

CRANFIELD UNIVERSITY



DEBRA LILLEY

**INTERFACE AND PATHWAYS:
EXPLORING PERCEPTIONS OF SUSTAINABILITY TO
INFORM COMMUNICATION STRATEGIES**

SCHOOL OF INDUSTRIAL AND MANUFACTURING SCIENCE

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DEBRA LILLEY

Interface and Pathways:

Exploring Perceptions of Sustainability to Inform
Communication Strategies

Supervisor: Dr. Emma Dewberry

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Abstract

The initial aim of this project was to investigate architects and designers perceptions of biopolymers and renewable materials in order to inform and develop Interface's marketing strategy for Pathways, a PLA based product.

The initial research was carried out to investigate the factors involved within the development of renewable materials, how the drive towards renewable materials has been addressed internally (Interface) and externally (wider industry) and how renewable materials are communicated within the design community. The issues, drivers and benefits associated with PLA were also investigated.

The background research identified several perceived issues regarding PLA, biopolymers and renewable materials. These assumptions were guiding Interface in how they communicated Pathways to their customers. Testing these assumptions and perceptions with Interface customers, therefore, was an essential step in identifying where the perceived issues were justified and where potential gaps between perceived issues and actual perceptions existed. In addition it was important to gain an understanding of how Interface could bridge these gaps and use customer's perceptions to develop a marketing strategy for Pathways.

An investigative style of research was undertaken to capture qualitative 'perceptions' of the target group. Face to face interviews were carried out with five respondents from four architecture and design practices based in London, with three distinct aims in mind. To gain an understanding of the decision making process, the drivers to consider biopolymers and the benefits offered to the client.

The product level information gathered related to Pathways in a direct sense, however the findings also held wider implications for Interface at a company strategy level. In a sense the investigation of Pathways served as a portal to wider issues raised by architects and designers regarding the effectiveness and suitability of Interface's sustainability communication.

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I would like to thank the following individuals for their support, guidance, interest and encouragement throughout this project.

My industrial sponsors Andy Wales and Nigel Stansfield from Interface Europe and my academic supervisor Dr. Emma Dewberry.

I would also like to thank all the architects, designers and Interface salespeople who gave their time to be interviewed.

Finally, I would like to dedicate this thesis to Edward Saunders, who always believed in me.

Contents

1. Introduction	pp 1-2
1.1. Project Partners	p 1
1.2. Researcher Profile	p 1
1.3. Aims and Objectives	p 1
1.4. The Project Journey	p 2
2. Background Research	pp 4-20
2.1. Introduction	p 4
2.2. Interface and Sustainability	pp 4-5
2.3. Interface and Renewable Resources	pp 5-7
2.4. The Development of PLA (Polylactide)	
2.4.1. Interface's Relationship with Cargill Dow LLC	pp 7-8
2.4.2. Production Processes	p 8
2.4.3. Issues, Drivers and Benefits	pp 8-15
<i>Fossil Fuels</i>	pp 8-10
<i>Cost</i>	pp 10-11
<i>Biodegradability and Waste Management</i>	pp 11-12
<i>Methane Gas</i>	pp 12-13
<i>PLA and the Genetically Modified (GM) Crops Debate</i>	pp 13-14
<i>PLA Production vs. Food Production?</i>	pp 14-15
2.5. Interface: Sustainability Communication	pp 16-17
2.6. Interface: Communication of PLA Products	pp 17-18
2.7. Summary and Conclusions	pp 18-20
3. Research Methodology	pp 22-31
3.1. Research Context: Justifying the Need for Primary Investigation	pp 22-23
3.2. Research Focus	pp 23-25
3.3. Research Aims	p 25
3.4. Selecting a Methodology	pp 25-28
3.4.1. Self Completion or Postal Questionnaire	p 26
3.4.2. Telephone Survey	pp 26-27
3.4.3. Face to Face Interviews	pp 27-28
3.4.4. Workshops/Focus Groups	p 28
3.5. Justification of Methodology Adopted	pp 28-29
3.6. Data Collection and Analysis Techniques	pp 29-30
3.7. Utilising the Findings to Inform the Outcomes	pp 30-31
4. Action Research	pp 33-60
4.1. Research Process	p 33
4.2. Introduction to Key Findings	pp 33-34
4.3. Key Findings	pp 34-55

4.3.1.	Are Architects and Designers Key Decision Makers?	pp 34-35
4.3.2.	The Drive Towards Manufacturer Responsibility & Accountability	pp 35-36
4.3.3.	Criterion for Materials Selection	pp 36-37
4.3.4.	Information and Training	pp 38-40
4.3.5.	Perceived Environmental Impact/s of Carpet Tiles	pp 40-41
4.3.6.	Lifecycle Thinking in Relation to Materials Specification	pp 41-42
4.3.7.	Validating Environmental Credentials	pp 42-45
4.4.	Key Findings Related to Pathways	pp 45-55
4.4.1.	'Raw Materials, 'Manufacturing' and 'Transportation' (A)	pp 47-49
4.4.2.	'End of Life' (B)	pp 49-52
4.4.3.	'Validating Environmental Credentials' (C)	pp 52-54
4.4.4.	Specification of Pathways	pp 54-55
4.5.	Summary and Conclusions	
4.5.1.	Decision Making Process	pp 56-57
4.5.2.	Drivers for Architects and Designers to Consider Sustainability	pp 57-59
4.5.3.	Drivers for Architects and Designers to Consider Biopolymers	p 59
4.5.4.	Perceived Benefits to End Clients	pp 59-60
5.	Sustainability Training	pp 62-71
5.1.	Introduction	pp 62-64
5.2.	A Shift in the Traditional Role of Salespeople	p 64
5.3.	Developing and Implementing Tools, Education and Training	pp 66-69
5.4.	Training Methodologies	pp 70-71
5.4.1.	On-line Training Package	p 70
5.4.2.	Short Courses	pp 70-71
5.4.3.	Environmental Champions/Mentors	p 71
5.4.4.	Internal Network or Forum Linked to Intranet Site	p 71
5.5.	Summary and Conclusions	p 71
6.	Conclusions, Recommendations and Future Work	pp 73-81
6.1.	Introduction	p 73
6.2.	Conclusions and Recommendations	pp 73-81
6.2.1.	Pathways Marketing: Review	pp 73-77
6.2.2.	Pathways Marketing: Recommendations	pp 77-80
6.2.3.	Future Work	pp 80-81

List of Figures

Figure No.	Figure Title	Page No.
1	The Project Journey	p 2
2	Front 4 - Closing the Loop (Anderson. R, 1998, p119)	p 7
3	Decision Making Chain	p 24
4	Stakeholder Expectation Analysis; Tracking Flow of Information and Communication Channels	p 31
5	Lifecycle of Pathways Mapping Perceptions	p 46
6	Perceptions of 'Raw Materials', 'Manufacture' and 'Transportation' Issues	pp 47-48
7	Perceptions of 'End of Life' Issues	pp 49-50
8	Perceptions of Issues Regarding Validation of Environmental Credentials	pp 52-53
9	End Clients Interest in and Awareness of Environmental Issues	pp 59-60
10	Implications of Research Findings in Company Context	p 62
11	Proposed Program for Developing and Implementing a New Approach to Sustainability Training	p 65
12	Proposed Sustainability Training Program For Interface Salespeople	pp 66-68
13	Pathways Marketing Approach	p 77

1. Introduction

1.1 Project Partners

This project was developed between 2nd of June and 12th of September 2003 as a part of the MRes Manufacturing: Sustainability and Design course at Cranfield University. The project was conducted by Debra Lilley, an MRes Manufacturing: Sustainability and Design student, with Dr. Emma Dewberry providing academic supervision and support. The project sponsors were Interface Europe, represented by Andy Wales, Director of Sustainability and Nigel Stansfield, Product Migration Director.

1.2 Researcher Profile

Debra Lilley, who graduated in 2000 with a BA Honours Interior Design degree (2:1) from Surrey Institute of Art and Design, will be the principal investigator. Upon graduating Debra gained relevant experience working as a Design Consultant with Johnson Controls Ltd, her role and responsibilities included using a variety of consulting tools to gain customer insight to inform the design process. These included paper based and online questionnaires, qualitative and quantitative surveys, conducting interviews and organising and managing focus groups.

1.3 Aims and Objectives

The aim of the project was two fold:

1. To investigate, and gain an insight for Interface, as to architects and designer's perceptions/understanding of the biopolymer vs. fossil fuel debate.
2. To gain a broad understanding of how the use of renewable materials factor in or affect their decision making or purchasing behaviour and specifically how these perceptions may be used by Interface to market and communicate 'Pathways' and other PLA based products.

1.4 The Project Journey

The project was designed with three main stages; background research, action research and synthesis of research, conclusions and recommendations. In the revised project brief (see Appendix A.ii) the scope of the project incorporated points one and two (described in fig. 1 below) within the final phase. However, as the project progressed the scope widened and the decision was made after the completion of the action research stage that point three should be added to the deliverables.

Project Phase	Research Tasks
Background Research	<ol style="list-style-type: none">1. Investigation of the development of renewable materials2. How the drive towards renewable materials has been addressed internally (Interface) and externally (wider industry)3. How renewable materials are communicated/reported upon within the design community.
Action Research	<ol style="list-style-type: none">1. Investigation of the perceptions/understanding of architects and designers of renewable resources2. Investigation of;<ol style="list-style-type: none">a) the decision making processb) the drivers for architects and designers to consider biopolymersc) the incentives/benefits they feel this material offers to their end clients.
Synthesis Of Research, Conclusions And Recommendations	<ol style="list-style-type: none">1. Conclusions drawn from background research and action research.2. Recommendations for a marketing strategy for Pathways as a product and concept3. Development of a Sustainability training package for salespeople.

Figure 1: *The Project Journey*

2. Background Research

2.1 Introduction

This stage will involve initial primary and secondary research, aiming to explore sustainability and how it is communicated within the context of Interface. In addition, the development of renewable materials and how the drive towards renewable materials has been addressed within Interface and within the wider industry will be explored.

2.2 Interface and Sustainability

Established in 1973 Interface Inc has grown to become the world's biggest commercial carpet and interior fabrics manufacturer, holding *"35 percent of the U.S \$1.5 billion world market in carpet tiles"* (Birchfield. D, 2002, p44) manufacturing and selling *"more than 40 percent of all the carpet tile used throughout the globe today"* (Interface (a), 2001). In fact *"four out of every ten carpet tile customers in the world buy Interface products"* (Interface Flooring (a), 2003).

For the first 21 years of Interface's existence, Ray Anderson had only given consideration to making sure the company complied with environmental legislation. Then, in 1994, he read Paul Hawken's *Ecology of Commerce*, which prompted him to begin to question the company's role in environmental issues *"For 21 years, I had never given one thought to what we were taking from the earth.....and I had surely not given one thought to what we were doing to the environment"* (Anderson. R, 2000, p6).

Determined to address the environmental issues associated with the industry and develop a new business approach, Ray set a challenge for Interface to become the world's first truly sustainable enterprise. *"I have challenged the people of Interface to make our company the first industrial company in the whole world to attain environmental sustainability"* (Anderson. R, 1998, p8).

Having made this commitment internally, Ray, who had recognised the influence of such a significant market share, was determined to lead by example in influencing the external marketplace towards sustainability *"it became clear to me that you move towards sustainability and, in doing that, you....set an example for others"* (Anderson. R, 2000, p8).

Therefore in the early nineties Ray Anderson began to spread the message, informing a wider industry audience about sustainability through education and information, with the aim to raise the awareness of both their customers and their competitors. This desire to *"lead others forward on that same path"* (Interface Sustainability (c), 2003) is a fundamental part of the company vision. Ray believes that companies, like Interface, are key players in moving the industry towards achieving sustainability *"as we win in the marketplace, the market shares swift and the whole industry moves towards sustainability. As one company leads, an industry will follow"* (Birchfield. D, 2002, p45).

Interface's strong sense of responsibility and commitment to working towards sustainability has been integrated into every aspect of the business. Recognising that their employees need to have an in-depth understanding and awareness of sustainability issues led to the development of a training programme to give employees *"appropriate education, information, training and tools"* (Charter. M, et al 2002, p8). Now, *"three-quarters of Interface Flooring Systems employees have been trained in sustainability principles"* (Interface Flooring (b), 2003). In addition sales personnel receive sustainability training, aligning Interface's internal environmental values and corporate vision to the external communication of the product, ensuring consistency in brand representation through a holistic marketing approach.

2.3 Interface and Renewable Resources

Interface's exploration of renewable resources has primarily been driven by the need to reduce dependence on fossil fuels. *"We understand the environmental impact associated with using oil.....and we believe that moving toward*



renewable resources, such as bio based fibers.....helps us move closer to our goal of sustainable manufacturing” (Interface Sustainability (d), 2003).

A key aspect in achieving this goal is their participation in the development of bio based materials. *“Finding alternatives to oil based products is a significant part of Interface’s plan to develop and integrate sustainable practices”* (Interface Sustainability (d), 2003). The exploration of PLA technology is considered to be an important step towards *“increasing our knowledge of and ability to use bio-based fibers”* (Interface Sustainability (d), 2003).

In the ‘Seven Fronts - Faces of Mt. Sustainability’ (Anderson. R, 1998, p110) Interface’s commitment to working towards sustainability through the exploration of renewable resources is demonstrated further. In front 1 ‘zero waste’ (see Interface Model in: Anderson. R, 1998, p111) the environmental and social impacts associated with current waste disposal methods are highlighted *“the products we make end up too often, at the end of their useful lives, in landfills. Or worse in incinerators, creating further pollution load for Earth’s biosphere to digest”* (Interface Sustainability (b), 2003)

Front 4 ‘Closing the Loop’ (fig. 2 page 7) can also clearly be seen as a driver for investigating renewable materials. Front 4 describes *“redesigning Interface processes and products into cyclical material flows”* (Interface Sustainability (b), 2003) to create a *“natural organic cycle, emphasising natural raw materials and compostable products (‘dust-to-dust’)”* (Anderson. R, 1998, p118)

THE INTERFACE MODEL
Front 4 · Closing the Loop

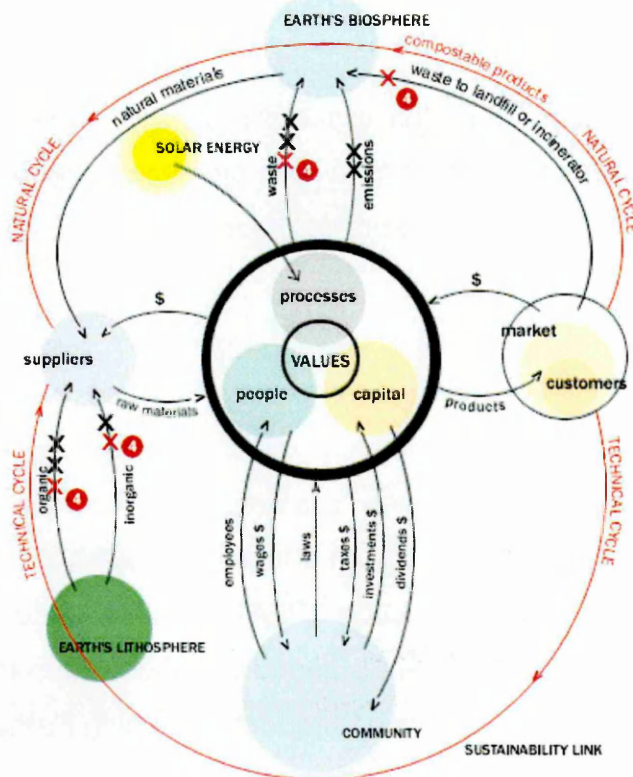


Figure 2: Front 4 - Closing the Loop

(Anderson. R, 1998, p119)

2.4 The Development of PLA (Polylactide)

2.4.1 Interface's Relationship with Cargill Dow LLC

Interface recognised that it was important to select a partner who shared their business ethics and their commitment to moving towards sustainability, *“to work with those suppliers that are committed to mitigating any negative environmental impacts that are encountered”* (Interface Sustainability (a), 2003). When assessing the market for potential partners, consideration was given to selecting a partner company who could combine expert technical knowledge and production capabilities, whilst still remaining true to their core sustainability values.

Cargill Dow LLC was formed in November 1997, as a joint partnership between Cargill Inc, a global processor and distributor of agricultural and food products, and The Dow Chemical Company, one of the world largest chemical companies. Cargill Dow have a strong sense of commitment and responsibility towards the environment which is reflected in their company philosophy and external communication. They define sustainability in terms of the triple bottom line approach, asserting that their *“business system should be sustainable from an economic, environmental and social perspective”* (Vink. T. H. E., et al, 2003, p403).

Having recognised the environmental impacts caused by oil based plastics, Cargill Dow set out to develop alternatives to petrochemical based polymers, with the aim to offer the marketplace *“sustainable and versatile polymers”* (Vink. T. H. E., et al, 2003, p403) made from annually renewable resources, resulting in the development of a Polylactide (PLA) polymer under the trade name NatureWorks and Polylactide fibers branded as Ingeo. Interface used the Ingeo fibres to create a series of PLA based products, of which Pathways is one.

2.4.2 Production Process

PLA or Polylactide is a versatile compostable polymer made using dextrose, a natural sugar derived from the starch in kernels of corn (or maize). The dextrose is fermented into lactic acid which is the basis of PLA. Ingeo is the brand name for the fibres extruded from NatureWorks PLA. The diagram in appendix B illustrates the production processes in greater detail. In this diagram we can see that the phase described as ‘modification for customers’ is where Interface intervened to create Pathways by processing the extruded fibres to create yarn, with which to make the face fibres.

2.4.3 Issues, Drivers and Benefits

Fossil Fuel

The dependence on fossil fuels within the plastics industry has become an environmental issue of increasing importance, recognised by industry, NGO's

and the Government. Within the fossil fuel debate are contained a number of issues relating to; the impacts of fossil fuel based products on the environment, the drivers behind remaining within an oil based manufacturing system and the benefits of moving towards non-fossil fuel based plastics.

Conventional hydrocarbon polymers utilise the rapidly diminishing reserves of oil and natural gas as their feedstock. The environmental impacts associated with the use of fossil fuels include the transfer of carbon from the ground into the atmosphere and the release of sulphur and nitrogen oxides emissions. Fossil fuels are also a dominant source of greenhouse gases, which are widely believed to be a contributing factor in global warming.

As emphasised in section 2.3, Interface have shown a clear commitment to reducing their use of fossil fuels. Cargill Dow share this sense of responsibility *“first generation[PLA 1] uses 25 – 55% less fossil fuel energy than petroleum based polymers”* (Vink. T. H. E., et al, 2003, p414). Within a long term perspective Cargill Dow hope to increase this to more than 90% less fossil fuel energy by sourcing renewable power and improving production processes within the second generation PLA B/WP (i.e. PLA made using Biomass and Wind Power) (Vink. T. H. E., et al, 2003, p414) with the hope to make PLA processes *“fossil-energy free and a source of carbon credits”* (Vink. T. H. E., et al, 2003, p418).

Although oil reserves are clearly declining, comparatively, fossil fuels are still regarded as the most economic option as the price has remained low despite the growing scarcity and this has adversely affected the adoption of bio based alternatives. *“Oil prices are still too low to stimulate widespread commercialisation of substitutes for petrochemical-based products”* (Ends 300, 2000, p19). However, the predicted shortage of fossil fuel resources and the increasing concerns over the western dependency on foreign crude oil has sparked a growing interest in investigating alternatives, signalling many industrial and chemical companies to put *“bio-based product development on*

their long term agenda" (Guzman. D, 2003, p12). Cargill Dow see the combination of these factors as an incentive to build a dominant market share in this emerging industry, *"products and services providing equivalent or superior function with little or no resulting GHG (green house gases) will enjoy an increasing global market advantage"* (Vink. T. H. E., et al, 2003, p413).

Cost

In the current market however, bio-based products are still relatively expensive *"biopolymers cost about 20% more than the equivalent conventional polymer"* [and this is a disadvantage as] *"comparatively high pricing for biopolymers is still a concern"* (Scott. A, 2000, p73). The relationship between environmental concern and purchasing behaviour has been repeatedly highlighted as an issue when attempting to introduce a product with a superior environmental performance but increased cost *"the size of the market willing to pay a premium is not as large as many think it is"* (Guzman. D, 2003, p14). The cost implications for PLA are believed by many within the industry to be a clear cause of the *"lack of market pull"* (Guzman. D, 2003, p14) currently being experienced by many in the bio-plastics trade. As Jim Stoppert (President and CEO of NatureWorks) commented in the Chemical Market Reporter *"most customers and companies are attracted to bio-based products because of their sustainability"* (Guzman. D, 2003, p14) but it seems that their environmental concerns are not yet translating into purchasing, which is a recognised problem associated with environmentally considered alternatives. *"An action/awareness gap in consumer markets...[exists] with expressed concern not matched by the levels of purchasing"* (Charter. M, et al, 2002, p24).

