.
- French (familiar: written and spoken).

EMPLOYMENT

Co-Director, 2 Sixteen Research and Innovation Lab
Toronto, CANADA; Washington D.C., USA**,** 2016 - Present
- Social Innovation Start-Up

Lecturer, Faculty of Design
OCAD University, Toronto, CANADA, 2016 - Present
- Sessional lecturing of GDES 3062 Design (As) Research to senior undergraduate design students.

Visiting Lecturer, Design Leadership, and Innovation
Cranfield University, Centre for Competitive Creative Design, Bedfordshire, UK, 2013 - Present

- Sessional lecturing of “Consultancy, Policy and Practice” to Master of Design: Innovation & Creativity in Business students.

Visiting Researcher, SEE Platform (PDR),
Cardiff Metropolitan University, Cardiff Wales, July 2014 - October 2014*(Sharing Experience Europe) is the lead partner in a EU consortia network of 11 European partners, engaging with national and regional governments to integrate design into innovation policies.*
- Worked with the Design Policy team as part of the European Commission’s European Design Innovation Initiative to integrate design into innovation policy throughout Europe. Contributed case studies of the economic, and social impact of design to SEE Policy Booklet.

- Worked to coordinate Academic/Industry Conference in Finland (Sept 2014). Liaised with PDR research teams in ***Service Design, Design Management, Design Support, Medical Design, Sustainable Design, and User Centred Design.***

Sr. Interior Architect/Design Researcher/Strategist
Geraghty & Associates - an International Interior Design Firm, Toronto, CANADA - 1993 to Present

- Provided leadership for an international, multi-disciplinary design strategy consultancy that partners with public and private sector to create targeted design solutions that translate into innovative and profitable outcomes for clients and the people they interface with.
- Developed design research and evidenced-based practices and services into the firm.
- Within the context of design strategy and design management, implemented the use of design methods and processes to public and private sector projects to maximize design value for clients and end users.
- Captured and presented demonstrated impact to clients and design industry at conferences.
- Developed and coordinated continuing education and self-interest courses for the design industry and the public.
- Led a diverse team of consultants (management, behavioral, marketing, graphic design etc.) on international projects.

Chair, Faculty of Interior Design 2010-2011; **Coordinator Faculty of Interior Design** 2008-2010; **Professor Faculty of Interior Design** 1999 to 2011
RCC Institute of Technology, Toronto, Ontario, CANADA

- Responsible for the successful review and accreditation of a university program; degree program development, coordination of campus move and alternative delivery strategies for program.
- Provided academic leadership in the delivery of high quality, career-oriented programs, and courses.
- Responsible for fostering an innovative learning environment based on teaching excellence, faculty development, customer service and collaborative decision-making.
- Developed /revised curriculum for various courses.
- Monitored curriculum delivery for quality assurance and to maintain consistency and cohesion in content.
- Acted as liaison between director, faculty, and industry professionals.
- Advised and counseled students.
- Coordinated annual exhibit of graduate student work.
- Liaised with industry to strengthen the program's position within the industry and procure scholarships.
- Instructed and graded 1st, 2nd and 3rd year undergraduate students (a variety of courses).
- Member of the Faculty Advisory Committee and University Senate.
- Nominated Instructor of the Year 2005, 2006, Awarded Educator of the Year 2007.

ACADEMIC PRESENTATIONS/ CONFERENCE PUBLICATIONS

Architecture Media Politics and Society 2020 Conference
Experiential Design – Rethinking relations between people, objects and environments
Conference presentation: "Designing for Impact: Multi-Disciplinary Residential Environmental Design Guidelines for Adults with ASD", Florida, USA– January 2020
Publication in: PARADE (Publication in Art, Architectures, Design and Environments) ISSN 2398-9467 April 2020.

Workshop Panel Presentation
Ontario Developmental Disability Advocacy and Support Network (ODDASN)
University of Toronto / University Health Network, Toronto, Canada – February 2019

World Design Summit 2017
Conference presentation: "Understanding Design in Government", Montreal, CANADA – October 2017

Design Principles and Practices 2017 Conference
Conference presentation: "Local Project, Global Context: Exploring Implications of 'global-mindedness' and 'community' in Local Institutional Projects, Toronto, CANADA – March 2-3, 2017.