When discussing the relative cost of a product, rarely are the environmental and social costs examined or even acknowledged as currently *"no accepted method for determining total costs exists that would take account of such factors as depletion of natural resources....or the environmental burden of waste management"* (Stevens. E.S, 2003). This sentiment is supported by Ray Anderson *"the true costs of a barrel of oil have nothing to do with the markets price"* (Seelig. F, 2000, p13).

Cargill Dow seem keen to 'play down' the environmental performance or sustainability benefits of PLA, instead focusing on stressing price and performance in relation to other polymers *"although the claimed sustainability benefits of PLA feature prominently in CDP's (Cargill Dow Plastics) promotion....they are not as strongly to the fore as its cost and performance"* (Ends 300, 2000, p20). According to Jim Stoppert, as reported in the Economist, *"what matters is that the material is able to compete on price and performance"* (Economist, 2000, p81).

The decision to highlight performance specific attributes over the sustainability benefits appears to have been adopted by one of Cargill Dow's customers. Despite Cargill Dows belief that *"PLA users closer to the customer may make more of its [PLA's] environmental attributes"* (Ends 300, 2000, p20) Cloverbrook, a specialist fabric manufacturer who use Ingeo fibres *"point out that the fibre is derived from a renewable resource"* but are *"keener to emphasise the materials performance"* (Ends 338, 2003, p33) stating on their website *"independent testing has confirmed Ingeo fibres have superior or equal performance to polyester in key activewear applications"* (Cloverbrook, 2003).

Biodegradability and Waste Management

One of the main drivers, for moving towards bio-based biodegradable plastics, emphasised by the Government and NGO's is the reduction of industry and consumers dependence on landfills for waste disposal. PLA; which biodegrades when composted, can be burned in an incinerator or has the potential to be recycled back into lactic acid, offers significant opportunities to businesses in terms of reducing waste, which in turn leads to a reduction in waste management costs. For the Government a strong incentive to push biodegradable plastics exists when considering the demanding targets of the 1999 EC Directive on Landfill. The factors discussed offer considerable opportunities for PLA based products and have contributed to *"an increasing interest in polymers that can be biologically reduced to biomass"* (Scott. G, 2000, p2).

Communication of the timescale for biodegradation, however, appears to vary, depending on the size, shape and application of the PLA material and the range of estimates for the length of time for PLA to biodegrade in landfill is quite broad. An article in Business Week states that *"it takes the heat and pressure of a landfill- and 45 to 60 days for the polymer to degrade"* (Ginsberg. J, 2001, p12) whereas an Ends Report indicates that *"in landfills, PLA is expected to biodegrade within 2-10 years"* (Ends 300, 2000, p21) this reflects the contradictory and confused message given to consumers through a variety of sources.

Despite these arguments in favour of biodegradability, there are a number of questions being raised about the environmental benefits of composting PLA and the viability of introducing industrial composting on a large scale. Primarily, these questions concern the availability of municipal or industrial composting facilities as a supporting infrastructure, as no such system is currently available *"a key issue will be the availability of an infrastructure to collect and sort the waste"* (Ends 300, 2000, p21). *"There is little that biopolymer manufacturers can do to build the municipal incinerators or composting facilities that would be required"* (Ends 315, 2001, p29). The collective opinion (based on literature review) is that the costs and scope associated with providing such an infrastructure would limit manufacturer's ability to provide this as a service.

Methane Gas

An issue of increasing concern in relation to the biodegradability of biopolymers, as reported in a number of Ends Reports (315, 338, 300), is the potentially rapid increase in the release of methane gas from landfills to air, which may follow the widespread adoption of biodegradable biopolymers being disposed of in landfills at the end of their life. These concerns are based on the assertion that biopolymers *"breakdown in landfills to produce methane – a gas with global warming potential 22 times that of carbon dioxide"* (Ends 315, 2001, p29).

Cargill Dow claim to be working towards reducing greenhouse gas emissions to ultimately deliver a *"net negative green house gas impact for PLA products"*

(Ends 338, 2003, p34) however, these claims have come under criticism. In response, Cargill Dow has reiterated the benefits of using corn as a feedstock in tackling global warming. They claim that reduced dependence on fossil fuels and the benefits of agricultural feedstock which emits less CO² than fossil fuel as *“carbon dioxide is removed from the air when corn is grown”* (Cargill Dow (a), 2003) supports their claims to reduce GHG emissions. However, as stated in the Ends Reports *“the crops used as feedstock capture only CO² from the atmosphere, not methane”* (Ends 315, 2001, p29).

Interface have responded to the potential problems associated with methane production from landfills through initiating a scheme in partnership with Atlanta authorities to capture and use the methane gas generated in landfills to power their factories.

PLA and the Genetically Modified (GM) Crops Debate

The benefits of bio-based polymers in comparison to fossil fuel based polymers have been recognised, however, the debates surrounding the issues involved are complex, and there appear to be a number of trade-offs at different points in the life-cycle of a PLA based product. The two most contentious issues identified through the literature review represent these ‘trade-offs’. The highly publicised debate surrounding the potential inclusion of GM derived crops, as a feedstock for PLA polymer has initiated a series of interesting discussions within industry and wider society in which moral, scientific and ethical questions have been raised.

Cargill Dows stance appears to be pro GM, *“the company contends that GM crops can bring environmental and health benefits”* (Ends 338, 2003, p33). They reportedly use *“both GM and conventional maize”* (Ends 300, 2000, p21), the GM maize *“engineered to express a pesticide to deal with the corn borer, a major maize pest”*, (Ends 300, 2000, p21) which in turn yields a higher crop. Despite an assertion by Cargill Dow that the majority of their existing customers have not cited GM as an issue, they have in fact, been under increasing

pressure to give their customers an assurance that their raw materials are GM free.

Regardless of assurances from Cargill Dow that *“even though some of the corn may have contained GMO’s there is no corn DNA found in PLA pellets”* (Cargill Dow (a), 2003) some customers are still unwilling to take the risks associated with GM based products and commit to purchasing PLA fearing a backlash from their customers. Sainsbury’s, who have expressed an interest in using biopolymers, have yet to commit due to the uncertainty surrounding *“public acceptability of genetically modified (GM) crops”* (Ends 315, 2001, p31). Stating that *“the bottom line is that we’re not able to use it until the general public say they are happy with it”* (Ends 315, 2001, p31). *“Cargill Dows refusal to differentiate between genetically modified and conventional crops”* (Ends 338, 2003, p33) could be one seen as a barrier to the widespread adoption of NatureWorks PLA in a number of sectors, as potential customers seem to be adopting a cautious approach to investigating PLA.

Those who have committed to the use of NatureWorks PLA, including Interface, have taken a proactive stance in addressing potential customer concerns about GM content, admitting that the starch component from the corn feedstock is harvested *“from numerous sources, some of which are from farms using genetically modified seed”* (Interface Sustainability (a), 2003) however, the chemical process used to produce lactic acid from the starch *“does not involve the modified portions of the corn plant, nor is GM modified corn required in any way to produce PLA”* (Interface Sustainability (a), 2003).

PLA Production vs. Food Production?

The second most pressing debate surrounding the production of PLA is the perceived potential threat to food production. The source of the dextrose used to produce PLA is from starch harvested from the most common corn variety, which is considered to be an abundant renewable resource and as discussed earlier, gives significant environmental benefits. Nevertheless, the use of corn

based starch for production of biopolymers has raised social issues about the potential future competition with food provision. *"It seems inevitable thatplastics production would be in competition with food production"* (Scott. G, 2000, p5).

The issue is centred on the use of the corn kernel, which is considered to be a food source. The agricultural waste generated in growing corn, however, would be a suitable feedstock for PLA production. *"In the long term, a more acceptable ecological strategy would be to utilise the biological wastes themselves"* (Scott. G, 2000, p5). Cargill Dow have recognised the potential conflicts associated with the use of corn kernels, and have pledged that although *"today we are using agricultural products, tomorrow we intend to use agricultural waste streams"* (Cargill Dow (a), 2003). With this aim they are currently working to develop a second generation of PLA, PLA B/WP, which will utilise *"new conversion technologies to facilitate the use of lignocellulosic biomass feedstock's, such as corn stover (the residue left in the field) grasses, wheat and rice straws and the bagasse (the residue of sugar cane production)"* (Cargill Dow (a), 2003).

The predicted increase in the use of land for growing biopolymer feedstocks has also been raised. *"Another societal issue is whether using agricultural land to produce industrial feedstocks may contribute to world hunger"* (Ends 300, 2000, p20). Cargill Dow have countered comments by claiming that today *"hunger is primarily an issue of inadequate distribution of available food resources, not a lack of production"* (Ends 300, 2000, p20).

Interface, in a statement released regarding this issue, go further to address possible concerns stating that *"the corn that would serve the PLA market is typically overproduction and will be grown with or without the decision to manufacture PLA"* (Interface Sustainability (a), 2003).

2.5 Interface: Sustainability Communication

Sustainability is a complex issue; therefore the way in which companies explain the term and the associated issues is an important consideration. The language and terminology associated with the term 'sustainability' within the consciousness of consumers is fairly low *"the concept of sustainability and many of the issues that are central to it are not yet widely understood throughout society"* (Charter, M. et al, 2002, p29). The term 'sustainability' is often substituted by other terms, *"for many people, sustainability translates into being 'environmentally friendly'"* (Interface Sustainability (d) 2003). Due to the lack of understanding of the concept and meaning of the term, it is crucial that companies present clear information about sustainability, pitched at an appropriate level to ensure understanding. Through primary and secondary research the varied approaches taken by Interface to explain 'sustainability' to consumers can be observed.

Communicating sustainability issues to customers is approached using a range of informative and educational methodologies including public seminars and lectures, a range of publications and CPD presentations.

The Interface sustainability website refers to the Bruntland definition which defines sustainability as *"meeting the needs of the present without compromising the ability of future generations to meet their own needs"* (World Commission on Environment and Development [WCED], 1987). Reference is also made to the 'triple bottom line' approach, *"economic, social and environmental. It takes all three to reach sustainability"* (Interface Sustainability (c), 2003).

In order to gain a wider perspective and first hand opinions regarding the effectiveness of the information, education and tools utilised by Interface to communicate sustainability issues to their customers, interviews were conducted with Interface salespeople. Within the interviews a number of issues were discussed in relation to the effectiveness of Interface's sustainability

communication approach (see Interview Guide in Appendix C. i). The findings have been summarised in the following section.

The sustainability training appears to be effective in providing employees with a general awareness of the company's efforts in sustainability; *"I understand where we are and where we're going and what our mission is"* (Interface Sales 02, 2003).

A key observation concerning CPD presentations revealed that although salespeople are asked to deliver CPD workshops to their clients, one interviewee felt strongly that although *"Interface think that we [salespeople] can be experts on it and we can deliver CPD presentations on sustainability to our practices"* *"I think that [CPD] ...should be delivered professionally and properly, by people trained to do what they do"* (Interface Sales 02, 2003). This finding will be referred back to within the context of the findings from interviews with architects and designers, to highlight its significance in the effectiveness of communicating sustainability to clients.

The focus within Interface marketing seems to be on the company processes surrounding the product not the product itself, *"[with] Interface, it's all on the process not on the product"* (Interface Sales 02, 2003). Interface seem to be attempting to broaden the clients thinking to consider the issues and impacts surrounding the product (i.e. manufacture, transportation etc) not just the product. However, this strategy was highlighted by one interviewee as misaligned with their client's focus which is strongly on the product, *"architects focus on the product itself and often the sales success comes down to how good you are at marketing the individual products"* (Interface Sales 01, 2003).

2.6 Interface: Communication of PLA Products

In order to gain an understanding of the marketing, branding and communication approaches used to explain PLA to consumers, three products incorporating PLA (FLOR, Terratex and Pathways) were selected as case studies.

These case studies were used to investigate the characteristics or attributes identified and exploited by the marketing approach and to evaluate the communication style and tone used in information provided to customers about PLA benefits, perceived concerns, issues and drivers. The decision to make a comparison between Terratex and Pathways versus FLOR was to identify differences and similarities between the marketing approaches for commercial vs. domestic markets. The full case studies and supporting evidence can be seen in appendix D.

In summary the analysis revealed that there are distinct differences in the level, tone and complexity of information presented to different target audiences (i.e. domestic versus commercial). Based on the differences between the marketing approaches taken within FLOR and Pathways an assumption may be that architects and designers (or those in industry) have a higher level of knowledge in comparison to general public.

The 'sustainability' message has been communicated with varying degrees of complexity; FLOR uses very simple language and succinct statements. In contrast, Terratex have taken a 'tiered or layered' approach incorporating the 'story' and benefits of PLA. With Pathways the promotional material balances the environmental benefits with the more traditional attributes, with emphasis on commercial viability.

2.7 Summary and Conclusions

In conclusion, through reflecting upon the information and perceptions gained within the background research it is possible to identify a number of issues, observations and assumptions to be explored within the action research.

In a general sense, when discussing the marketing and communication of 'environmentally considered' products, the following issues have continually been raised throughout the literature review as potential barriers;

- The gap between environmental concern and purchasing behaviour.
- Perceived increase in cost and decrease in performance/quality commonly associated with superior environmental performance.
- The lack of a 'green' or 'full cost' accounting system¹ as a methodology to justify the higher costs associated with products with a superior environmental performance.

Within the next stage, these assumptions will need to be tested by investigating;

- Whether architects and designers determine cost or performance to be an issue when considering the specification of an 'environmentally considered' product.

In terms of sustainability, marketing and training within Interface;

- Interface currently focus their communication of sustainability initiatives on corporate level as opposed to a product level.
- Interface have committed to a program of sustainability training and education for employees. However the content of the training focuses on macro strategic level initiatives, not a product level.
- The focus within marketing seems to be on the company processes surrounding the product not the product itself. This is misaligned with their client's focus which is strongly on the product.

Footnote:

1. 'Green' or 'full-cost' accounting can be defined as *"the process of accounting for and including all environmental, economic, and social costs (and benefits) of a particular action, in the decision-making and/or approval process and pricing"*

(People and Planet website, 2003)

These assumptions, made on the basis of the internal sales perspective and the analysis of Interface marketing literature, need to be tested and validated in the next stage. If these assumptions are confirmed by Interface customers, then the implications of these findings for Interface will indicate that there is a need to re-evaluate the marketing focus and the training content.

The perceived benefits of PLA can be identified as;

- Reduced dependency on fossil fuels and reduced GHG (green house gas) emissions.
- Advanced consideration of alternatives to combat predicted shortage and scarcity of fossil fuel (which may lead to inflated prices).
- Reduction of dependence by industry and consumers on landfill for disposal as PLA can biodegrade, be incinerated or recycled back into lactic acid.

The perceived areas of concern associated with PLA can be identified as;

- Current relative expense of PLA or other biopolymers versus oil based polymers.
- Viability of 'biodegradability' (lack of consensus of time to biodegrade, possible methane release, lack of infrastructure to support industrial composting on a large scale).
- The use of GM (genetically modified) crops and the potential competition with food production through use of corn as a feedstock.

These factors, which have been derived from the literature review, analysis of Interface and Cargill Dow marketing literature, and discussions with Andy Wales (Sustainability Director) are currently guiding Interface in how they communicate Pathways to their customers. Therefore they need to be tested and validated in the next stage, to investigate whether they are the key drivers for architects and designers i.e. if perceived issues equal actual customer perceptions.

3. Research Methodology

3.1 Research Context: Justifying the Need for Primary Investigation

Within the initial background research stage, one of the aims of the project brief was to conduct an investigation of how the issues of renewable materials, biopolymers, PLA and the reduction of fossil fuels are communicated and reported upon within the design community, by reviewing trade journals, and approaching relevant professional bodies (i.e. CSD, RIBA).

However, attempts to gain information in these areas, from these sources proved to be a difficult task. After an extensive review of relevant trade journals and discussions with journalists, publishers and architecture organisations, it became apparent that although some organisations *"encourage [the] publication of environmental information as a standard aspect of published project information in architectural journals....in order to bring the issues into the mainstream"* (RIBA, 2003, p2). There is a significant lack of awareness and representation of these issues within industry publications. Therefore, primary investigation of architects and designer's awareness and how they gain information was required.

In addition, several perceived issues (on the part of Interface, Cargill Dow and academic/industrial commentators) regarding PLA, biopolymers and renewable materials had been identified within the background research. These assumptions were guiding Interface in how they communicated Pathways to their customers. Testing these assumptions and perceptions with Interface customers, therefore, was an essential step in;

- Firstly identifying where the perceived issues were justified and where potential gaps between perceived issues and actual perceptions existed.
- Secondly, gaining an understanding of how Interface could bridge these gaps and use the perceptions gained to develop a marketing strategy for Pathways.

An additional assumption on the part of Interface, which the researcher has based on discussions with Interface representatives, was that architects and designers are key decision makers. This assumption is demonstrated by the original brief, given by Interface (See appendix Ai), in which the focus of the primary research stage is an investigation of architects and designers perceptions.

However, this decision was questioned by both the researcher and the academic supervisor. Who suggested that analysis of the scope and formation of the decision making process within the architects and designers practices and additional 'decision makers' further down the life cycle of the product (i.e. within their clients organisations – where the product will be installed) would also be a key component of the research. As each decision maker would have a valid perceptions of Pathways and be able to identify issues associated with different stages of the product life.

Therefore a primary investigation of architects and designers role within the specification process and potential influence as decision makers or 'change agents' was an important additional consideration, which could only be clarified by capturing their perceptions.

3.2 Research Focus

In order to 'locate' architects and designers within the chain of decision making associated with specifying a product or material and identify the other various stakeholders/players involved, a mapping technique was used to indicate how, when and by who decisions about interface products are made. The map was generated based on discussions with Interface salespeople and the researchers own knowledge in the areas of Workplace Consulting and Design (see 1.2 Researcher Profile).

The map (fig. 3 shown below) highlights the scope of research project and where research is focused, whilst still making reference to the wider scope to be considered within the context of the investigation.

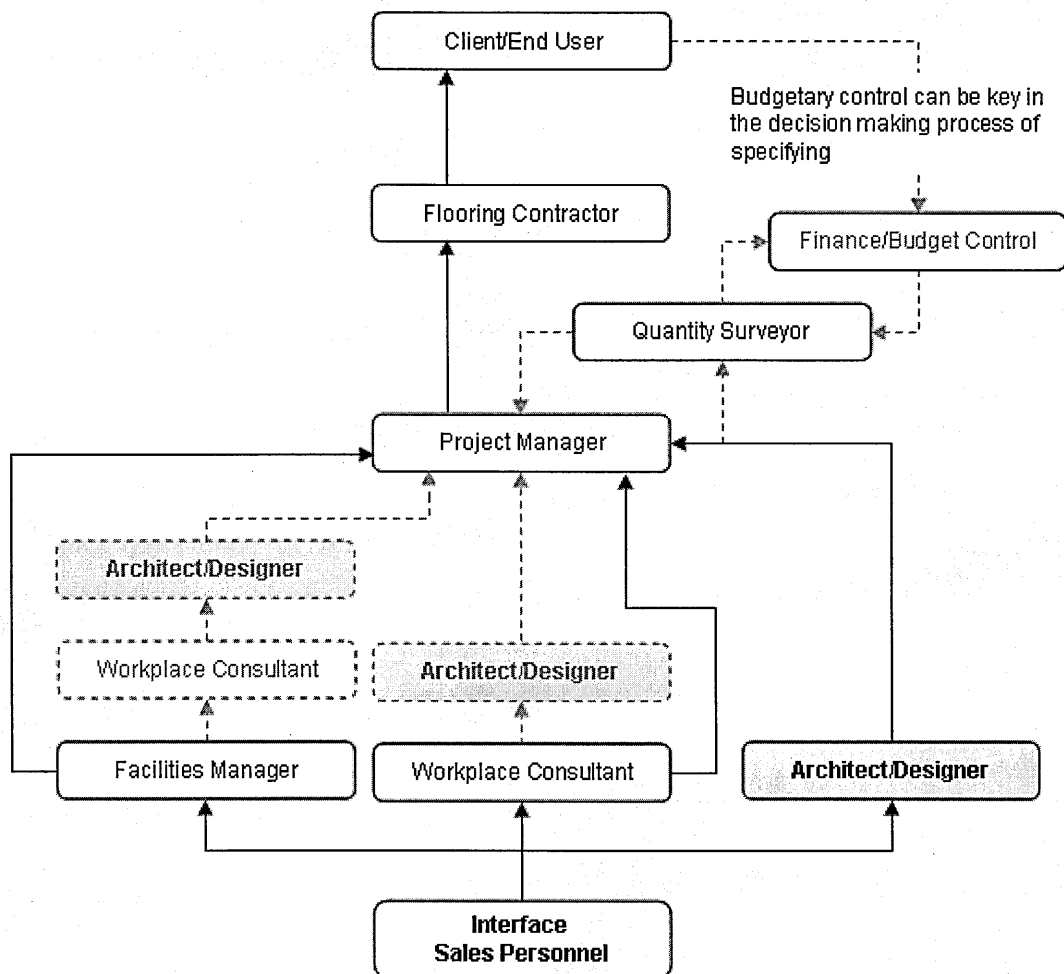


Figure 3: *Decision Making Chain*

Within the map, potential 'paths' of decision making are shown, indicating the range of points of intervention or influence a salesperson may have. The salesperson may first make contact with the Facilities Manager, the Workplace Consultant or the Architect or Designer. Alternatively the Architect or Designer may be further down the decision making chain, they may have been brought in by a Workplace Consultant through a Facilities Manager.

The number of 'players' involved in a project is usually dependant on a number of factors including the scale of project, client, and budget.

3.3 Research Aims

The aim of the second phase of the project was to gain a general understanding at an overall level of architects and designers decision making process in relation to the selection and specification of renewable materials.

Primary and secondary research was conducted to investigate how the issue of sustainability impacts upon the decision making process associated with the specification of materials, and how these issues are communicated and reported upon within the design community. Using trade journals, and approaching relevant professional bodies both more mainstream (i.e. CSD, RIBA) and specifically those geared towards addressing sustainability.

In addition interviews with selected Interface customers, within architecture and design practices, were undertaken with three distinct aims in mind, to gain an understanding of;

1. The decision making process associated with the selection of renewable materials.
2. The drivers for architects and designers to consider biopolymers, specifically Pathways.
3. The perceived benefits they feel this material may offer their end clients.

3.4 Selecting a Methodology

Investigative research is primarily undertaken by companies in order to *"gain insights as a basis for initiating and implementing purposeful actions e.g. to improve their competitive position, to exploit discovered opportunities and/or to handle threats"* (Gronhaug. K, Olson. O, 1999, p6) through capturing the 'customer voice'. As the 'perceptions' of the customers are sought, the type of information to be captured will be primarily qualitative not quantitative.

Therefore, the methodology adopted has to be sufficiently unstructured to encourage open discussion in order to solicit perceptions, but guided, to ensure the discussions are focused around specific topics, and relevant information is captured. A number of potential information collection methodologies could be adopted; these are presented in ascending level of interaction between the researcher and the target group:

3.4.1 Self Completion or Postal Questionnaire;

Benefits; the opinions of a wide range of respondents may be accessed and recorded giving a large data set.

Disadvantages; a set questionnaire (especially postal) limits the amount of information that can be gained as discussion is minimal (unless questions are open ended). In addition, responses are recorded without reasoning or explanation, therefore *“the researcher is ignorant of the many factors influencing the choice of response to a question”* (Robson. C, 2002, p253)

The response rate is typically fairly low. *“The refusal rate for interviews...is typically...smaller...than the non-response rate for postal questionnaires”* (Robson. C, 2002, p253). In addition respondents may not give *“serious attention to the questions”* regarding the questionnaire as *“a tedious chore to be completed in a perfunctory manner”* (Robson. C, 2002, p253).

3.4.2 Telephone Survey;

Benefits; a telephone based interview survey would be beneficial in terms of the targeted groups time pressures, as they *“substantially reduce the time and travel resources involved in...face-to-face interviews”* (Robson. C, 2002, p254). The major advantage however is in *“the lower cost in terms of time, effort and money”* (Robson. C, 2002, p282).

Disadvantages; There may be difficulties in recording the interview without loss of sound quality. In addition the call would need to be prearranged and scheduled to avoid a lack of attention/time spent on the part of the interviewee. Initiating an in-depth of discussion may prove more challenging, as *“rapport may be more difficult to achieve”* (Robson. C, 2002, p282). In addition *“the lack of visual cues may cause problems in interpretation”* (Robson. C, 2002, p282).

3.4.3 Face to Face Interviews;

Benefits; enables the researcher to engage the participant in discussing and articulating their views, through open discussion, based on a pre-prepared agenda of issues as a guide.

The researcher has the option to expand upon interesting points and quickly move on when the discussion is becoming irrelevant or unhelpful. Providing the *“possibility of modifying one’s enquiry, following up interesting responses and investigating underlying motives”* (Robson. C, 2002, p272).

In addition, the researcher is able to clarify questions and avoid non-responses which may occur in postal surveys. The interviews may be recorded, which assists in the analysis of the perceptions gathered and forms a record of the discussions.

A secondary ‘layer’ of evidence may be gathered in the form of visual observation of *“non-verbal cues”* [which] *“may give messages which help in understanding the verbal response”* (Robson. C, 2002, p273).

Disadvantages; Interviewing can be time-consuming in terms of preparation, travel, and transcribing audio tapes. Persuading subjects to consent to an interview may also prove difficult, especially within busy organisations. Therefore the length of the interview must be planned carefully, *“under half and*

hour is unlikely to be valuable;...over an hour may be making unreasonable demands on busy interviewees” (Robson. C, 2002, p273).

3.4.4 Workshops/Focus Groups:

CPD events currently run by Interface could be used as a vehicle to access architects and designers. A short workshop/focus group could be devised and added to the CPD program to observe a dialogue between groups centered on the issue of biopolymers/renewable resources.

Advantages; enables the facilitator to gain an understanding of the perspectives of a range of target customers through facilitated discussion, encourages two way debate and discussion and increases the awareness and involvement of the group.

Disadvantages; Include the time consuming nature of the process, the difficulties of successfully recording the views of such a large group and the potential for irrelevant or un-helpful debate.

Capturing individual perceptions may be difficult as *“it is....impossible to follow up the views of individuals; and group dynamics or power hierarchies affect who speaks and what they say”* (Robson. C, 2002, p284).

3.5 Justification of Methodology Adopted

In evaluating the suitability of the various methodologies outlined above the following conclusions were made;

- As the emphasis in this study is on quality and depth of information not necessarily quantity and breadth, a self completion or postal questionnaire would not be appropriate.

- Telephone interviews may be suitable for interviews with subjects who are based overseas or for whom lack of time or an agreeable location is an issue. However as the majority of interviewees are based in London, the advantages of meeting 'face-to-face' outweigh the cost and time involved in travel.
- Although a focus group methodology would provide be an appropriate methodology for capturing the 'customer voice', Interface deemed the technique to be inappropriate within the time and budget constraints.

Therefore, upon reflection face-to-face interviews were selected as the most appropriate method for collecting the perceptions of the target group.

3.6 Data Collection and Analysis Techniques

In preparation for the interviews an agenda of issues in the form of an 'interview guide' was developed (see Appendix C. ii). An interview 'guide' *"is not a tightly structured set of questions to be asked as verbatim as written.....rather, it is a list of things to be sure to ask about when talking to the person being interviewed"* (Robson. C, 2002, p281). The guide encompasses a series of discussion points based upon the findings and conclusions from the background.

Open ended questions were selected as the most appropriate form of questioning. Open ended questions, as referenced in 'Real World Research' (Robson. C, 2002, p276) are:

- Flexible,
- Allow you to go into more depth or clear up any misunderstandings,
- Enable testing of the limits of the respondents knowledge,
- Encourage co-operation and rapport,
- Allow you to make a truer assessment of what the respondent really believes,
- Can produce unexpected or unanticipated answers.

The interviews will be 40mins – 1hr in duration, recorded using audio equipment and then transcribed. Upon completion of all interviews, the perceptions gathered will be collated using mind mapping diagrams, in order to cross reference, support or challenge the perceptions of the various stakeholders interviewed. Mind mapping techniques are particularly useful when dealing with a range of different information sources as they enable the researcher to cluster or group issues with similar patterns or characteristics together around a series of themes. Helping to *“unravel and clarify situations in a way that reduces complexity”* (Craig. M, 2000, p11) and enabling the researcher to *“see relationships, whether of influence, cause or control”* (Craig. M, 2000, p11) *“bridging the gap between thinking and writing”* (Buzan. T, 1993, p13).

The following 3 step process, based on tools described by Robson in ‘Real World Research will be used to interpret the mind maps generated;

1. *Note patterns, themes and trends*
2. *Evaluate plausibility*; question whether the trends, patterns and conclusions make sense.
3. *Build a logical train of evidence*; try to understand trends and patterns through developing logical relationships.

3.7 Utilising the Findings to Inform the Outcomes

Following the analysis of the perceptions gathered within the background research and the action research stages, an interim presentation of the findings was made to Interface at a product launch meeting for Pathways at Interface Paris (4th August 2003). Following this meeting a series of potential outcomes were presented to Interface and it was decided that the final phase of the project would focus on developing a sustainability training program for the salespeople, based on the outcomes of the research findings.

To assist in collating the findings relevant to training requirements (identified by architects and designers) the findings were reviewed and mind mapping techniques were used to ‘sift’ or ‘filter’ relevant data.

In addition figure 3 was revisited to enable the researcher to 'locate' the salesperson in the chain of decision making and identify their 'points of influence' in terms of the players with which they interact.

A model (figure 4, below) was generated to clarify the process of information exchange, the demands made by various stakeholders, key requirements in terms of information relating to individual products, the expectations of various stakeholders of the role of the salesperson and the process of information flow between internal departments at Interface required to build an appropriate base of knowledge to inform a training program. As the focus of the action research was to gain Architects and Designers perceptions, their stakeholder group was selected to be developed within the model framework.

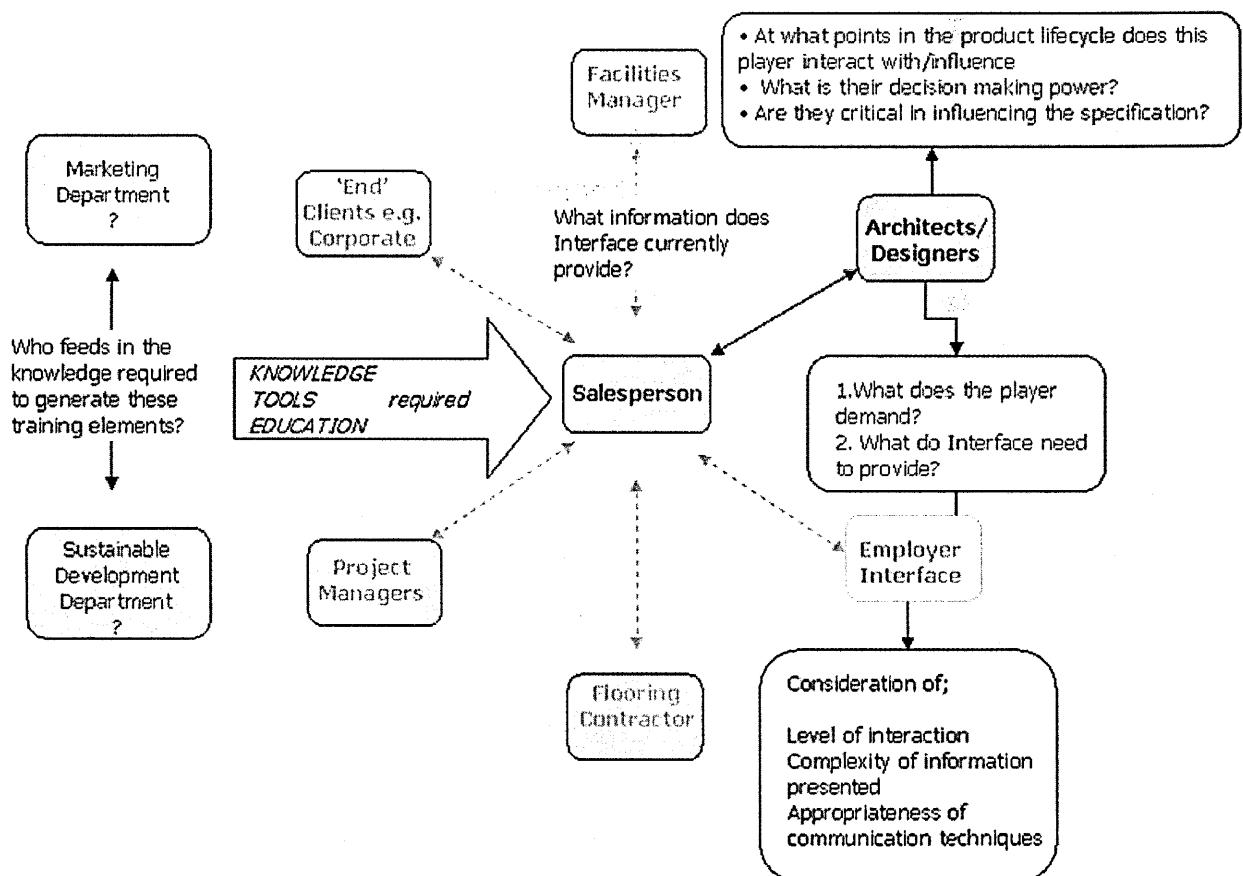


Figure 4: Stakeholder Expectation Analysis; Tracking Flow of Information and Communication Channels

4. Action Research

4.1 Research Process

Having defined the scope and focus of the primary research, and selected an appropriate research methodology (see preceding chapter), the research aims were refined to form an interview guide (see Appendix C. ii) based on issues identified within the previous background research.

Perceptions were gained through face-to-face interviews with a selection of architects and designers to generate discussion based on the aforementioned interview guide (see Appendix C. ii). Interviews were carried out with five respondents from four architecture and design practices based in London, the interviewees comprised of: an interior designer, a knowledge centre co-ordinator, a design director/partner, a senior associate and a director of sustainability. A sample transcription can be found in Appendix E. Out of the five people interviewed three had either an official role or unofficial involvement in actively integrating sustainability into projects and processes.

In addition, as referenced in the background research, interviews were also conducted with Interface sales people to gain an internal perspective (see Interview Guide in Appendix C.i). To ensure the confidentiality of all the sources interviewed, each individual has been given a code, which identifies their stakeholder group for e.g. Architect 02.

4.2 Introduction to Key Findings

The aim of the following section is to draw out, classify and present a summary of the key research findings, by cross referencing the perceptions of stakeholders identified and interviewed within the action research (i.e. architects, designers, and Interface Sales personnel) and the secondary research (literature review) and primary research (discussions with architecture organisations and journals) undertaken within background research. Three key pieces of prior research in this area were referred to in order to support the

findings; Chick and Micklethwaite (2002) and two RIBA Materials Surveys (Young. E, 2002 and Stungo. N, 2003).

4.3 Key Findings

4.3.1 Are Architects and Designers Key Decision Makers?

As discussed in sections 3.1 and 3.2, one of the considerations within the investigation was to determine if architects and designers are the key decision makers, therefore interviewees were asked to discuss their decision making process.

Many of the architects and designers interviewed recognised that they do have an opportunity to influence the specification of certain materials through changing their specification process;

“the direct way we can impact upon what we do is to ask contractors who actually build the thing to abide by certain rules, beyond what they have to do as statutory” “when we write specifications for a project here....we can very simply say; don’t use timber from this source, do use timber from this source”
(Architect 02, 2003)

“We are looking at revising or writing guidance notes with our specifications, looking particularly at ‘green’ specifications for materials. Issues such as recycled content, whether it is recyclable, all those types of issues we are trying to integrate into our specification and what we are choosing to specify”
(Architect 04, 2003)

However, they also recognised that they are part of a wider decision making network, involving a series of key players. A network which one Interface salesperson, believes Interface need to educate and involve, *“we have got to educate both sides – the design community and the corporate end users”*
(Interface Sales 02, 2003)

The relationship between the architect/designer and their end client was highlighted within Chick and Micklethwaite (2002) as an important factor in the acceptance and specification of recycled materials. *“the client has a critical role in relation to the specification of.....products and materials”*. This finding is supported by the perceptions of those interviewed within this study.

[The responsibility] *“varies between the two [architect and client] you can seldom make a client do something he or she doesn’t want to do” “it is something we can promote, but they [the clients] have to be willing” “they’ve got to be challenging us to go down that route”* (Architect 05, 2003)

“I think that it should be two pronged, it should be from us [architects] and within [our practice] there is a management directive to follow sustainability and drive [it] forward and improve upon our practices, but it would also assist the matter if it was also client driven” (Architect 05, 2003)

To conclude, the findings clearly demonstrate the growing level of awareness and understanding within the architecture and design sector of both environmental issues and what they perceive to be their role and responsibility for achieving it.

The interviewees acknowledged that their role was part of a wider network, but they had some power in influencing other players. In relation to figure 3, we can see this influence extends both upstream i.e. clients, project managers and downstream i.e. suppliers and manufacturers.

4.3.2 The Drive Towards Manufacturer Responsibility & Accountability

In addition to being asked to define the scope of their role and responsibility, the interviewees were asked to discuss the manufacturer’s role or responsibility in investigating and promoting sustainability.

Respondents acknowledged that manufacturers have a growing responsibility for the environmental impact of their products. The need for manufacturers to become more transparent regarding their environmental impact was recognised by two of the five interviewed;

“Manufacturers have realised it’s going to be hard to sell their products unless they go some way to demonstrate they can give some sort of analysis or depth as to the environmental benefits of using the products” (Architect 02, 2003)

“Even if they [manufacturers] don’t believe it is now I’m sure within the next few years they will be forced to do it through legislation. EU directives that are coming out within this field” [manufacturers] “will be forced to be very clear about their environmental credentials” (Architect 04, 2003)

These findings indicate that there is a growing pressure on manufacturers to demonstrate the environmental benefits of their products and communicate these benefits in an effective and transparent way. The perceptions of how effective Interface environmental communications are, in relation to Pathways, can be observed within the discussions in section 4.4.3.

4.3.3 Criterion for Materials Selection

In order to investigate further the decision making process associated with specifying a material or product, respondents were asked to discuss their criterion for materials selection.

Within these discussions the objectives were to investigate;

1. What factors are involved within the decision making process of specification.
2. If and how the sustainable performance of a product/material factors into the decision making process and whether it affects/influences the specification of a product/material.

The most prominent factors in the criterion for materials selections identified within the research can be observed as being performance and cost.

In terms of performance;

- A series of sub components, including suitability for the function, longevity, wear and maintenance were identified.
- A strong connection between the performance of a product/material and a sense of risk or liability on the part of the architect or designer was found.
- The findings reflected that in many cases architects and designers prefer to specify materials they can predict the performance of, to ensure the preservation of their reputations and to minimise risk and fear of failure.

In terms of cost;

- Cost was perceived to be a strong criterion for architects and designers.
- However, the strength of the influence of cost as a decision making factor was dependent on the type of project, the budget constraints and the length of the occupancy lease.

Cost, performance and sustainability;

- Cost was considered to be a potential barrier to client acceptance of a new material with a superior environmental performance. *“it seems that it comes down to cost....a lot of time I’m finding that we can’t have the environmental conversation because of cost issues”* (Architect 02, 2003)
- A perceived lack of performance of environmentally considered products had been cited previously within Chick and Micklethwaite (2002) as a concern for specifiers, this was confirmed within the interviews in this study; *“in the past there has been a perception that perhaps being sustainable makes a product a second rate good, with less performance”* (Architect 05, 2003)

Further evidence of architects and designers perceptions in relation to this line of questioning can be found in appendices Fi and Fii.

4.3.4 Information and Training

Within this section, the aim was to; gain an insight into the sources of information available to architects and designers to enable them to evaluate new materials and products and the effectiveness of the information, in aiding their decision making process.

To enable the researcher to validate/challenge assumptions made in the background research concerning the level of awareness and knowledge within the design community and the target group about sustainability issues.