Design Management Institute (DMI) 2016 Conference
Conference paper and presentation: July 27-29, 2016

Policy and Politics 2015 Conference
Conference paper and presentation: "Examining the Capability of Design in Government for the Development and Delivery of Public Services", University of Bristol School for Policy Studies, Bristol, UK – September 15-16, 2015.

Design Principles and Practices 2015 Conference
Conference paper and presentation: "The Design-in-Government System", Chicago, Illinois, USA - March 12-15, 2015.

Wales Institute of Research in Art and Design (WIRAD) Emerging Researchers Symposium
Symposium paper and presentation: "Design Capability in Government", Wales Millennium Centre, Cardiff, UK - September 11- 12, 2014.

Cambridge Academic Design Management Conference,
Conference Poster: *"D.A.M. Political Reform: An Integrative Structural Tool for Comprehensive Design Policy Development",* Cambridge University, UK. September 4-5, 2013.

Appendix I: Thematic Analysis of Secondary Case Studies

Available at:

https://figshare.com/s/ae36e420b52f9806c45f

10.17862/cranfield.rd.19552594

Appendix J: Ethical Principles of Working with Stakeholders

The following principles formed the ethical basis for defining working procedures as follows:

1.Confidentiality and disclosure.

a. To demonstrate and assure stakeholders that information provided is confidential, anonymised, is held securely and will not be disclosed without their consent.

b. To agree the information recorded for use in analysis and explain the reporting process.

c. Ensure compliance with Data Protection and the Freedom of Information Act

2. Ethical procedures and independence

Procedures for working with stakeholders will be submitted to the Cranfield University Research Ethics Committee [CUREC] to ensure that the researcher responsible can be satisfied that:

a. the level of risk [in including stakeholder participation] is justified by the importance and relevance of the research study
    i. any risks are unavoidable within the study's objectives
    ii. the level of perceived risk is minimised as far as possible
    iii. participants are fully aware of the level and nature of the risk before they agree, freely, to take part in the study
    iv. precautions are in place to deal adequately with the effect of participation.

Risk in this context includes but is not to, safety, physical, psychological, emotional, spiritual, reputational, mental well-being or financial harm, for all participants.

b. Ensure our research conforms with appropriate ethical principles and standards; notably
    i. CU-RIO-POL-1.0 - Research Integrity Policy Statement
    ii. CU-RIO-POL-1.1 - Implementing and Monitoring Research Integrity Policy
    iii. CU-RIO-POL-2.0 - Research Ethics Policy

Appendix K: Notes from the Exploratory Case Study

Context of the Enquiry

This section presents a profile of the case study organization providing a contextual setting for the study. The content is presented as a narrative based on researcher notes from a review of the organizations published materials, observations, and unstructured interviews with staff.

Profile of the Organization

To give context to the enquiry, this section provides a descriptive profile of the organization.

Housed within a university in the United Kingdom, this uniquely structured organization operates as a multi-disciplinary and interdisciplinary design research-practice spanning local and global contexts. Diverse design-research related projects are financed through a combination of university support, private contracts with industry and external grant funding streams (REV). Through these varied sources, the organization is able to actively engage with a wide variety of clients including local, national, and international governments (policymakers and programme managers in various sectors), small and medium enterprises as well as the design industry.

Similarly formed research centres exist globally, affiliated with universities (to various degrees), actively engaging in design research and interfacing with both public and private sectors. This particular centre was selected for its history of research impact in the area of design and government, it's level of leadership and active engagement with other research centres globally, it's novel organizational structure and the opportunities afforded to the investigator to access all levels of their human and physical resources. In addition, and specifically relevant to this study is the centres engagement in the production and use of both tangible and intangible dimensions of design (DO, REV) within the context of government.

In operation for over 20 years, the organization was founded by a small group of research directors from diverse design and business backgrounds. Their approach combines “quality research activity alongside an experienced consultancy practice (REV).” Operationally, “the firm undertakes research, enterprise, and knowledge exchange across a number of research and practice groups that encompass the policy, management and practice of product and service design in both the public and private sectors (firm’s published material).”

During the placement, eight sector groups (representing a variety of design practice areas) were observed in operation each with their unique areas of expertise but often working collaboratively within the organization to convey their results driven mandate through the production of quality and innovative design outputs as well as new knowledge generation. Sectors include user centred design, new product development, service design, surgical and prosthetic design, prototype and manufacture, eco-design, design management and design and innovation policy.