In a general sense, information concerning new materials is gained through a mixture of primary sources, i.e. conferences, CPD events and word of mouth and secondary sources, i.e. journals, which include *“industry specific sustainability magazines and journals, such as Sustain and Forum for the future: Green Futures”* (Architect 04, 2003), marketing literature and websites. These findings are reflective of the practices of a wider group of architects in the RIBA Materials Survey (2002) in which 68% of the 127 architects surveyed referred to projects in magazines, followed by marketing literature (43%) and surfing the web (39%) in third place, with CPD receiving 8%.

The evidence gathered from respondents emphasised the benefits to manufacturers in running CPD presentations. Within discussions regarding environmental products and services, three out of five respondents could accurately recall details of competitors services, and when asked how they had gained this understanding many quoted CPD as the source.

“We did have a presentation from Milliken recently where they talked about their manufacturing [and] company response to sustainability” (Architect 01, 2003)

“with Nylon products, Milliken offer a service called ‘Life Squared’ [or Earth Square] where what they do is they take the old products and they put them

through a jet wash, and then they shear the top of it, give it a bit of a trim, and then revitalise it and re-use it. So there's no wastage" "I think Interface do a similar process but forgive me I've forgotten what it's called" (Architect 01, 2003).

Three out of the five respondents cited suppliers and manufacturers as a specific source of information regarding new materials, however, a clear finding is that respondents are beginning to develop a more rigorous approach to questioning manufacturers about their products, processes and company policies, as part of their decision making process.

"we are actually trying to develop a questionnaire for product suppliers and manufacturers" [to address] "issues such as whether they are ISO 14001, or have their own environmental management systems, what their in-house operations procedures are, whether they have procedures to reduce their harm of the environment, whether they have staff health, welfare procedures in house" "then the standard considerations like toxicity, embodied energy and general environmental impact of use" (Architect 04, 2003)

"We probably ask suppliers a lot more closer questions now about the environmental side" (Architect 02, 2003)

In summary, the findings indicate that environmental implications of products and materials is an increasing area of concern for Architects and Designers and their awareness of the factors involved is growing, despite a lack of information within architectural and design journals (see Chapter 3: Research Methodology).

The depth of investigation on the part of architects and designers can be demonstrated by the fact that three of the five respondents are currently developing processes and techniques to question salespeople on a deeper level in order to investigate manufacturer's claims. HOK International, for example, have developed a corporate policy on integrating sustainability.

Advising architects, within their 'Guide to building your sustainable building library – What makes a product green?' to *"question the [sales] representative about the full lifecycle of the product; do not focus on just one aspect of it"* (HOK, 2003)

The implications of this growing 'questioning' of products and associated processes represent a number of communication challenges for manufacturers, marketers and salespeople; which are explored further within sections 4.3.6, 4.3.7 and 4.4.3.

4.3.5 Perceived Environmental Impact/s of Carpet Tiles

The preceding section demonstrates the current level of environmental awareness in a general sense; the following line of questioning aimed to investigate the customer's level of awareness of the environmental impact of carpet tiles.

Respondents were aware of the environmental implications of using fossil fuels, recognising that oil is non-renewable, energy intensive in the refining process and that petroleum based products do not biodegrade.

Increasingly shorter leases within commercial offices, and a high turnover in interior finishes were linked to an increase in landfill. *"most [clients] are in spaces that have very short leases, 18 months to 5 years maximum" "that can mean that you can have a couple of carpets in a space in a relatively short space of time and that has an impact"* (Architect 02, 2003) Respondents acknowledged that although nylon based carpet is incredibly durable, carpets are being replaced more frequently. *"I think there is an awareness certainly in terms of flooring and in particular carpet, as a commodity, that there is an issue in terms of filling up landfills full of nylon, PVC backed carpet tiles"* (Architect 01, 2003)

Transportation linked to the use of fossil fuel energy and related to the origin of the manufacture process was raised, respondents recognised that carpet tiles

are often manufactured in Europe or America, and are therefore shipped to the UK for installation.

In terms of their understanding of the issues involved, the respondents had a sense of the benefits of reducing dependence on fossil fuels and the environmental implications of using oil to produce plastics. The scope of their thinking in terms of the full lifecycle appeared at this stage to be limited to the specification, installation and transportation stages. Consideration was given to 'end of life', in terms of reducing landfill use, however it was acknowledged that as decision makers, they would have little opportunity to influence this stage.

4.3.6 Lifecycle Thinking in Relation to Materials Specification

Within this section, coupled with the findings from sections 4.3.1 and 4.3.5 the concept of 'segmented' or 'divided' responsibility for the lifecycle of a product or material is investigated further through the following questions;

1. What do you understand by the term 'lifecycle' in relation to materials?
2. Which elements of the lifecycle of a product do you consider when you specify?

Discussions with architecture organisations coupled with an extensive review of publications and journals within the architecture and design community and leading architectural practices revealed a sense of the need to take a complete view of the lifecycle of a product when specifying. *"A material must be evaluated according to its lifecycle" "understanding how each of these phases [of the lifecycle] affects the environment is key to understanding sustainability"* (Malin. N, 2003, p174)

However, as reported in section 4.3.1 respondents felt that although they do have an opportunity to influence the specification of certain materials through changing their specification process, they only interact within certain areas of

the decision making process, therefore their potential influence as individuals is limited.

In addition, the influence they can have is currently hampered by a lack of knowledge about how to evaluate lifecycle performance. Although architects and designers have an understanding of the term 'lifecycle' in relation to materials;

"Cradle to grave" "from the raw material production, through the manufacturing, through the use or installation of that product, then the waste or recycling of that product" (Architect 05, 2003)

"Lifecycle, for me, would infer.....how long the particular product performed the function it was expected to perform, and beyond that how long the product existed before it biodegraded" (Architect 01, 2003)

Many of those interviewed expressed a sense of confusion regarding how to evaluate a product's lifecycle performance. *"It's awkward because 'lifecycle' is such a complex issue, in terms of the weightings of all the requirements involved in evaluating a product" "without being fully conversed with lifecycle analysis you are relying on the manufacturer to give you the story" (Architect 05, 2003)*

Analysis of these findings is documented at the end of the following section.

4.3.7 Validating Environmental Credentials

The aim of the following section was to measure the effectiveness of product information in assisting architects and designers to validate a product's environmental credentials. The following findings support and build upon the conclusions drawn from section 4.3.6 above.

Confusion regarding how to evaluate environmental credentials is attributed in part to difficulties in evaluating manufacturer's claims about the sustainable performance of their products;

"What we have found actually is that practically every manufacturer especially within the carpet tile sector..... has said why their product is better than someone else's, in some cases there is a genuine case that that is true" "It's difficult for us from a non scientific side to weigh up the pro's and con's" (Architect 02, 2003)

This had led in some cases to a lack of consideration of sustainability issues:

"Sustainability or environmental issues would generally figure quite low currently, but I think that's as much to do with people's sort of general disbelief, particularly in this sector, as to what people are doing to rectify that"

"I think Interface, in particular, have spoken at length about sustainability and green issues, butpeople generally within this practice" share the "general view is that it's been spoken about a lot, but we don't really see much tangible evidence of it" (Architect 01, 2003)

In addition, there is a perceived lack of consistent and comparable performance indicators across products and manufacturers;

"It's impossible to compare, that's the problem, it's actually impossible to compare across manufacturers what their claims are..... we just have to take the best view that we can" "it would be great for everybody if you could.....understand, I mean really understand what they mean, and could meaningfully compare it to another product" "but it's very difficult to thing to do" (Architect 02, 2003)

"The problem we find is that you can go to individual manufacturers, but you cannot really compare the performance of one product against another because the performance indicators are so broad" (Architect 04, 2003)

Inconsistency in terminology; *"Sustainable or green materials (the terms are used interchangeably) are not so easy to identify"* (Malin. N, 1999, p137)

Complexity of 'trade-offs' between environmental factors; *"Selecting 'green' products remains a difficult exercise because it always involves trade-offs"* (Snoonian. D, Gould. K.L, 2001, p88)

and a lack of specialist materials knowledge;

"Anything to do with the life process of a material is actually hugely complex and the only people who would understand are experts" (Architect 02, 2003)

Sources of information concerning the environmental credentials or lifecycle analysis are few in the UK. Two out of the five respondents mentioned the BRE (Building Research Establishment) as a source; *"the Building Research Establishment....do a sustainability pack for specifying. You can actually look at the impact"* (Architect 02, 2003) *"I use BRE, who have an 'eco points' system"* (Architect 05, 2003), and a third respondent referred to a similar guide *"we rely on the 'green guide to specification', in which people have done very focused research to compare materials over a number of key issues, and therefore you can work out some sort of rating for a material"* (Architect 04, 2003)

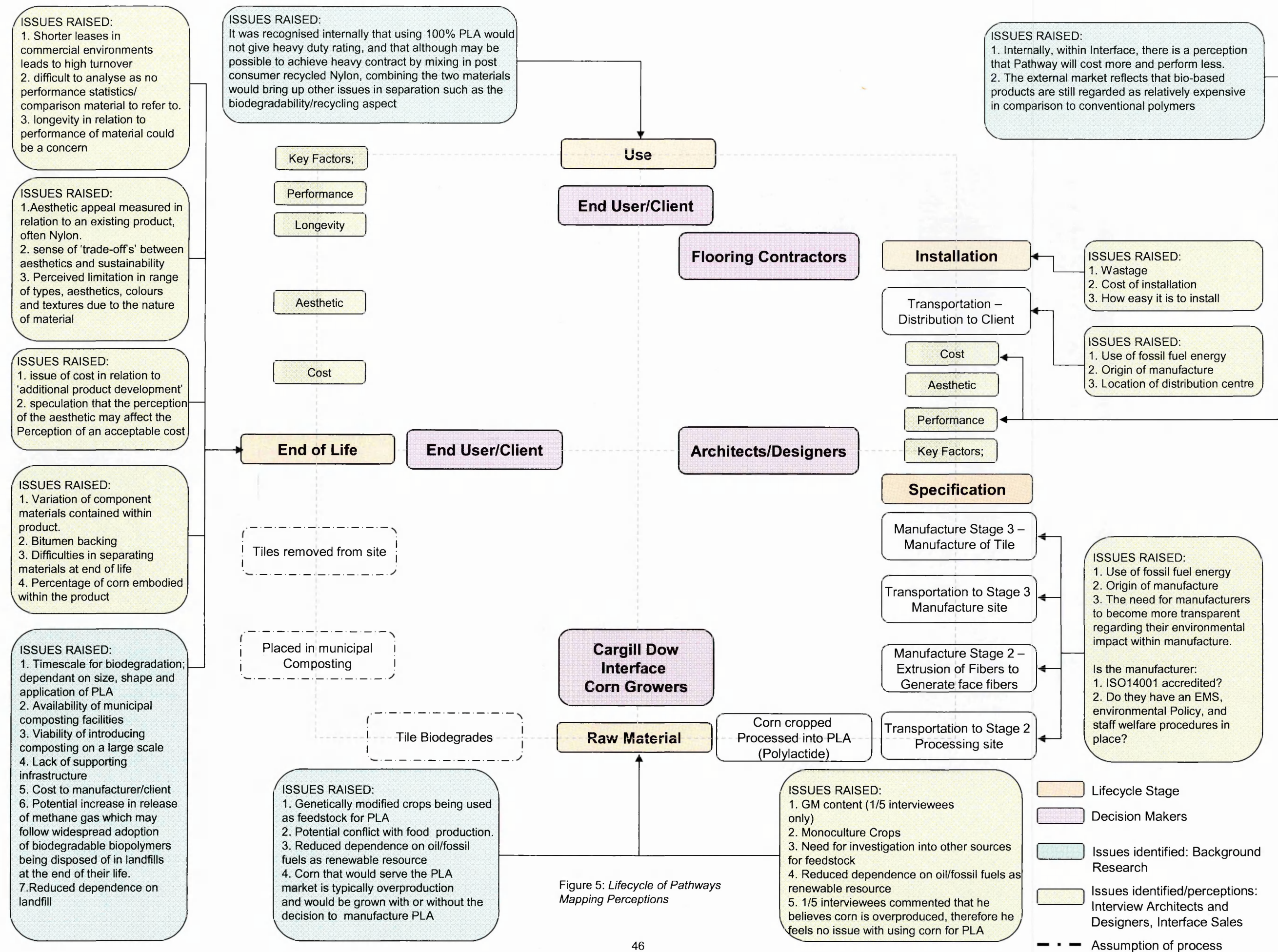
Through cross referencing the findings from sections 4.3.4 and 4.3.6 with the perceptions gathered within this section of questioning, the following conclusions have been drawn;

1. The decision making process involved in considering the environmental impacts of a product requires architects and designers to access and understand complex, often scientific/technical information.
2. Architects and designers require a greater depth of information regarding the lifecycle performance to assist them in understanding the environmental implications of specifying products and materials.
3. The sources of information open to architects and designers promote a greater depth of inquiry and questioning in terms of considering the lifecycle performance, however, feedback suggests that the current modes of evaluation and rating for products are complex and incomparable across products and manufacturers.

4.4 Key Findings Related to Pathways

The discussions surrounding Pathways raised a series of debates within the context of the lifecycle story of the product. The most prominent of which have been grouped under three main headings;

- A. 'Raw Materials', 'Manufacture' and 'Transportation', which involved discussions concerning the viability of using corn as feedstock, energy use related to transportation and the manufacturing processes.
- B. 'End of life', which involved discussions concerning biodegradability related to the component materials contained within the product and longevity related to perceived performance.
- C. Validation of environmental credentials – how the lifecycle story is communicated. Within which the lack of clarity, depth and detail of information provided linked to a need for comparable 'sustainability' performance indicators and an explanation of environmental benefits was discussed.



The following section explores these issues in greater detail, by cross referencing varied stakeholder perceptions. In addition to clarify further the analysis of points A and B, the perceptions of the varied stakeholders in relation to the different stages of the product lifecycle were mapped on to a product lifecycle framework (see fig. 5, p 46).

The map illustrates assumptions generated through the background research (which are summarised in section 2.7 at the end of the background research chapter) and maps them against the perceptions gained within the interviews (architects and designers) which are detailed below. Identifying which perceived issues were justified, gaps in the 'story' and new previously unidentified issues to be considered.

4.4.1 'Raw Materials', 'Manufacture' and 'Transportation' (A):

This section involved discussions concerning GM crops, monoculture crops and location of manufacturing and distribution processes. The findings are summarised in the table below (fig. 6);

Issue	Evidence
GM Crops	One of the five interviewed identified GM as an issue.
Monoculture Crops	<p><i>"Another issue would be monoculture crops, which are quite destructive in terms of the environment, because they tend to leach the soil after a certain time"</i> (Architect 05, 2003)</p> <p><i>"I think we need to diversity and not just use corn" "there are other crops out there that could be provide the oil base for yarn" "I would be more interested in investigation into various crops" "we need to diversify so we are not destroying the soil in any one way or converting landscape to a single crop"</i> (Architect 05, 2003)</p>
Location of manufacturing processes	<p>Production system of PLA questioned in terms of the environmental impact associated with the transportation;</p> <p><i>"the one problem I have with PLA....is that the corn's grown in Nebraska, then its extruded in Italy and then its shipped to the UK for production" therefore "are we bringing it back up to the Nylon level with the amount of transportation and the amount of processes it's going through?"</i> (Interface Sales 02, 2003)</p> <p>As previously highlighted, respondents were aware of the environmental implications associated with manufacturing within the US and Europe</p>

	<p>and transporting to the UK. This awareness directly impacted some respondent's decision making regarding Pathway.</p> <p><i>"Is this [Pathways] going to be manufactured in Europe?" [Q: Would that be an issue for you?] "Yes, because of transportation and shipping costs, which would come into it, but again its getting back to the use of fossil fuels, transportation is fossil fuel intensive" (Architect 05, 2003)</i></p> <p><i>"I'd ask where it was manufactured, because that's the furthest miles it would travel, with distribution there may be a local stockpile nearer the site, but really you have to take into account where it was manufactured" (Architect 05, 2003)</i></p> <p><i>"I certainly wouldn't specify a carpet from America" (Architect 05, 2003)</i></p>
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Figure 6: *Perceptions of 'Raw Materials',
'Manufacture' and 'Transportation' Issues*

The background research findings indicated that GM Crops had been identified by Interface as a potential issue for PLA based products. Interface had anticipated possible future concern, by putting in place advisory sections in a range of publications addressing the potential GM debate and the possible perceived competition with food production. (see section 2.4.3 *PLA and the Genetically Modified (GM) crops debate*).

However, the actual awareness and concern of respondents appeared to be fairly low. Although no data had been gathered to determine why this is the case, it is possible to speculate that given the fact that the GM debate is currently restricted to food production, architects and designers may not have made the 'link' between corn for PLA and GM. Therefore, Interface has an opportunity to take proactive stance in anticipating and addressing future customer concerns.

Monoculture crops were not directly highlighted as an area of concern within the background research, however, if this does become a more widely acknowledged issue, steps could be taken to diversity the feedstock used. In fact, as reported in section 2.4.3 *PLA Production vs. Food Production* Cargill Dow plan to begin producing PLA from alternative feedstock and agricultural waste.

As reported in section 4.3.5, awareness of the environmental implications of transportation is increasing, for Interface these findings indicate that;

1. Consideration of the location of manufacturing plants, production sites and distribution depots will be of increasing importance, as these factors will affect the decision making process.
2. Analysis of the environmental impact of transportation, will need to be conducted and communicated to relevant stakeholders (i.e. salespeople, architects and designers, end users) to establish whether the environmental footprint is less than a standard product, e.g. Nylon.

4.4.2 'End of Life (B);

Which involved discussions concerning; biodegradability related to the component materials contained within the product and the difficulties in separating these materials at end of life, particularly focused on the bitumen backing. In addition the percentage of corn embodied within the product. The findings are summarised in the table below (fig. 7);

Issue	Evidence
Biodegradability of Pathways	<div>Respondents questioned the biodegradability primarily;</div> <div><ul style="list-style-type: none">In relation to the component materials contained within the product, particularly the bitumen backing, and the difficulties in separating these materials at end of life.</div> <div><i>"I think that more information would have to be given as to how it would be biodegradable; I don't know how it would biodegrade in that format, with the bitumen backing"</i> (Architect 01, 2003)</div> <div><i>"It couldn't biodegrade because of the backing – the yarn would biodegrade" "but it [the tile] would have to be unzipped" "and that's the problem, we can't unzip any of our products. We can shear the yarn off the top" but "the yarn is contaminated with the bitumen and the bitumen is contaminated with the yarn"</i> (Interface Sales 02, 2003)</div> <div><ul style="list-style-type: none">and the number of materials used within tile</div> <div><i>"The thing we tend to look at is the number of materials, there's a material there which looks like it could be bitumen, then there's a</i></div>

	<p><i>bonding level of some description, then there's the weave material itself, and then the ink and the dye chemicals come into it as well" "so there's four or five products sitting in that" (Architect 02, 2003)</i></p>
<p>Percentage of corn embodied within the product related to biodegradability claims.</p>	<ul style="list-style-type: none"> • Lack of information provided as to the percentage of corn embodied within the product. • biodegradability of the corn constituent seemed to be accepted • Question of the percentage of corn directly related to the acceptance of the biodegradability. <p><i>"It sounds as if it should be biodegradable, if it's made from corn, but not all of it is made from corn" (Architect 03, 2003)</i></p> <p><i>"It says it is made from corn but it hasn't got the technical back-up and that's what you'd expect they'd be marketing that is has 90% natural material, its recyclable etc – but there's no mention of that" (Architect 04, 2003)</i></p> <p><i>"I'd like to know which part of it is corn, all of it? some of it? the dyes or the ink?...I'd like more information" (Architect 02, 2003)</i></p> <p><i>"The better informed people are the closer they will look at it [Pathways]" "so that is made of corn, what is the other half made from?" "People get very suspicious that it is all marketing, that only 10% of it is natural and that the rest is the same as any other material or even worse" (Architect 03, 2003)</i></p> <p><i>"Carpet from corn.... What I'd like to see is a bit more substantiation of that" "if you had a simple diagram or description, something that is just quite simple to read, that said that's made from that, that's made from that..." (Architect 02, 2003)</i></p>
<p>Biodegradability, performance and longevity</p>	<ul style="list-style-type: none"> • Respondents seemed to form connections between the concepts of biodegradability, performance and longevity, however, many appeared to find the process of weighing up these factors in relation to Pathway difficult and a common understanding across all interviewee's could not be determined. <p><i>"I have no idea how long that [Pathways] would last, it doesn't look as if it would wear and tear the same" "that is obviously an issue, because if you're producing something that is biodegradable, but you have to use three lots of it in the same space of time you'd use a nylon product....." (Architect 01, 2003)</i></p> <p><i>"Convincing people that it lasts longer isn't necessarily going to work. It might work some cases because then you don't need to replace it, but in a lot of cases people will renew things on a regular basis" "so actually recycling or buy-back, in those cases will be more important than longevity" (Architect 03, 2003)</i></p>

Figure 7: Perceptions of 'End of Life' Issues

Within the literature review (see sections 2.4.3 and 2.7) academic and industry commentators were already beginning to raise questions concerning the biodegradability of PLA.

Within the context of the Pathway, the biodegradability of the material was extensively questioned externally by architects and designers and internally by salespeople, reflecting the lack of development in the lifecycle 'story' of Pathways. These findings represent significant challenges for Interface in resolving the 'end of life' story for Pathways and communicating this story to their stakeholders.

In terms of resolving the 'end of life' story; although the marketing material from Cargill Dow highlights the versatility in the options for 'end of life' e.g. biodegradable when composted, can be burned in an incinerator or has the potential to be recycled back into lactic acid. Upon reflection, these options represent difficulties logistically, economically and in some cases environmentally;

1. Currently the biodegradability is restricted to the face fibres only; therefore the backing would remain intact. Disposal of bitumen is generally managed by incineration, which, arguably, would not be within the remit of the end client's capabilities.
2. In addition questions concerning potential by-products of the biodegradability process (i.e. methane) have been raised.
3. As reflected in the literature review, there is currently no infrastructure for industrial composting in place, therefore the mass composting of PLA could not currently be effectively managed by clients.
4. Although Interface could feasibly 'take-back' Pathways
 - a) the additional expense for this service would inevitably be passed on to the client in the cost, contributing to the existing perception of environmental good and services being less cost effective.

b) Widespread adoption of 'take-back' services would place increasing pressure on Interface production, and could feasibly cause a 'backlog' in the system.

The challenges involved in communicating the lifecycle story to stakeholders are explored within the following section, which outlines the current perceptions of Pathways communication approach and identifies opportunities for improvement.

4.4.3 'Validation of Environmental Credentials' (C);

Further exploration of the current perceptions of Pathways communication approach to stakeholders in terms of the lifecycle story revealed that interviewees perceive;

- A lack of information regarding product's lifecycle/environmental performance and its environmental/economic benefits
- Difficulties in evaluating claims about the sustainable performance of product
- A lack of consistent and comparable performance indicators across products and manufacturers.

The results of these findings are demonstrated in the following table (fig. 8)

Issue	Evidence
Environmental Communication	<ul style="list-style-type: none">• lack of information to explain the environmental credentials or benefits of Pathways; <p><i>"What's interesting here is that all of this technical information, none of it is about sustainability performance. All it shows is that it is made from renewable energy and it has some sort of recycled label"</i> (Architect 04, 2003)</p>

Difficulties in evaluating sustainable performance of product	<ul style="list-style-type: none"> Architects have a lack of expertise in evaluating lifecycle considerations, and therefore find it difficult They find it difficult to 'weigh up' environmental attributes and claims. <p><i>"without being fully conversed with lifecycle analysis you are relying on the manufacturer to give you the story, but they only tend to give the story of the good points, they don't tend to advertise what they are not achieving" (Architect 05, 2003)</i></p> <p><i>"It's awkward really because 'lifecycle' is such a complex issue, in terms of the weightings of all the requirements involved in evaluating a product. Evaluating each product is not something we really have the time to undertake as a profession" (Architect 05, 2003)</i></p>
Need for sustainable performance indicators/comparisons to other materials	<ul style="list-style-type: none"> Four out of five of those interviewed highlighted the need for comparable 'sustainability' performance indicators. <p><i>"What would be good to do is to show why it [Pathways] is more sustainable compared to other products, i.e. why corn based is better than fuel based" (Architect 05, 2003)</i></p> <p><i>"It would be interesting for Interface to compare each of their products against all of these issues and have a rating for each one" (Architect 04, 2003)</i></p> <p><i>"Interface need to come up with some way of getting quite complex information across simply in a way that you could actually benchmark it against other materials" (Architect 02, 2003)</i></p> <p><i>"If you could have an industry or international performance characteristics standard for materials that would be fantastic" (Architect 04, 2003)</i></p> <p><i>"It would be nice to have a comparison to have some sort of comparison with another type of product" "something that is considered to be the normal standard for whatever market this [Pathways] is aimed at....so it could be shown as the same as or better" (Architect 03, 2003)</i></p>

Figure 8: Perceptions of Issues Regarding Validation of Environmental Credentials

As referred to in the information and training section (4.3.4), the implications of these results represent a number of communication challenges for manufacturers, marketers and salespeople;

- To recognise the range of stakeholders involved in the decision making process and provide 'tiered' or 'layered' information at a suitable level of complexity to suit the target audience.

- To identify the varied stakeholders perceived level of responsibility for the product lifecycle, and to target those decision makers directly to initiate change through influencing behaviour.
- To develop training and tools for salespeople to educate architects and designers on how to influence their client's decision making process concerning the disposal of the product at end of life.
- To provide in-depth yet easily accessible information concerning the product's material components and the environmental implications of their application.
- To demonstrate the social, environmental and economic benefits of specifying Pathways.
- To provide information and tools; comparable 'sustainability' performance indicators for example, to enable architects and designers to evaluate environmental/lifecycle performance and make comparisons across manufacturers and materials.

In addition to the three main debates raised previously (4.4.1, 4.4.2 and 4.4.3), respondents also discussed specification criterion in relation to Pathways (involving cost, aesthetic, and performance). The key points which emerged from these discussions are summarised below, and supporting evidence provided in Appendix G i;

4.4.4 Specification of Pathways

- There was some speculation that the perception of the aesthetic of Pathway may affect the perception of the cost. *"The client's that we work with would perceive this as a very low cost carpet, and it is a low cost carpet"* (Architect 02, 2003). This assumption was based on an observation of the texture of the face fibres and the thickness of the backing material.

- Within discussion surrounding the aesthetic; the limitation in colourways and the texture and material base of the yarn were factors raised as potential barriers to specification. *“some of these products, particularly with carpets, in the past there has been a very limited range of types, aesthetics, colours and textures” “so that does affect the decision making”* (Architect 04, 2003)
- Respondents seemed keen to compare Pathway to existing carpet materials to try to classify or rate the aesthetic against a familiar existing product like Nylon.
- As highlighted in sections 4.3.3 and 4.4.3, the performance was an issue which respondents seemed to find difficult to analyse as they had no comparison material or performance statistics to refer to.
- In terms of cost in relation to ‘sustainable’ attributes, increased cost for ‘sustainable’ products was considered acceptable, in some cases, if the additional costs could be justified to the client in terms of benefits;

“People accept, certainly at the moment that you have to have a certain premium for some things, if it is sustainable.... There will be a willingness to do that up to a point” “what Interface have got to do is work out where that point is” (Architect 02, 2003)

“If it genuinely costs [manufacturers] more because they are developing new processes, and that cost comes out in the product, then we will have to balance the cost the aesthetic and the performance when we make specification decisions. But if they see it as an opportunity to have a higher cost product because they can market it as a ‘green product’....” (Architect 04, 2003).

4.5 Summary and Conclusions

A series of informed conclusions based on the perceptions gathered and the background research have been formulated in response to the research questions outlined in the Chapter 3: Research Methodology.

4.5.1 Decision Making Process

With reference to fig. 3, and the supporting evidence in sections 4.3.1, 4.3.3 and 4.3.6, the following conclusions have been drawn;

In terms of their responsibility for the product lifecycle (as illustrated in fig. 5) architects and designers perceive their responsibility to be within the specification and in some cases the installation. However, their awareness extends through the lifecycle, encompassing manufacturing, transportation, use and end of life (see section 4.3.5).

Respondents recognise that their role forms part of a wider network, involving a series of players, but they have some power in influencing those players, given appropriate tools and information.

Reflection on the perceptions gathered indicates that in order to successfully introduce 'sustainability' as a key decision making factor within the specification of a product/material there needs to be a supportive network of players, each with the same agenda, each playing their part in influencing and driving change.

For Interface, this finding would indicate that;

1. There needs to be a 'tiered or layered' approach to the marketing and communication of sustainability initiatives. Which means pitching the right information at an appropriate level to the varied stakeholders/customers involved within the decision making chain.

2. Service initiatives which rely on the co-operation and 'buy in' of several players to succeed (Re-Entry for example) need to be marketed to those players in order to educate and inform them about their role and responsibilities within that system.

In the case of Re-Entry, the infrastructure surrounding the product is vital to the success of the scheme. Therefore it is essential that Interface involve, educate and encourage industry players to buy in to the ethical aspects of the scheme in order to make the Re-entry concept into a system.

Through discussions with Interface Sales personnel the infrastructure issues became apparent;

Interface currently charge 35p per metre for the Re-Entry system, it cost approx £1 per metre to send it to landfill – Interface *“promote that saving”* but *“they haven’t because someone’s got to stack all those tiles up”* which means the client will have to employ a flooring contractor, who charge between 50-80p per metre, so it is not as cost effective. Interface need to encourage the flooring contractors to *“buy into Re-Entry”* on an ethical and environmental level, *“so that they don’t see it as a profit making exercise”* and so that they *“go in at minimum cost”*. (Interface Sales 02, 2003)

4.5.2 Drivers for Architects and Designers to Consider Sustainability

Internal drivers identified were;

- Management directives; *“Within [our practice] there is a management directive to follow sustainability”* (Architect 05, 2003)
- Internal sustainability champions promoting green specification initiatives and developing practice guidelines;

An example being one of the five practices who initiated an *“internal sustainability group within the practice” “to develop and discuss relevant issues within the industry” [and] “setting environmental management systems in place so that projects are forced to go through.... design reviews and technical reviews, where they will be questioned on these issues”* (Architect 04, 2003)

- and integration of sustainability into professional development courses (CPD)

External drivers identified were;

- Architectural organisations; such as the RIBA Sustainable Futures committee, who *“exist to hold the vision of how sustainability relates to the profession and thus to informmembers in order to promote sustainable design”* (RIBA, 2003, p1). *“Insisting that sustainability become part of the education process for architects”* (Architect 04, 2003)
- Pressure from NGO's; demonstrated by a recent article in Building Design, describing Greenpeace's efforts to *“alert architects of the importance in specifying ‘sustainable timber’”* (Building Design May 9, 2003, p7)
- Pressure from clients; *“if we are specifying wood or wood veneers, they [the client] would ask whether they came from a sustainable source, because there has been a lot in the press about that”* (Architect 01, 2003)
- Growing interest from clients; Pathways would be considered *“if there was an interest from the client in terms of sustainability or green credentials”* (Architect 01, 2003)

- and competitive advantage; *“clients are becoming more aware [of sustainability issues], and what we’ve realised is we need to steal a margin with that”* (Architect 02, 2003)

4.5.3 Drivers for Architects and Designers to Consider Biopolymers

Having reflected upon the perceptions gathered, the following conclusions have been drawn;

- Environmental; reduced dependency on fossil fuels, reduction in ‘pollution cycles’ associated with oil refining, reducing landfill use through biodegradability, *“if it is truly biodegradable”* (Architect 01, 2003) (see discussions in section 4.4.2).
- Social; contribution to reducing ‘sick of syndrome’ *“in terms of ‘sick office syndrome’, if you use lots of man made fibres, petroleum based, you tend to get a vapour....that adds to ‘sick office syndrome”* (Architect 01, 2003)
- Economic; reduced use of landfill linked to an opportunity to reduce ‘end client’s’ landfill charges.

4.5.4 Perceived Benefits to End Clients.

With reference to the supporting evidence in figure 9 below the following conclusions have been drawn;

Issue	Evidence
Clients awareness	<p><i>“We work with some quite large corporate clients, and those types of clients are pretty well educated, they obviously understand that there is a desire to be green, but there is also a marketing desire to be seen to be green”</i></p> <p><i>“Although you could argue that that’s not necessarily a good thing, you could argue that it does make large companies act in a partially responsible way”</i> (Architect 02, 2003)</p>
	<p><i>“It depends on which clients. Commercial or ‘city’ clients aren’t really interested, they become interested when it becomes a legal requirement, or if there is some obvious commercial advantage, but otherwise they will wait until it is absolutely necessary to make any changes”</i> (Architect 03, 2003)</p>

	<i>"other clients, particularly in education, will have a different sort of agenda and brief, they may have some 'green' credentials they aspire to, and so there is more opportunity there" (Architect 03, 2003)</i>
	<i>"the bottom line sadly is often profit and even those city clients who are interested [in environmental issues] are generally interested because it affects their share price or their standing within the Dow Jones Sustainability Index, or FTSE 4 good" (Architect 04, 2003)</i>

Figure 9: *End Clients Interest in and Awareness of Environmental Issues*

In terms of benefits, accreditation with an environmental rating system, such as BRE or LEEDS (in the U.S) was seen as a strong driver for clients to consider Pathways;

"If you are in the states the LEEDS system you will be given points because it is a renewable product, also for clients here [UK] if they follow the BRE system or those types of systems there are advantages to alternatives" (Architect 05, 2003)

"If an office or a client is particularly following a sustainability strategy then this [Pathways] becomes another part of the story which they may be able to use in terms of publicity upon completion" (Architect 05, 2003)

As stated in sections 4.5.3 and 2.4.3, the use of bio-based plastics would offer economic benefits to end clients in terms of reducing waste therefore waste management costs.

In terms of client business sectors (i.e. public vs. commercial), respondents recognised that the benefits may be greater in public sector organisations, due to the increased level of accountability and sense of reputation; *"other clients, particularly in education, will have a different sort of agenda and brief, they may have some 'green' credentials they aspire to, and so there is more opportunity there" (Architect 03, 2003).*

5. Sustainability Training

5.1 Introduction

The original scope of the project was concerned with investigating perceptions of PLA and its application within Pathways; as the project progressed, however, the scope and depth of questioning within the interviews widened to incorporate larger issues which related to the company environmental communications strategies. The product level information gathered related to Pathways in a direct sense, however the findings also held wider implications for Interface at a company strategy level. In a sense investigation of Pathways served as a portal to wider issues raised by architects and designers regarding the effectiveness and suitability of Interface’s environmental communication. Figure 10 (below) illustrates this progression.

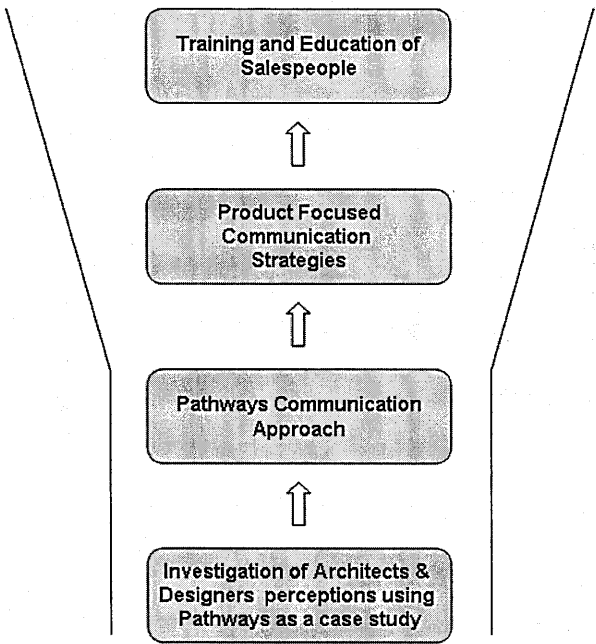


Figure 10: Implications of Research Findings in Company Context

The research findings revealed that Interface sustainability communication and marketing is focused at a strategic level formulated around the macro level concepts embodied within the seven fronts (faces of Mt. Sustainability) model (Anderson. R, 1998, p110) relating to the company level philosophy.

Interface have developed a very strong 'language' of sustainability, a language which is integrated into all levels of communication, including the training approach.

Having reviewed recent Interface presentations (Interface (c), 2003) given as part of the internal sustainability training program for salespeople, it is evident that the presentations focus on macro concepts, and company level actions. The company training has been successful in conveying an understanding of company level initiatives and vision, as demonstrated by a comment made by one salesperson interviewed, *"I understand where we are and where we're going and what our mission is"* (Interface Sales 02, 2003). However, the presentations, although informative on a company level, lack the level of detail in terms of products required by the sales teams.

The findings generated within this study, based on varied stakeholder perceptions, have challenged the effectiveness and appropriateness of the Interface approach. The emphasis on company level philosophy and strategic concepts is misaligned with the customer's expectations and level of understanding which is at a product level. Therefore, the organisation needs to adapt their focus and language to meet the market and customer expectations.

For Interface this means re-focusing the communication approach and developing a more appropriate 'language' with which to communicate to their stakeholders. At a company level this means;

1. Re-focusing the sustainability communication to a product level, in line with customer expectation, through;

a) Firstly, capturing the 'customer voice' in order to understand their requirements.

b) Then secondly using those perceptions to inform a training program for the sales team, incorporating appropriate tools, education, knowledge and training to enable them to provide information at an appropriate level to meet customer requirements.

2. Re-evaluating the role of the salesperson, to encompass values and responsibilities more in line with sustainability principles and viewing salespeople as potential 'change agents' who can influence and inform customer thinking.

5.2 A Shift in the Traditional Role of Salespeople

The sales teams are an integral part of developing, implementing and ensuring the effectiveness of new approach to communicating and marketing product level sustainability initiatives. *"A significant determinant of the success of a new product introduction is the sales force selling that product"* (Micheal. K, et al, 2003, p271).

Therefore initially Interface need to 'sell' the product to the salespeople in order to secure their support, as in order to successfully market a new product, *"the sales force has to 'adopt' the new product"* (Micheal. K, et al, 2003, p272). Part of the launch phase of a new product should, therefore, be an internal launch. The aim of the internal launch should be, on a practical level; to build awareness and understanding of the product attributes benefits and environmental story and on a personnel level; to create a sense of inclusion and value within the sales team. This initiative forms part of step three within a proposed company level program for developing and implementing a new approach to training (see fig. 11 page 65).

Within the proposed program each step involves a series of activities which contribute towards designing, delivering and maintaining a sustainability training program for salespeople, which has the flexibility to be responsive to changing customer needs through effective stakeholder engagement.

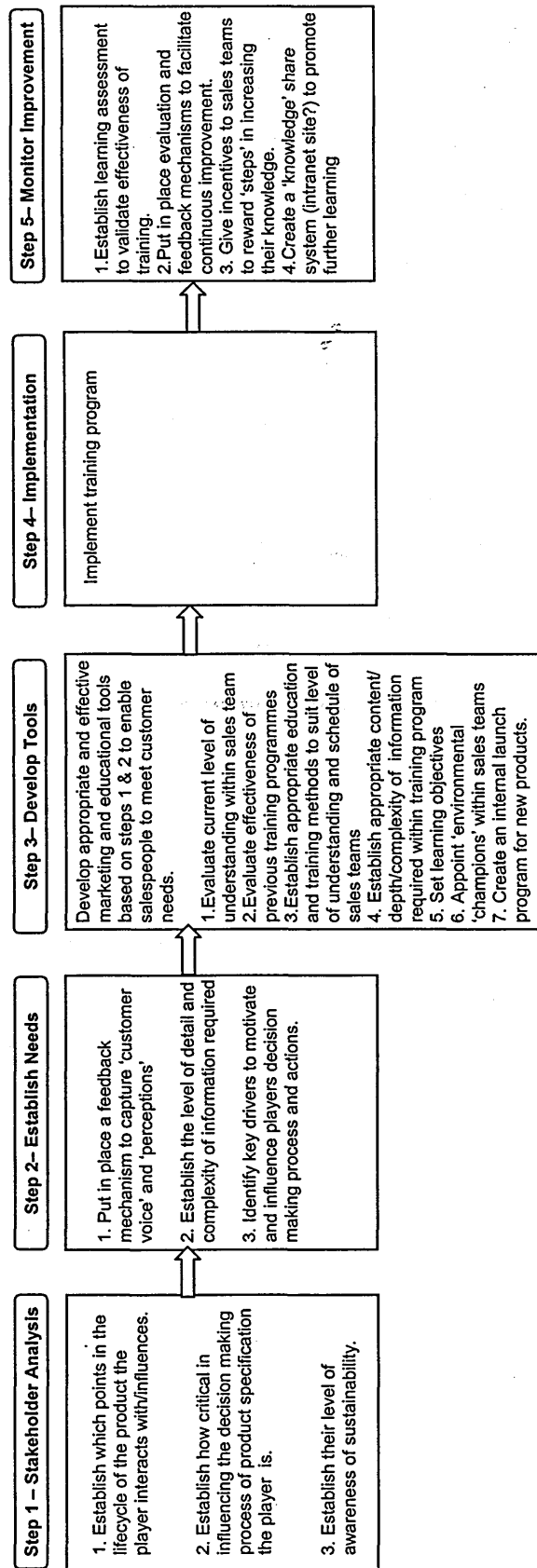


Figure 11: Proposed Program for Developing and Implementing a New Approach to Sustainability Training

Steps Three and Four of the program will be expanded upon in the following section.