According to the organizations published documents the staff was comprised of “39 individuals and 16 PhD students.” In addition to the research staff and executive leadership, it was observed that there was one internal full-time administrator and one contracted graphic designer working pan-sectoral in house.

The firm “operates from a building that is a unique mix of offices, workshops, prototyping technologies, design studio and a user-centric design lab that enables staff to undertake a progressive programme of work and offer services at the leading edge of current design practice (REV).” A range of high tech and low-tech tools (from 3D printers to post-it notes) being utilized was observed to perform work-related tasks including the visualization of ideas and the capturing of data (DO).

Within the building, the overall office space was compact with each sector clustered into collaborative team environments within proximity to each other. Workspaces featured no physical interfaces between staff, facilitating communication, team building and collaboration. The investigator was positioned

within the design policy sector but engaged directly and regularly with the service design group, administrator and graphic designer located in the same room.

A key goal of the organization was to create impact through their service offerings. The emphasis on impact was both project and publication focused. Through discussions with a number of staff it was clear that most were from a design background and strategically engaged some level of an academic track by way of the firm so as to inform knowledge creation through their work as design research.

The organizational structuring, with design policy unofficially at the helm, was based on the rationale that design policy and innovation was the driving sector to facilitate the necessary awareness, shifts and opportunities needed at the level of government. An awareness, primarily about design value was understood to create pathways for the other design teams to engage with the public sector in strategic ways. This imperative was highlighted during informal meetings with two of the three Senior Directors, one of whom stressed the importance of the policy sector as being "the driver that facilitates the change in government necessary for the other teams to move forward (UI)."

The importance of the policy agenda was also evidenced in the types of projects the teams engaged in. Many projects were with local and regional governments throughout the United Kingdom. The nature of weekly company team meeting agendas was also policy driven. For example, policy team updates set the context for the other teams' presentations in terms of informing on new government priorities, funding opportunities, connections made and possible future opportunities for collaboration. Also, the emphasis on publishing results for dissemination to government stakeholders was a common focus amongst project teams. Examples observed were ground-breaking projects with local hospitals from the surgical and prosthetic design team and service design projects with the European Commission targeting Alzheimer care reform.

Being situated in this particular research centre also offered opportunities to travel to three other European cities as part of the design policy team. During these visits to London, Brussels and Helsinki, the team led and participated in

knowledge transfer activities and executed presentations evidencing design use and impact in government. Of equal significance were the valuable industry connections and insights gained from interactions with designers, researchers and government practitioners engaged in this area who attended these events. These interactions also allowed for an international contextualization of research gaps and insights which were identified by the investigator to that particular point in time. Reflections were noted for reference.

The investigator was situated within the design policy division for three consecutive months full time. During the placement tenure, the following tasks were undertaken:

- General daily activities as directed by design policy team research director.
- Attendance at team meetings and the organization's weekly staff meetings.
- Preparing case studies for the organization's on-line case study library.
- Aiding in research on Innovation Labs around the world.
- Supporting the policy team in their attendance and presentation of the impact of their research to international design policy practitioners in Brussels.
- Supporting the policy team in the organization and implementation of an industry-academia conference with consortia partners in Finland.

All of these opportunities collectively allowed for unique internal and externals views of the field and its operations. Through the lens of the design-in-government framework, these observations are summarized and analysed in the next section.

General Daily Activities

The following operational principles were noted through observations of regular internal and external activities. Most were demonstrated consistently over a period of three months and as such were taken to represent part of organizational culture.

Collaboration:

The precept of collaboration is a conventional part of design practice. Observed during this residency was the deliberate building of collaborative opportunities into the research-practice as a core element of both the internal culture and external operations of the organization.

Internally, staff from the diverse project groups engaged in informal and formal brainstorming meetings, seeking out ideas and opportunities to work together on future projects. There was an impression that each employee knew each other's strengths and area of expertise and saw that as resource to leverage for their own team benefit and for the benefit of the organization (REF). Organizational collaboration, teambuilding and communication was fostered by weekly general staff meetings where each team was given a short time to present a summary of current projects and areas of impact. During the 4 staff meetings attended, active interest in and support for each-other's work was noted. The atmosphere in the conference area was upbeat and collegial before the meeting. The majority of attendees brought notebooks, paper or an electronic device to record highlights from the meeting. Q&A sessions saw constructive feedback, pointed questions and comments posed to challenge teams forward. On one occasion a networking contact was given to the presenting team and the leveraging of a team member from another group was proposed to assist in grant-writing for a future project.