5.3 Developing and Implementing Tools, Education and Training

Steps Three and Four would be undertaken in tandem as parallel activities. Points one and two within step three would be the starting points.

In terms of evaluating the current level of understanding within sales team, it may be appropriate to introduce a short evaluation two to three months following any training program undertaken to test the level of retention and applied understanding. In addition 'spot-check' interviews may be used to evaluate the understanding in relation to specific products or services. However, the most effective method of evaluating the level of understanding of salespeople and how effectively they communicate that understanding would be to question the customers themselves, as demonstrated by this research.

The second point in step three 'evaluate effectiveness of previous training programmes' is vital in ensuring that the training is not only effective but also whether it enables the salespeople to meet the information needs and demands of the customers.

The following approach (shown in fig. 12 below) has been developed to provide a framework of elements to be included in a sustainability training program for salespeople, based on the requirements identified by the architects and designers interviewed;

Stakeholder requirement identified	Training content	Implementation Tool/Methodology
1. Ability to demonstrate environmental, social and economic benefits of specifying product.	<p>Present and explain triple bottom line model as a basis for introducing sustainability within a business context.</p> <p>Use triple bottom line model as a framework to evaluate the social, environmental and economic benefits of product, based on sales knowledge of customer business.</p>	Use triple bottom line model framework as a demonstration tool to explain to customers the social, environmental and economic benefits of specifying Interface products and services.

<p>2a) Understanding of 'performance' attributes of standard materials or products.</p> <p>2b) Ability to make comparisons between 'standard' products and Interface products to demonstrate advantages /benefits</p>	<p>Identification of key performance criteria highlighted by Architects and Designers in relation to decision making process of specification.</p> <p>Independent analysis of performance criteria and environmental credentials of standard materials applied within carpet/flooring products (i.e. Nylon, bitumen, PVC etc), presented within a framework to enable comparisons to be made.</p> <p>Awareness of and comparison between various 'eco' points rating schemes currently used by Architects and Designers to rationalise performance criteria of products (i.e. BRE, LEEDS etc)</p> <p>Understanding of the performance attributes and environmental credentials of Interface products in relation to standard products.</p>	<p>Development of a presentation 'tool' in conjunction with an independent organisation/ NGO such as BRE to demonstrate the performance criteria and environmental credentials of standard materials and Interface materials</p> <p>Integrate 'rating' system into marketing publications in the form of a table/matrix for easy comparison between materials.</p> <p>Develop a database in partnership with BRE for e.g., which includes standard products and Interface products. Make database an interactive feature available on Interface website for Architects and Designers to use when selecting products and presenting materials options to their clients.</p>
<p>3. Understanding of the decision making process associated with product specification within different types of client organisations.</p>	<p>Understanding of stakeholder identification and analysis methodologies.</p> <p>Ability to use methodologies to identify and analyse stakeholders.</p> <p>Understanding of and ability to identify key drivers and benefits of products from different stakeholder's perspectives.</p>	
<p>4. Ability to adapt and target language, terminology and approach to different stakeholders to influence decision making process.</p>	<p>Ability to identify opportunities within client organisations for influencing behaviour.</p> <p>Ability to use key drivers and benefits to initiate change and influence behaviour.</p> <p>Consulting and influencing skills</p>	
<p>5. Understanding of and ability to effectively communicate product's lifecycle story.</p>	<p>Understanding of Lifecycle stages and environmental impacts associated with those stages.</p> <p>Understanding of and ability to communicate lifecycle analysis</p>	<p>Create 'lifecycle' diagram for individual products to explain lifecycle story and to demonstrate the products environmental, social and economic benefits.</p> <p>Provide information to Architects</p>

	<p>of Interface product ranges.</p> <p>Ability to demonstrate how Interface products compare with competitors products in terms of lifecycle thinking. (for e.g. that Re-Entry is only UK based in order to reduce environmental impact in transportation)</p>	<p>and Designers/end users about the positive effect/influence they can have in reducing the environmental impact of the product in the USE and END OF LIFE stages.</p> <p>Demonstrate how Re-Entry as a service option fits into the product lifecycle diagram and make clear its business and environmental value.</p>
6. Understanding of where the product fits in the companies overall environmental strategy.	<p>Understanding of where each product fits into an overall strategy. Use Interface seven fronts (faces of Mt. Sustainability) model to benchmark or rate the environmental improvement.</p>	

Figure 12: *Proposed Sustainability Training Program
For Interface Salespeople*

Point three within step three; ‘establishing appropriate education and training methods to suit level of understanding and schedule of sales teams’ has been explored further in section 5.4.

Point four within step three makes reference to ‘appropriate’ content/depth/complexity of information; this is an important factor which must be evaluated through the information gathered in points one and two.

The effectiveness of the training and the successful retention of information can be dependant on the level of complexity of the information and the method in which it is delivered. As discussed in section 2.5, sustainability is a complex issue, and the delivery of sustainability information needs to be delivered in a clear way and pitched at an appropriate level to suit the target audience’s level of understanding.

Having reviewed the training presentation for sales; ‘Sustainability: Doing well by doing good’ (Interface (c), 2003), it was revealed that considerable use of fairly complex graphs and tables was made, which in some examples were

highly scientific in content. Information presented in the form of complex and dense text or facts can cause the audience to lose focus. As demonstrated by the experiences of one salesperson interviewed who stated that their experience of the current training program was that it although she understood most of the issues discussed concerning the wider issues associated with sustainability the content tended to be quite “*scientific*” and “*complex*” and that “*some of the content went over her head*” (Interface Sales 01, 2003).

The interviewee referred to above also reflected that most of the knowledge she had gained about sustainability came from conversations with other people (internally and externally) and through attending seminars and lectures. Indicating that perhaps an internal network or forum may be an effective additional training element in conjunction with more focused short courses (training methodologies are discussed further in section 5.4)

By setting learning objectives attached to each element of the training program, the salespeople have measurable targets, which although not financially rewarded, allow them to feel a sense of achievement and progression. Targets also enable Interface to benchmark and catalogue the level of training of the sales teams.

Appointing ‘environmental champions’ within the sales teams, in conjunction with a mentoring and networking scheme, enables the sustainability message to be promoted and discussed. Champions can drive change and development by engaging others in key issues.

5.4 Training Methodologies

In terms of appropriate training methodologies, the findings reflected that although the current two day intensive course content and delivery was valuable in delivering macro level concepts and communicating the company vision, the content was not considered to be aligned to customer expectations of salespeople in terms of knowledge and information. In addition it was also found

that some salespeople felt a lack of confidence in their ability to effectively deliver a 'sustainability' agenda to their clients. Finally a key finding was that some salespeople, who are actively interested and engaged in the sustainability debate, find it necessary and helpful to supplement their official learning through attending seminars and by approaching internal or external sources on an informal basis.

Therefore it would be recommended that Interface adopt a 'tiered' approach for training the sales team combining mandatory and optional training elements delivered using formal and informal approaches.

5.4.1 On-line Training Package

An on-line training package for mandatory training elements, with a fixed time period for completion, would facilitate learning on an individual basis. The user would have the option to learn in their own time to suit their schedule. The system would log when the modules had been completed and enable the systems administrator to track the progress of individuals and collate training achievements across the sales force as a whole.

Considering the pace of new product development, an on-line system would be ideal, enabling quick and easy uploading of new training programs or information/educational presentations regarding new product releases and keeping the sales people up to date with new developments.

The on-line package could contain links to an intranet site for salespeople, run in conjunction with an internal network of forum to facilitate interaction and sharing of knowledge and enable the user to access a database of further information relating to specific products or services (as described in section 5.3)

5.4.2 Short Courses

Short courses relating company level information and communicating the strategic vision should continue to be a mandatory element for new employees.

A short course would be an appropriate medium for this type of information as it is fixed and unlikely to change.

5.4.3 Environmental Champions/Mentors

As previously described in section 5.3 environmental champions can have a positive effect on their colleagues by promoting environmental information and co-ordinating the transfer of knowledge through word of mouth.

5.4.4 Internal Network or Forum Linked to Intranet Site

Although this suggestion may be time consuming in the short term in terms of setting up the system and engaging salespeople in the benefits of subscribing, the benefits once the system is up and running are considerable.

An internal network or forum linked to and coordinated on an informal basis, by official personnel and unofficial environmental champions may be useful in encouraging and facilitating debate and discussion and the sharing of experiences and knowledge. In addition a network may help to 'flag up' common issues/queries from customers regarding specific issues, products or services.

5.5 Conclusions

- An integrated approach to implementing a sustainability training program has advantages in that it enables a wide range of learning 'styles' to be taken into account, helping to ensure that a consistent, unified message is presented across a range of potential methodologies to suit a range of individual learners.
- In addition through combining informal and formal, and mandatory and optional training elements, salespeople who are more interested or proactive can enhance and build upon their knowledge, whilst the whole sales force receives a broad understanding of sustainability at a company level and a more detailed understanding at a product level.

6. Conclusions, Recommendations and Future Work

6.1 Introduction

The aim of the following section is to consider the implications of the overall research findings for Interface. How the findings may be used to inform and develop improved marketing and communication strategies for Pathways and other PLA based products. Within which consideration will be given to how the findings may be used as a basis for questioning and challenging current marketing methodologies, company language and communication. The discussions and conclusions regarding the content and delivery of sustainability training, as previously discussed in Chapter 5, will be discussed further within the context of how improvements in this area impact upon sustainability communication strategies.

Finally recommendations for future work will be made on the basis of areas of research identified for further investigation and steps the company could take.

6.2 Conclusions and Recommendations

6.2.1 Pathways Marketing: Review

The conclusions drawn from sections 2.4.3, 2.5, 2.6 4.4.1, 4.4.2, 4.4.3 and 4.4.4 in conjunction with meetings and discussions with company representatives and the researchers own evaluation of the marketing material provided strongly indicate that the marketing approach for Pathways is misaligned with the customers level of expectation and understanding. This is demonstrated in figure 5 (page 46), in which the company and external industry perceptions regarding the issues, drivers and benefits of PLA (section 2.4.3) have been correlated with the perceptions gathered from architects, designers and salespeople, revealing a 'gap' between perceived issues and actual perceptions.

These findings indicate that significant changes to how the current marketing approach for Pathways is formulated and delivered are required in order to

meet the customer expectation and ensure that the product concept and surrounding issues are understood and valued by the customer.

In terms of formulating appropriate content at a suitable level, as discussed in section 5.1 and illustrated in figure 11 (page 65), the marketing team need to listen to the stakeholders, through capturing the 'customer voice' and gaining feedback from salespeople 'in the field'.

As this project has demonstrated customer feedback is extremely valuable in determining how effectively product information is being delivered both through literature and by salespeople. From an internal perspective, the salespeople can provide useful evaluation of how effective the tools, education and training they receive are in assisting them to deliver the sustainability message.

This recommendation follows the aim set out as part of the social sustainability agenda. The "People P" of sustainability (Social Sustainability), involves a commitment to improving relationships between Interface and their stakeholders. Aiming *"to improve quality of life for all our stakeholders: employees (associates), customers, suppliers, local and global communities, shareholders"*, *"Core to this challenge is the development of suitable tools for capturing those interesting dialogues that will result in the changes that people want to see"* (Interface Sustainability (d), 2003)

To ensure that the product concept and surrounding issues are understood and valued by the customer, the marketing information needs to provide a clearer indication of the benefits of specifying Pathways.

As reported in section 4.5.3, architects and designers are aware of potential environmental, social and economic benefits. However, the product information does not capitalise on these selling points by making reference to the environmental and economic factors associated with oil based polymers, i.e. the impacts of oil based polymers on the environment or the future implications of

using oil within plastics production (i.e. depletion of reserves, possible shortages).

Section 2.3 clearly outlines how the drive towards increasing the use of renewable resources fits into the Interface vision for sustainability, however, the reasoning behind this strategy, and information as to why renewable resources are environmentally beneficial is not included within the marketing material. In terms of the marketing approach the information provided gives little or no indication of the benefits of using PLA.

A clear finding is that in order for architects and designers to be able to 'sell' PLA on to their clients they need to have supporting information showing the benefits of specifying this product.

In terms of economic benefits, as highlighted in section 4.5.3 reduction in landfill, which for the client means a reduction in landfill tax, is an incentive. Interface can assist companies to achieve a considerable reduction in the amount of carpet going to landfill and this incentive needs to be emphasised within individual product information.

Initial observations by the researcher (See Appendix D.iii), allied with the perceptions of sales people, confirmed by comparison with the perceptions gained from the interviews with architects and designers (See sections 4.4.1, 4.4.2 and 4.4.3) revealed a lack of developmental thought in the lifecycle story of Pathways and a sense of indecision within the marketing approach, leading to a lack of understanding within sales people and architects and designers. Specific areas of the lifecycle thinking appeared to be unresolved particularly the 'end of life' and biodegradability (see discussion in sections 2.4.3 and 4.4.2).

Through further discussions with Nigel Stansfield and Andy Wales, regarding the research findings, a key outcome was the decision by Interface to concentrate the promotional emphasis on the renewable resource benefits, and

play down the biodegradability aspect. This decision was reached due, in part, to the currently unresolved questions highlighted in section 2.4.3 concerning the lack of a supporting infrastructure and lack of cohesive 'story' and consideration of processes involved in the 'end of life' stage.

In terms of clarity, depth and validity of information, the evidence presented in sections 4.3.7 and 4.4.4 suggests that the level and detail of comparative information required by architects and designers regarding environmental performance exceeds the current level of information provided by manufacturers generally and Interface (within Pathways). The information requested appeared to be focused within two distinct areas;

1. Comparative data relating to the environmental performance (see section 4.3.7, 4.3.4 and 4.4.4), materials content (see section 4.4.2) and performance against traditional factors (such as aesthetic, durability, wear etc) (see section 4.4.4)
2. Narrative style information relating to the environmental 'story' of using corn to manufacture carpet tiles.

Trust for manufacturers in terms of their products environmental claims was strongly linked to clarity and transparency in environmental information. Trust was also linked to a sense of familiarity in terms of being able to trust and predict a products performance (as demonstrated in appendices Fi and Fii). In addition, a sense of cohesion in the manufacturers approach to their company practices and product development was cited as an indication of trust for a manufacturer;

“generally in architecture and design at the moment I think that there are so many other pressures to bear like scarcity of work, budget issues, timeframes, people tend to use what they know and trust” (Architect 01, 2003)

“a lot of product manufacturers are saying ‘I’ve created a sustainable product’ but if you look a bit further than just that initial statement, it’s whether the processes are really sustainable” (Architect 03, 2003)

As reported in section 4.4.3 the implications of these findings for marketers are that there is a heightened need for not only effective and informative communication of relevant product information, but also a sense of clarity and integrity in the message.

6.2.2 Pathways Marketing: Recommendations

Based on the research findings gained through the background research and the action research, the following recommendations have been formulated to assist in shaping the marketing approach for the Pathways launch. The elements of the marketing approach are represented in figure 13 below.

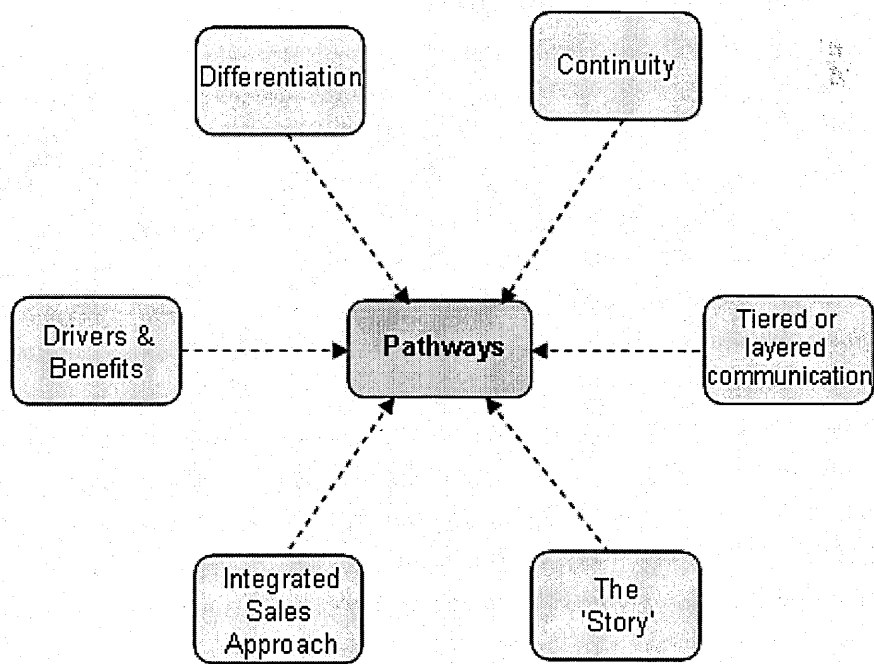


Figure 13: Pathways Communication Approach

1. Differentiation

Pathways is a completely new approach to manufacturing carpet, therefore the marketing approach should seek to differentiate it not only from competitors products but also other Interface products. To this end careful consideration should be given to the packaging, literature and product launch to ensure that the 'uniqueness' of the material is highlighted. Revisions to the current packaging presentation should be considered if possible to emphasise the benefits and production story associated with the material and the strong message of sustainability integrated within the product concept. (See points two and five below).

2. Continuity

The concept and the values embodied within the product need to be carried through the entire marketing provision. Therefore, consideration should be given to revising the packaging. The current packaging has been manufactured using Polypropylene, where there may have been an opportunity to create a holistic product concept by using PLA within the packaging as well as the product.

3. Tiered or Layered Information

Consider taking a 'layered' approach to information provision. Use leaflets and sample packs to satisfy the customer's initial standard considerations (i.e cost, performance, aesthetic etc) then use an additional media, such as an interactive presentation on a CD-Rom to give more detailed technical information.

As discussed in points 2a and 2b within figure 12, section 5.3, it would be advantageous to integrate the 'rating' system developed for salespeople into marketing publications in the form of a table/matrix for easy comparison between materials. In addition the database described could be made available as an interactive feature available on Interface website for Architects and Designers to use when selecting products and presenting materials options to their clients.

4. The 'Story'

The story or journey involved in creating carpet from corn is an interesting selling point, and from a creative perspective a concept which captures the imagination of designers and architects. The marketing literature should tell the story/concept through a simple lifecycle diagram, taking the Cargill Dow production cycle (Appendix B) onward. Showing a kernel of corn, how it is turned into carpet and then how it is disposed of. Involving the varied stakeholders in the journey by showing where they can have a positive impact. (see section 4.5.1)

5. Drivers and Benefits

The findings from this study have provided key information regarding the expectations and level of understanding of architects and designers. Interface should take on board the conclusions generated to inform the marketing content; focusing on providing a clear indication of the drivers and benefits for both architects and designers and their end clients in specifying Pathways.

Interface have the opportunity to utilise communication techniques already practiced in other areas of the business in communicating PLA. For example, by adopting the approach taken with the Terratext series, in which the customer is taken on a 'journey' which charts the progression from oil based polymers, explaining the environmental impacts, towards the development of bio-based polymers in clear and straightforward language. (See Appendix D: Terratex Case Study).

6. An Integrated Sales Approach

As discussed in Chapter 5 the importance of training the sales force and obtaining their support is vital to the successful marketing of a new product. Section 5.2, discusses the benefits of holding internal events to include and involve the sales force in a new product launch, to assist in building a sense of inclusion. In addition, integrating the sales force opinions into the marketing approach, through informal and formal discussions, would enable marketers to

benefit from their opinions about the effectiveness of the current marketing material.

As emphasised within sections 4.4.3, 5.1, 5.2 the need to educate the sales force about the features or benefits of PLA to enable them to talk to their customers and answer potential questions is clear. CPD events are perceived by architects and designers to be a useful source of information and as demonstrated in section 4.3.4 the retention of information is high. However, in Interface's case the content of the CPD presentations (Interface (b), 2003) may need to be revised to focus on product level initiatives in line with customer expectations. In addition, consideration should be given to the selection of candidates for delivering CPD presentations to customers as clearly the expectation for all salespeople to deliver CPD may not be aligned with the sales team's perceptions of their own knowledge and abilities (See section 2.5).

A recommendation would be to select candidates to deliver CPD on the basis of their pro-activeness and progressiveness in terms of the sustainability training modules described in section 5.3. In addition CPD representatives may also be appointed 'environmental champions/mentors' (see sections 5.3 and 5.4.3) who's interest and commitment could be an additional responsibility for which they are rewarded.

In a general sense, a recommendation would be to create a tool that salespeople can use to sell Pathways to their customers and leave with the customer to assist them in selling Pathways to their end clients (this may be the CD-Rom presentation). The database described in points 2a and 2b in figure 12 may be a significant part of this tool.

6.2.3. Future Work

In terms of future work, the research has identified a number of issues which could be investigated further, within either an academic or industrial context.

The following areas are recommended;

- Analysis of the lifecycle environmental and social implications of the current transportation involved in the production of Pathways. In section 4.4.1, the production system of PLA was questioned in terms of the environmental impact associated with the transportation; raising the question of whether the energy and fossil fuel involved in transportation contributed to a greater environmental impact than a standard product e.g. Nylon.
- Further investigation, research and testing to establish whether Pathways can achieve 'closed loop' in terms of materials. Linked to this would be a requirement for further investigation of the viability of the biodegradability aspect of the material within a carpet application.
- Further investigation is also required into developing alternative backing materials for Pathways, as if it is to achieve 'closed loop' the backing will need to be revised.

References

- Anderson. Ray, (1998) *'Mid-Course Correction, Toward a Sustainable Enterprise: The Interface Model'*, Chelsea Green Publishing White River Junction, VT
- Anderson. R, (2000), 'Climbing Mount Sustainability', *Reflections: The Society for Organizational Learning Journal*, June 2000, Vol. 1, Issue 4
- Birchfield. D, (2002), 'Totally floored: The CEO who plans to change the world', *New Zealand Management*, August 2002, Vol. 49, Issue 7
- Building Design, (2003), 'Lessons in Sustainable Timber', *Building Design*, Vol. 1578.
- Buzan. Tony, (1993), *'The Mind Map Book'*, BBC Books, London
- Cargill Dow website (a), *'Life Cycle of PLA NatureWorks'*, (accessed June 2003) http://www.cargilldow.com/corporate/life_cycle/index.asp
- Cargill Dow website (b), *'NatureWorks PLA how it's made'* (accessed June 2003) <http://www.cargilldow.com/corporate/natureworks.asp>
- Charter. Martin, Peattie. Ken, Ottoman. Jacqueline, Polonsky. Micheal. J, (2002) *'Marketing and Sustainability booklet'*, BRASS, Cfsd, J. Ottoman Consultancy, Victoria University, Smart: Know-Net
- Chick. Anne and Micklethwaite. Paul, (2002) *'Recycling by Design'*, Kingston University, Kingston
- Cloverbrook website, *'Technical Product Innovations'*, (accessed June 2003) <http://www.cloverbrook.com/ingeo.htm>
- Craig. Malcolm, (2000), *'Thinking Visually Business Applications of 14 core Diagrams'*, Continuum, London
- Ends (2001), 'Easy claims, difficult choices on biodegradable polymers', *Ends Report*, 315
- Ends, (2000), 'Cargill Dow Polymers: Turning plastics from plants into a sustainable business', *Ends Report*, 300
- Ends, (2003), 'Cargill Dow offers 'Non GM' maize for biopolymer feedstock', *Ends Report*, 338
- Ginsberg. J, (2001), 'Plastics as high as an elephants eye', *Business Week*, Issue 3740

Gronhaug. K, Olson. O, (1999), 'Action research and knowledge creation; merits and challenges', *Qualitative Market Research: An International Journal*, Vol. 2, No. 1

Guzman. D, (2003) 'Bio-based industry introduces new products', *Chemical Market Reporter*, April, Vol. 263, Issue 16, New York

HOK, 'Guide to building your sustainable building library – What makes a product green?', (accessed July 2003)

<http://www.hoksustainabledesign.com/doc/productlibrary1.doc>

Interface Fabrics Group Terratex website (a), (accessed June 2003),

<http://www.terratex.com/launch.html>

Interface Fabrics Group Terratex (b), 'Terratext 1', (accessed June 2003), www.terratex.com/pdf/terratext1.pdf

Interface Flooring Website (a), 'End Use Segment: Corporate', (accessed June 2003), <http://www.interfaceflooring.com/enduse/corporate.html>

Interface Flooring website (b), 'Seven Fronts for Sustainability', (accessed June 2003) <http://www.interfaceflooring.com/sustain/>

Interface Sustainability website (a), 'Bio-based Products – Impacts', (accessed June 2003), <http://www.interfacesustainability.com/biobased.html>

Interface Sustainability website (b), 'Interface Model', (accessed June 2003) <http://www.interfacesustainability.com/model.html>

Interface Sustainability website (c), 'Interface's Commitments', (accessed June 2003), <http://www.interfacesustainability.com/commit.html>

Interface Sustainability website (d), 'What is Sustainability?' (accessed June 2003) <http://www.interfacesustainability.com/whatis.html>

Interface Sustainability website (d), 'Position Statement on the Development and Use of Bio-based Products', (accessed June 2003), <http://www.interfacesustainability.com/biobased.html>

Interface (a), (2001), 'Sustainability Information: Product News', Interface Inc

Interface (b), (2003), 'Sustainability CPD Presentation: Doing well by doing good', Interface Inc

Interface (c), (2003), 'Sustainability Training Presentation for Sales: Doing well by doing good', Interface Inc

Interface (d), (2003), 'Pathways product brochure', Interface Inc

Interfaceflor website (a), '*About Interface Inc*', (accessed June 2003),
http://www.interfaceflor.com/cgi-bin/flor/about_ifaceinc.html

Interfaceflor website (b), '*Eco-Flor*', (accessed June 2003),
<http://www.interfaceflor.com/cgi-bin/flor/ecoflor.html>

Interfaceflor website (c), '*Spring Planting*', (accessed June 2003),
http://www.interfaceflor.com/cgi-bin/flor/spring_planting.html

Malin. N, (1999) 'What it means to be green', *Architectural Record*, Vol. 187, Issue 8

Malin. N, (2003), 'There are numerous ways to determine just how sustainable so-called green products are today', *Architectural Record*, Vol. 191, Issue 2

Micheal. K, Rochford. L, Wotruba. T. R, (2003), 'How new product innovations affect sales management strategy: The impact of type of 'newness' of the product', *Journal of Product Innovation Management*, Vol. 20.

People and Planet website, '*Green Industry: Glossary*', (accessed 2003)
<http://www.peopleandplanet.net/section.php?section=9&topic=8>

RIBA, (2003), '*Sustainable Futures Action Plan*', RIBA, London

Robson. Colin, (2002), '*Real World Research*', 2nd Edition, Blackwell Publishing

Scott. A, (2000), 'Biopolymers move into the mainstream', *Chemical Week*, Vol. 162, Issue 34

Scott. G, (2000), 'Green Polymers', *Polymer Degradation and Stability*, Vol. 68, issue no 1, pp 1-7

Seelig. F, (2000), 'Environmental sustainability is business' responsibility', *Grand Rapids Business Journal*, March issue, Vol. 18, issue 12

Snoonian. D, Gould. K.L, (2001), 'Architecture rediscovers being green', *Architectural Record*, Vol. 189, Issue 6

Stevens. E.S, (2003) '*Environmentally degradable plastics*', Binghamton University, Binghamton, New York

Stungo. N, (2003) 'Dare to be different', *RIBA Journal*, Vol. 110, No. 7

Vink E.T.H., Rabago. K.R, Glassner. D.A, Gruber. P.R, (2003), 'Applications of life cycle assessment to NatureWorks polylactide (PLA) production', *Polymer Degradation and Stability*, Vol 80, pp 403 – 419

Wagner, Dr. S.A. (1998) *'Strategies for Environmental Communication'*
University of Leicester, Leicester

World Commission on Environment and Development [WCED], (1987), *'Our common future'* (a.k.a. *'The Brundtland report'*), Oxford University Press, 1987)

Young. E, (2002) 'The new wave', *RIBA Journal*, Vol. 109, No. 7

Appendices

A: Project Briefs

- i. Company Project Brief
- ii. Revised Project Brief

B: PLA Production Process: NatureWorks PLA - How it's Made

C: Interview Guides

- i: Interface Salespeople
- ii: Architects and Designers

D: Case Studies of FLOR, Terratex and Pathways

E: Sample Transcription

F: Criterion for Materials Selection

- i. Perceptions of Performance Issues
- ii. Perceptions of Cost Issues

G: Further perceptions of Pathways

- i. Specification of Pathways (Cost, aesthetic and performance)

Appendix A: Project Briefs

i. Company Project Brief

The three ideas all involve research in our marketplace:

Project 1

Interface is about to launch the first of our biopolymer based products into our marketplace (Pathways, a carpet tile with a yarn derived from corn). How can we get architects and designers interested/excited in the sustainability message that this product embodies? Should we be developing a different mindset in our customers that would help them understand the journey we are on towards sustainable plastics? What do they think of 'plastics' and sustainability?

Project 2

Interface is introducing our second wave of new random design floors to the marketplace, that we feel should assist customers in getting a longer life out of their floor covering - being able to rotate/replace tiles without there being an obvious design inconsistency or wear problem. But how useful is this concept for our customers? Are they interested in having a floor covering that has an improved performance over 7+years or do they expect, even want it to wear out? Are they realistically prepared to change/replace tiles periodically? Will the random designs really offer increased resource productivity in our marketplace and if so how can we best share the concept with customers?

Project 3

The Interface Evergreen leasing model has struggled for a number of reasons, one of which is the fact that some purchasers are not interested in leasing only a carpet. What are the opportunities for Interface being involved in a leased commercial interior - not just carpet but other products as well? How would such an interior work? What positive environmental impact would it bring? How would it be maintained? How would it be offered to a customer? Which other interior product companies should we partner with?

Appendix A: Project Briefs

ii. Revised Project Brief

Bio Plastics Perceptions Project Brief

This project is a collaboration between Interface Europe and Cranfield University. The project will be conducted by Debra Lilley, an MRes Manufacturing: Sustainability and Design student, who will be supervised by Dr. Emma Dewberry. Interface will be represented by Andy Wales, Director of Sustainability and Nigel Stansfield, Product Migration Director.

Project Aims

1. To investigate, and gain an insight for Interface, as to architects and designer's perceptions/understanding of the biopolymer vs. fossil fuel debate
2. To gain a broad understanding of how the use of renewable materials factor in or affect their decision making or purchasing behaviour and specifically how these perceptions may be used by Interface to market and communicate 'Pathways' and other PLA based products.

The project will be broken down into the following phases, each of which has associated tasks, methodologies and deliverables.

Phase 1: Context – Background Research

Phase 2: Exploring the perceptions and understanding of architects and designers of renewable resources.

Phase 3: Synthesis of research, conclusions and recommendations

Phase 1: Context Background Research

This stage will involve initial primary and secondary research, aiming to explore the development of renewable materials and how the drive towards renewable materials has been addressed internally within Interface and externally within the wider industry and society.

Primary and secondary research will be conducted to investigate how the issues of renewable materials, biopolymers, PLA and the reduction of fossil fuels are

communicated and reported upon within the design community. Using trade journals, and approaching relevant professional bodies both more mainstream (i.e. CSD, RIBA) and specifically those geared towards addressing sustainability. At this stage Interface hosted, or wider marketplace events or lectures for architects and designers could be attended by the researcher, as an opportunity to discuss the issues on an informal basis.

A brief 'case study' of Entropy will be conducted to gain an understanding of how architects and designers have engaged in the associated issues embodied in the design of this product. Within the study a comparison will be made between Entropy and Pathways, to evaluate whether the appearance of a product embodying a very visual reference to sustainability is perceived differently or is more acceptable to customers.

This will form the literature review section of the thesis.

Phase 2: Exploring the perceptions of Architects and Designers

The aim of this stage is to focus on investigating the perceptions and understanding of architects and designers of renewable resources, centring on biopolymers though not exclusively PLA. The research process will aim to identify and understand the decision making process associated with the selection of renewable materials, the drivers for architects and designers to consider biopolymers and the perceived incentives/benefits they feel this material offers to their end clients.

The data collection process will be predominately face-to-face interviews with a selection of architects and designers to generate discussion based on a pre-prepared agenda of topics/issues. Telephone interviews will be used where a face-to-face meeting is not possible. A template will be designed to capture responses and the interviews may be recorded using audio equipment. The companies or individuals, selected by Interface, will be predominately London based; however, a selection of companies in Paris will also be included in the study.

Within the primary research the following questions will be investigated:

- How do architects and designers see PLA fitting into the textile market?
- What is their perception of the appropriate use of PLA within an interior space?
- What do architects and designers perceive as the potential advantages and possible negative perceptions of biopolymers? Can common perceptions be identified through assessing the breadth of information?
- Which environmental factors associated with the lifecycle of PLA are they most interested in or concerned about? (i.e. end of life – composting) and why?
- How do they feel their reservations about the product could best be addressed?
- What questions do they think their clients will raise? How can Interface assist them in addressing these issues?

Within each target company, it will be necessary to gain an overview of the decision making process, i.e. the chain of decision making involved in the purchasing decision.

- Who makes the final decision? Therefore, who needs the information? And at what level should the information be pitched?
- What kind of information or tools do architects and designers need to aid their client's decision making process? How can Interface provide that information? Through service based provision (i.e. presentations by sales) or literature packs, demonstrative software illustrating benefits and issues?

At this stage interviews with Interface salespeople, selected by Interface, will be conducted to gain their perceptions on:

- The effectiveness of the information, education and tools provided to enable them to discuss sustainability issues in a general sense
- How they feel they could approach introducing biopolymer/PLA as a product and renewable materials as an issue.

Phase 3: Synthesis of research, conclusions and recommendations

The primary outcome of this phase will be the analysis and documentation of the insights gained in phases 1 and 2 into architects and designers current level of awareness, understanding of and support for biopolymers and renewable materials, and the information they need to educate and secure 'buy-in' from their end customers.

Conclusions will be drawn from the research which will be used to generate recommendations to assist Interface in developing a marketing strategy to communicate the issues surrounding Pathways as a product and concept, in an appropriate and effective way to architects and designers.

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Appendix B: PLA Production Process

NatureWorks PLA How it's Made.

PLA Production Process

Introduction

The diagram below, taken from the Cargill Dow, NatureWorks PLA website (Cargill Dow (b), 2003) provides further clarification of the production processes involved in producing Nature Works PLA.



NatureWorks PLA - How it's Made
(Cargill Dow (b), 2003)

Appendix C: Interview Guides

i. Interface Salespeople

Interview Guide Interface Salespeople

Issue 1: Sustainability Training

Andy mentioned that there is a sustainability training program for salespeople

- What are your experiences of sustainability training?
- How has the training you have received impacted on/improved your ability to communicate with your clients?

(It would be useful if you could bring any documentation you may have received)

Issue 2: How does sustainability fit into the sales process

- How is sustainability currently communicated to customers?
- How effective do you feel the information, education and tools (i.e. marketing literature etc) provided by Interface are in helping you to discuss sustainability?

Issue 3: Biopolymers and PLA

- How do you see PLA fitting into the textile market?
- How do you think Interface should market PLA to the marketplace?
- How do you feel you could approach introducing biopolymer/PLA as a product and renewable materials to customers?
- What do you perceive as the potential advantages and possible negative perceptions of biopolymers?
- What questions do you think your clients would raise about PLA?

Appendix C: Interview Guides

ii. Architects and Designers

Interview Guide Architects and Designers

Environmental Impact of Carpet Tiles

What do you consider to be the main environmental impacts associated with carpet tiles?

What do you perceive to be the environmental implications of using fossil fuels to manufacture carpet tiles?

Design Decision Making – Selection of Materials

What is your criterion for materials selection? What factors are involved?
Prompt: is cost an issue? or performance?

What do you understand by the term 'lifecycle' in relation to materials?
Which elements of the lifecycle of a product do you consider when you specify?

Who makes the final decision about materials specification?

Biopolymers

What is your understanding of bio-polymers?

Definition given if no response: A bio-based polymer is a polymer made from an annually renewable natural resource such as corn, starch or maize

What differences do you perceive between traditional oil based polymers and bio-based polymers?

What do you perceive as the potential advantages? Or disadvantages of using bio-based polymers?

PLA

Are you aware of a bio based polymer called PLA or Polylactide?

Definition given if no response

Pathway – Introduce Pathway Marketing Material

Which environmental factors associated with PLA are you most interested in? (*i.e. end of life – composting*) and why?

Would you have any concerns about specifying this product?

What questions do you think your clients would raise about PLA?

Appendix D: Case Studies

- i. FLOR**
- ii. Terratex**
- iii. Pathways**

Case Studies: FLOR, Terratex and Pathways

Introduction

As described in section 2.6 within the main text of the thesis, case studies of three products incorporating PLA (FLOR, Terratex and Pathways) were undertaken in order to gain an understanding of the marketing, branding and communication approaches used to explain PLA to consumers. These case studies are shown in full below.

i. FLOR

FLOR is a modular flooring system designed for the domestic market, which is purchased on-line and shipped directly to the customer for home delivery. FLOR is predominately marketed on its service, convenience, and versatility, however, the range does incorporate sustainability through the use of recycled materials.