"Tea times" scheduled at the end of each week were primarily for team building but proved to be another welcomed collaborative opportunity for staff. Each week one research team was responsible to hosts the event. The event not only built creativity and positive team dynamics within teams; it also fostered a competitive spirit between teams that extended beyond the communal dining table into daily work activities. During the week conversations within and amongst teams could be heard discussing strategy and menus. It was an interesting balance to between collaboration and competition observed within the organization. At the afternoon tea, informal discussions about projects, community relationship building, and networking opportunities could be heard (PO).

Outward facing collaboration was evidenced in observed relationships spanning industry, academia, government (all levels) and the design community. Research teams were encouraged to take leadership roles on European projects through building a list of national and international industry contacts from which to form project consortia's where necessary. During the time of this case study, the policy team was the lead on a European design and innovation policy project managing a consortium of 11 countries for a 4-year research venture. Similarly, the Services Design team was the lead on an EU directed project. Collaborative work with varied stakeholders added a participatory element to the research work.

Community Engagement *(relationship, service and networking):* Both within the organization (as discussed) and externally.

Through informal discussions with team leaders from 7 of the 8 research groups it was learned that the organization strategically and simultaneously interfaces with clients representing multiple sectors. These include the public sector (local – national, international level), public service sector, the private sector (small – medium sized enterprises), the design industry, education sector as well as individuals. These relationships create opportunities for collaboration networking and inform the point of view of the organization (user needs focused), its relevance and diverse work.

In doing so, the organization whose roots stem from the area of design promotion toward both the public and private sectors, continues to demonstrate a variety of modes of interdisciplinary engagement in their daily work. This includes an "in service" mode to stakeholders where design methods and tools are used to help the public and private sectors, collaborate, capture data, communicate and visualize findings. During the time of the case study, the policy team engaged policy developers in 2 workshops where the use of the following methods and tools were observed:

Visualization, Journey Mapping, rapid prototyping (mock-ups), Mind Mapping (See images below).



https://www.mockplus.com/blog/post/design-thinking-tools

http://www.opencolleges.edu.au/informed/features/45-design-thinking-resources-for-educators/#ixzz2bnMyQLfC



The following observations showing conformance to the CF has been noted:

CF Principle C: **Operational Consideration: Reflects Interdisciplinary Engagement**	
Mode of engagement (Barry, Born and Weszkalnys, 2008; Kimbell, 2016)**,**	Example of evidence from ECS
*In service mode**:*** **one discipline or field being in service to another to fulfil a need or address a lack with a hierarchical division of labour.**	The use of design visualization tools, participatory, user centered, service design tools and methods with stakeholders to meet specific needs.

Leadership: The organization describes itself as "a world leading design consultancy and applied research centre with a unique approach involving the blending of a leading, high quality research activity alongside award winning, proven and highly experienced consultancy practice." (REV)

The leadership position they possess is acknowledged not only in the uniqueness of the work that they do but also in the type of design practice that they are.

The organization has leveraged their history of projects and documented impact from the past 20+ years to position themselves as international innovation and thought leaders in the area of design and design research. Although each team is small (2-5 people), each possess, confident, competent, networked leaders equipped to carry out projects at any level. and innovate on ground–breaking projects. "Each [team is] a leading exponent in its field with an extensive history and back catalogue of projects, innovations, and ground-breaking knowledge. Each group is a globally renowned source of expertise and practice in its field. Together, under one roof, the capabilities, knowledge, and expertise is unprecedented and maintains the organization at the cutting edge of knowledge and practice and a world leading centre in design and innovation. (REV)."

It was clear that the innovative research-practice structure is positively influencing the practice of design by modelling a prototype of the evolving practice. The practice of design as a concept is in a state of flux internationally. The evolution of its scope is broadening to include tangible and intangible aspects of the profession, as well as theoretical and methodical shifts in practice (Di Russo, 2013). The reality and awareness of design value and impact has also prompted the need to measure and articulate the fundamental effects of outputs into intended domains. Few design firms operate within a research context with an emphasis on process and outcome (as most traditional firms do) and also knowledge generation and documentation of impact. This profile of a design firm is innovative in and of itself. Perhaps modelling a new type of practice where research is intuitively integrated into the fabric of design activities. This is arguable the evolution of design practice (Di Russo, 2013).

At a macro level, this new practice model, through its strategic interface with NGOs, and public and private sectors, is indirectly creating a demand for services and therefore a need for similar firms to operate at this level of impact. The request for SEE to assist governments outside of the European region to provide design support services, speaks not only to the emerging need for services globally, it also attests to their impact and influence outside of their region.

Innovation:

Innovation as it relates to design can be defined as “an outcome achieved by a multiplicity of processes, some including imagination, creativity, or simply repetitive tasks (Manu, 2009)”. The outcome is “the successful exploitation of new ideas carried through to new products, new services, new ways of running a business or doing business (Cox, 2005).”

Outstanding, award winning achievements in design, contributions to knowledge in design research and accomplishments in transforming systems, and businesses, attests to the organization’s focus towards excellence in innovation. The premise was always to be forward thinking as far of service offerings and research endeavours. During the engagement, innovations in new product development, service design, design management within business and thought

leadership in the form of published papers, reports conference hosing and presentations were observed.

Within the design policy team, the primary project being worked on was focused on design innovation policy. The role of the unit was to foster the uptake of design into innovation policy in European member countries. A framework was developed collaboratively with stakeholders to bridge this gap. Finally, the following characteristics were noted in the organization's operations and daily activities.

General characteristics of organization noted through daily observations

Characteristics	Evidence
Excellence	Award winning projects
Efficiency	Synergy of teams on each project
Forward-thinking	Novel design firm structure
Knowledge sharing	External workshops with industry and government
Promotion	Publications promoting design impact

Presenting Design Impact

Work in this activity included supporting the policy team in their attendance and presentation of the impact of their research to International Design Policy practitioners in Brussels.

Panel included Design Association, Design Research, Government, Design practice, Design Industry. Challenges:

- "The policy consortium has influenced 17 design-related policies and 40 design-related programmes representing new investment in design of €6.2m. The consortium can demonstrate impact in all of the partner countries because we have facilitated peer-learning and exchange among innovation policymakers across Europe enabling them to transfer and adapt best practices in design policies and programmes. As a result of

policymakers participating in their workshops, engagement by the consortium and drawing on their research, design now features in national level policies in Denmark, Estonia, Finland and Greece as well as at regional level in Wales (UK), South Bohemia (Czech Republic), Greater Copenhagen (Denmark), Central Finland, Central Macedonia (Greece), Ljubljana Urban Region (Slovenia), Malopolskie and Silesia (Poland). Some examples include the Estonian Design Action Plan, the Regional Development Strategy for South Bohemia, the Smart Specialisation Strategy for Central Macedonia, the Regional Development Strategy for Ljubljana, the Innovation Strategy for Wales and the Regional Innovation Strategy for Silesia.

- In addition to influencing 17 policies, the consortium has influenced the implementation of 40 new design-related programmes. Some examples include Design Management in the SME Wallet (Flanders), ChangeWorks (Denmark), Design Bulldozer (Estonia), Schauman Service Factory (Central Finland), Extroversion (Greece), Design for Dementia (Ireland), Design At Your Service (Silesia), Design Thinking in Public Services (UK) and Design for Independent Living (Wales). This amounts to new investment in design programmes of over €6.2 million.
- The policy consortium continues to support government to develop, implement and evaluate design policies and programmes in the coming years."

Knowledge: Generation and Transfer

Specifically, within the Design Policy department where the research was stationed knowledge generation and transfer was the main focus. The funding of projects directed the focus of outputs and their interface with government:

Design-in-Government Mechanisms

The design policy department was actively involved in structuring this particular domain of the CF through knowledge generation (design research) and by

providing consultancy services directly to countries requiring assistance in writing design related policies.

From 2000 - to date, the organization has published an extensive number of reports and papers articulating the various activities and participants that are resident as mechanism to enable design's move through government. These include the specification of the categories of design promotion.

Facilitating Stakeholder Engagement

In addition to the above, the research worked supporting the policy team in the organization and implementation of an industry-academia conference with consortia partners in Finland, at the JAMK Innovation Week. The visualization research impact and relevant communication tools were observed.