The language and terminology used to describe the environmental aspects of the products is fairly simplistic, referring to FLOR as *“eco-friendly and recyclable”* (Interfaceflor (b), 2003). The importance of establishing *“consistency between different types of messages sent out”* (Wagner. S. A, 1998, p16) and ensuring that all communication is *“appropriate, consistent and co-ordinated”* is considered essential to ensuring a good level of consumers understanding. Within FLOR communications there appears to be no common language established *“call it alternative flooring or green flooring or whatever you like”* (Interfaceflor (b), 2003)

Within the FLOR range, Interface have introduced PLA fibres in ‘Spring Planting’, which is described as having the feel of *“a cross between sisal and wool”* (Interfaceflor (c), 2003) and whose *“face fibers are made from renewable resources and are recyclable”* (Interfaceflor (c), 2003). The product specification gives little information about the origin of the face fibers, however, in the ECO-FLOR section reference is made to a design which is *“actually made from corn”*

(Interfaceflor (b), 2003) No specific mention of the biodegradable aspect of the material is made, though the customer is encouraged to return the product at the end of its life, through local recycling collection facilities, for recycling or reconditioning for reuse *“to avoid landfilling”* (Interfaceflor (b), 2003)

An interesting connection is made between the values embodied in the products and the customers own sense of values, in a section entitled ‘Well-Bred Strong Family Values’, a shared sense of integrity is implied *“FLOR may be a new idea, but it has....integrity standing behind it. And so will you”* (Interfaceflor (a), 2003)

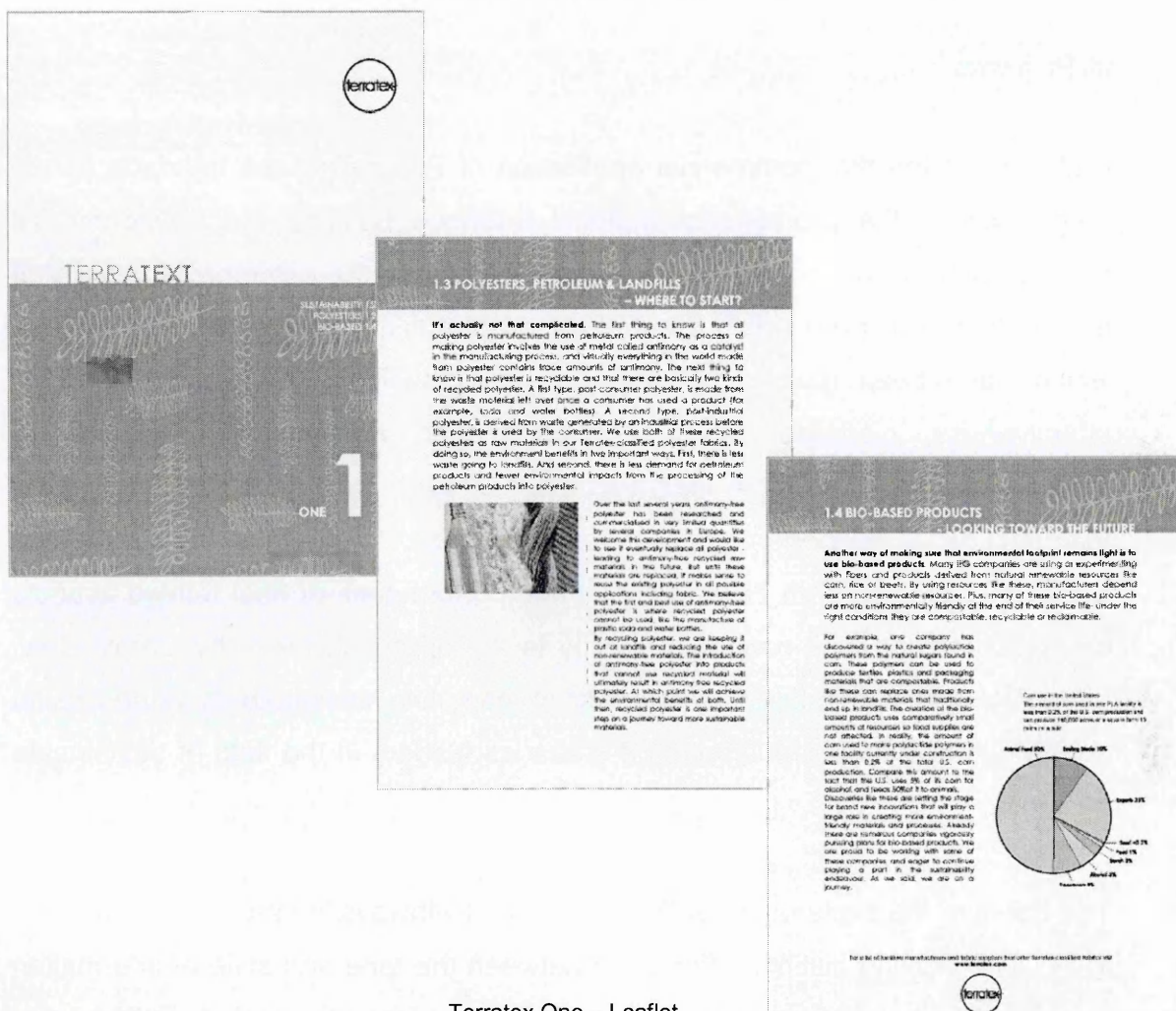
The simplified approach employed within the FLOR literature to explain the concept of PLA gives the consumer a basic understanding of the key benefits i.e. reduced use of landfill, recycling opportunities, and the renewable nature of the material, but it does not address the wider issues associated with the use of biopolymers. This may be a conscious decision on the part of the marketers, based on a perception that the general public have a lesser understanding of environmental issues.

ii. Terratex – Interface Fabrics Group

Terratex, who also incorporate PLA based biopolyester in some of their products, have taken a ‘tiered or layered’ approach to communication and marketing. This strategy varies *“the complexity of an environmental message according to the information needs of the customer”* (Wagner. Dr. S.A, 1998, p5) through establishing different layers of the message and cross referencing the layers, presenting customers with a base level of information and making additional information available to enable them to explore further.

The second level for Terratex, following initial leaflets, brochures and webpages, is a series of educational booklets. ‘Terratext 1’ describes the concept of sustainability, and then charts the progression from oil based polymers,

explaining the environmental impacts, towards the development of biobased polyesters. Representing the story of PLA development as a journey.



The benefits of bio-based products, which are defined as “*fibers and products derived from natural renewable resources like corn, rice or beets*” (Interface Fabrics Group (b), 2003, p3) include a reduced dependance on non-renewable resources and the ability to compost, recycle or reclaim at the end of the products life thereby reducing the dependance on landfills for disposal.

Interestingly, the most pressing issue that Interface Fabrics appear keen to address is the PLA production vs. food production debate stating *“the creation of bio-based polymers uses comparatively small amounts of resources so food supplies are not affected”* (Interface Fabrics Group (b), 2003, p3)

iii. Pathways

Pathways is the first commercial application of PLA within the Interface carpet range. Within the promotional material Interface balance the environmental benefits with the more traditional attributes to ensure the commercial viability of the product, whilst remaining true to their own sense of values. The key themes which have been given emphasis can be identified as; performance, cost effectiveness, biodegradability, recyclability and aesthetics. In relation to performance Interface state that *“Pathways, though constructed from a natural material, gives the performance of many synthetics”* (Interface (d), 2003) The decision to present both environmental and performance or cost related aspects as equally importance contrasts directly to the approach taken by Cargill Dow. The pro-active stance taken by Interface in marketing ‘sustainability values’ could be attributed to their reputation and status as leaders in the field of sustainable business.

The detail of the explanation of PLA within the Pathways literature in comparison to FLOR revealing distinct differences between the tone and style of information presented to a commercial audience versus the domestic market. Pathways is described as *“a carpet made from a natural plastic made from corn”* whose *“face fibre is constructed from a new bio polymer called PLA (poly lactic acid)”* (Interface (d), 2003) whereas in FLOR the reference made to PLA is restricted to the ‘corn’ base of the material.

Initial observations by the researcher, allied with the perceptions of sales people, revealed a lack of developmental thought in the lifecycle story of Pathways, a sense of indecision within the marketing approach, leading to a lack of

understanding within sales people. Specific areas of the lifecycle thinking appeared to be unresolved particularly the 'end of life' and biodegradability.

In addition, continuity between the environmental message of the product itself had not been carried through to the packaging which has been manufactured using Polypropylene, where there may have been an opportunity to create a holistic product concept by using PLA.

The provision of information within the marketing literature gives little or no indication of the benefits of using PLA. In addition no reference to the environmental and economic factors associated with oil based polymers, i.e. the impacts of oil based polymers on the environment or the future implications of using oil within plastics production (i.e. depletion of reserves, possible shortages) has been made.

Appendix E: Sample Transcription

Phase 2 Interview Architect 03, Architect 04

This document forms a record of the issues discussed with Architects, 03, and 04 and the researcher Debra Lilley. The interview took place on Thursday 17th July at 3:30pm.

Introduction

Architect 03: "One of my main roles, as Design Director, involves taking on board difficult design aspects of projects as they come to certain stages and we have regular workshops where teams bring in their projects and we try to help them with the design direction. Also as a partner, I'm trying to procure work for the practice, and to guide some of the projects we have already got. At the moment the projects are mainly commercial projects, but I'm also going to be working on some education projects as well.

Architect 04: "I head up the sustainability group within the practice and manage that. We've been going about 2 and a half years, and have 10 members. We meet regularly to develop and discuss relevant issues within the industry. Also as a Design Director my role is to ensure that sustainability is integrated into the projects we do now, right from the outset.

Discussion Topic: Environmental Impact of Carpet Tiles

Q: What do you consider to be the main environmental impacts associated with carpet tiles?

Architect 03: "We discussed sustainability within carpets yesterday, because the Interiors Department are looking at refitting a huge building in the city and we've asked the question 'what is happening to all the acres of carpet?' and answer is its going to go in the skip" "its could be that the old furniture and lighting could be re-used, someone mentioned that the backing from carpet can be re-used, but this department, the bankers and traders, had so abused the carpet that I can't imagine that they could do much with it, so it probably will be thrown away" "but it was something that was discussed, so actually being able to provide something in the future which had recycling properties would be useful"

Q: Was that discussion from an in-house perspective i.e. was it something you saw as important?

Architect 03: "yes. I mean, no doubt the client couldn't care less" [Q: Do you think that that is a typical client response?]

Architect 04: "very typical. We deal with a lot of commercial clients, within London, although probably some of the clients in London are more aware"

Architect 03: "I think sustainability with regards to interiors has an even lower importance in everyday dealings than in architecture, in architecture at least people are aware" "in interiors it isn't even on the agenda at all" "Architect 04 tries to bring those issues to the fore each time we look at a product. Had he not mentioned it...it wouldn't have been a factor"

Q: Have you heard of any schemes by carpet manufacturers about re-use or recycling?

Architect 04: "I'm aware that Interface deals with some of these issues, increasing recycled content of their carpets for instance and offering 'buy-back'. I'm also aware of other manufacturers who have introduced 'buy-back' schemes"

Q: Is that service something that you would approach a client with as a selling proposition?

Architect 04: "very much so. We are looking at revising or writing guidance notes with our specifications, looking particularly at 'green' specifications for materials. Issues such as recycled content, whether it is recyclable, all those types of issues we are trying to integrate into our specification and what we are choosing to specify"

Q: Do you think architects have an understanding of the 'lifecycle' in relation to materials?

Architect 04: "we are quite a big practice, we have 150 here [London] and 40 in Manchester, so there's an extreme difference between the understanding and awareness of these issues, between people in the sustainability group and some people within the main practice" "a varied reaction and range, a real mixture of understanding"

Q: What kinds of mechanisms are you putting in place to increase the level of understanding?

Architect 04: "We're writing some guidance notes for the practice, we're setting environmental management systems in place so that projects are forced to go through a process where they have to stop and think about these issues" "through design reviews and technical reviews, where they will be questioned on these issues" "we also participate in CPD events in house to create a greater level of understanding"

Q: How do architects gain information about new materials?

Architect 04: "through websites, conferences – we keep in touch with organisers to decide which conferences are relevant to us, industry specific sustainability magazines and journals, such as Sustain and Forum for the future: Green Futures"

Architect 04: "we don't have the time and the resources to go into too much depth"

Awareness of architects and designers about environmental issues Q: Would you say it is an unusual step you have taken as a practice to consider sustainability?

Architect 04: "I wouldn't say unusual. I think that there is a very fast growing awareness of these issues. I'd say, amongst general commercial practices, we're probably towards the top end of practices in terms of what we have actually managed to achieve so far" "although it's not necessarily known, outside of the practice, how much we have done" "but now the RIBA are insisting that sustainability become part of the education process for architects" "so I think it is a fast growing area"

Q: Are clients currently aware of or interested in environmental issues?

Architect 03: "It depends on which clients. Commercial or 'city' clients aren't really interested, they become interested when it becomes a legal requirement, or if there is some obvious commercial advantage, but otherwise they will wait until it is absolutely necessary to make any changes" "but that's only less than half the work we do" "other clients, particularly in education, will have a different sort of agenda and brief, they may have some 'green' credentials they aspire to, and so there is more opportunity there" [Q: Do you think that comes more from the level of transparency required, as a public organisation, as opposed to a private one?] Architect 03: "the commercial sector, in speculative offices,...will be building an office to sell it, so they will build something that they think someone will want to buy or rent. If they perceive that the end users are interested in green issues or are insisting upon them and when it comes to negotiating the price, that they are willing to pay more... then the developer will be interested. But that is pretty rare, it has to be said"

Architect 03: "if a government agency is the end user, they probably would pay for green recruitments, in which case the developer would take a greater interest"

Architect 04: "the bottom line sadly is often profit and even those city clients who are interested [in environmental issues] are generally interested because it affects their share price or their standing within the Dow Jones Sustainability Index, or FTSE 4 good" "You have the government clients who have to meet certain targets, BRE ratings etc, in the buildings that they lease or own, it's very different in different sectors"

Architect 03: "We try to talk to clients about thinking longer term, thinking about what intents they will have in several years time, but the attitude tends to be 'I know that if I build this now I can let it in a years time, and if I can make it cheaper then people will let my building rather than someone else's'" "so until they hear of someone who hasn't been able to let their building...because it is isn't 'green' enough, they won't really be interested" "and that will happen in the next few years" [Q: so is it about the negative aspects rather than positive incentives?] "if it helps them make more money if they do consider it [sustainability] then they will do it"

Architect 04: "one of the developers who are actually doing that is [company]. What we need is a change in the market. They should insist that developers only use buildings for long periods of time. [company name] have actually

taken sustainability and that's how they make profit, is by addressing sustainability, because they are interested in lifecycle costs because they run the buildings" "but that's only because they have a long term ownership rather than selling it on day one"

Design Decision Making – Selection of Materials, Q: is there a difference between considering 'green' materials as opposed to mainstream materials?

Architect 04: "the bottom line for us is the aesthetics" "we have some interesting debates about sustainability and whether that means a building should look any different or whether it would not have such a modern aesthetic" "because some of these products, particularly with carpets, in the past there has been a very limited range of types, aesthetics, colours and textures due to the recycled nature" "so that does affect the decision making" "if it was an equal footing, if you could get exactly the same finishes, but one had a higher recycled content or lower environmental impact, then we would definitely choose that one"

Architect 03: "the buildings that we work on that have carpet rather than hard flooring, tend to be offices, but it is seldom that we fit out offices we designed"

Architect 03: "I think that there is a lot of research and awareness within architecture and building design, but as to interior finishes, I think it's still largely what it looks like rather than the lifecycle implications and sustainability issues"

Architect 04: "it would be interesting to compare the educational systems, architecture versus interior design"

Architect 03: "I wouldn't be surprised if there is actually little or no sustainability input at all when it comes to interior design" Architect 04: "that it's not really on the agenda yet"

Decision Making in relation to selection of materials

Who makes the final decision about materials specification?

Architect 03: "it varies between the two [architect and client] you can seldom make a client do something he or she doesn't want to do" "there needs to be a willingness all round" "particularly if it is going to cost them more money" "it is something we can promote, but they [the clients] have to be willing" "they've got to be challenging us to go down that route"

Q: If you put two products in front of a client, one of which was environmentally superior, would you actively try to promote that? And how do you think the client would respond

Architect 04: "it depends on the client. If there wasn't the aesthetic issue then certainly, what we're hoping now is that everyone in the practice would be promoting the better environmental performance of certain materials" "and we would be specifying them"

Architect 03: "its not that we will try and sell or push one material over another, we will just explain what they are"

Q: So you would put forward some options and explain what the benefits are with each material?

Architect 04: "yes. Whether it's on cost, aesthetics or environmental performance"

Architect 04: "are you questioning whether there is a potential for a higher cost if a product has better sustainability?"

I'm questioning if that is a perception, that if a product has better environmental credential then it is perceived as having a higher cost

Architect 04: "I think that is one of the key problems within the sustainability debate, is that everyone is perceiving that 'green' costs more, if it didn't then everyone would be doing it much more"

But it does seem to be one of the issues surrounding attempts by manufacturers to introduce these sorts of issues in relation to new materials

Architect 04: "if it genuinely costs [manufacturers] more because they are developing new processes, and it that cost comes out in the product, then we will have to balance the cost the aesthetic and the performance when we make specification decisions. But if they see it as an opportunity to have a higher cost product because they can market it as a 'green product'...." [Q: Do you think that that is something that a manufacturer would do?] Architect 04: "yes. I can imagine that in the market currently that people are sustainability as a major marketing ploy, its got this hold at the moment" [Q: How much do you trust manufactures? What questions would you ask about their sustainability claims?] Architect 04: "we are actually trying to develop a questionnaire for product suppliers and manufacturers" to address "issues such as whether they are ISO 14001, or have their own environmental management systems, what their in-house operations procedures are, whether they have procedures to reduce their harm of the environment, whether they have staff health, welfare procedures in house" "then the standard considerations like toxicity, embodied energy and general environmental impact of use" "if they have a wider agenda" [Q: So you seem to be looking at not just the product, but also the processes involved] Architect 04: "I think that that really shows you whether someone has true commitment to the environment"

Architect 04: "the problem that we find is that you can go to individual manufacturers, but you cannot really compare the performance of one product against another because the performance indicators are so broad" "we rely on the 'green guide to specification', in which people have done very focused research to compare materials over a number of key issues, and therefore you can work out some sort of rating for a material" "it is such a complex issue"

Q: Would there be a benefit in introducing a common performance criteria relating to sustainability?

Architect 04: "absolutely. I'm sure that in the same way that in three years time, buildings are going to be eco labelled, an A, B, C rating according to

environmental performance, the same way as a fridge has an A, B, C rating. If you could have an industry or international performance characteristics standard for materials that would be fantastic"

Discussion Topic: Biopolymers in context of Pathway

[Pathway introduced and description given of Biopolymers]

Architect 03: "the client would probably ask, how hardwearing is it, how easy is it to clean and" Architect 04: "how much does it cost"

Architect 03: "we would obviously be interested in how well it fits in with the scheme, in terms of colour and texture, the normal issues" [Q: would the environmental aspect of the material change your decision making process? Would you ask any additional questions?]

Architect 04: "a lot of product manufacturers are saying 'I've created a sustainable product' but if you look a bit further than just that initial statement, it's whether the processes are really sustainable. I mean it's made from a natural fibre, but is that process maybe worse than other carpet manufacturing processes? You might improve performance in one sector of that product, but it doesn't necessarily mean it's a better product"

Architect 03: "wool is a natural fibre isn't it? Wool is fairly sustainable"

Q: But are there any issues with specifying wool?

Architect 03: "how easy it is to clean, how much it shows stains" "how long it will last, how much it costs, whether people get static electricity from walking across it" "there are different types of carpet that are suitable for spaces with computers" "also what fire rating it holds" "it mustn't produce noxious gas, if it burns"

Q: In terms of the information provided with the products, is it sufficient? What kind of additional information would you require?

Architect 04: [refers to 'green specification guide] "Toxicity in terms of manufacture, combustion, off-gassing when they are installed, air quality, embodied energy of the material in terms of manufacture process, its transportation: where its come from.." "there was one issue, on a particular project, where the only recycled carpet we could find came from the States, so the embodied energy was totally off balance with the sales material claims" "emissions, what resources are used within the material, recycled content, those sorts off issues"

Architect 03: "Is there a technical sheet?" "it would be nice to have some sort of comparison with another type of carpet, I suppose we could do that ourselves, but it would make it easier"

Architect 03: "we don't know whether more than 4.5 kw per metre sq. for example is a good thing...I assume that seeing that its is here it is a good thing, otherwise they would either keep quiet about it or do something about it"

Architect 03: "to have something that is considered to be the normal standard for whatever market this [Pathway] is aimed at...so it could be shown as the same as or better"

Q: Is it difficult to make comparisons between different products for the same use? Say a petroleum based nylon vs. a biopolymer. Would you have an understanding of the potential benefits or disadvantages?

Architect 03: "no, we wouldn't have a detailed understanding. The implication is that it is better than petroleum based, because petroleum based is....based on oil" "I'm sure people would understand to that extent" "how it compares with sustainability credentials to wool would be interesting" "because that seems like a natural fibre as well, which probably requires less chemical engineering to get it to the same state" "that would be an interesting comparison"

Architect 04: "I'm sure with a lot of specifiers, it [Pathway] will probably work, because they will think 'it comes from a natural product, therefore it must be better' it gets a tick, we will use it" "but I'm sure certainly some, and increasingly so, people are expected to look deeper, the reason these books [refers to guides for specification] have started coming out is that there is increased necessity to look a bit further"

Discussion Topic: A company's responsibility Q: is the manufacturer's responsibility to investigate and promote sustainability?

Architect 04: "Even if they [manufacturers] don't believe it is now I'm sure within the next few years they will be forced to do it through legislation. EU directives that are coming out within this field" [manufacturers] "will be forced to be very clear about their environmental credentials"

Q: In terms of the information provided with products, is it easy to understand?

Architect 03: "I think it's very tastefully done, but its difficult to make a comparison" "the people who are making this want to sell this to us, our clients, and in order to be convinced, it doesn't matter what it is made from...you still go through the same process; how much does it cost, what does it look like, what is maintenance like and then you have this extra dimension of sustainability" "if it's made easy for us to compare it on all of those factors then they [clients] will buy it" "but it does depend on what is important to them [the client] as to which order those factors go in" "some clients may put sustainability as a higher priority than cost, to a certain degree, they wouldn't pay twice as much but they may pay 10-20% more if they were particularly interested"

Architect 04: "it would be interesting for Interface to compare each of their products against all of these issues and have a rating for each one"

Architect 04:" what's interesting here is that all of this technical information, none of it is about sustainability performance. All it shows it that it is made from renewable energy and it has some sort of recycled label" "what percentage of that is corn?"

Architect 04: "there is an increasing pressure to specify natural materials with a lower embodied energy"

Architect 03: "the better informed people are the closer they will look at it [Pathway]" "so that made of corn, what is the other half made from?" "people get very suspicious that it is all marketing, that only 10% of it is natural and that the rest is the same as any other material or even worse" "those people who have researched further are more likely to question"

Architect 04: "I think that's what people will question. It says it is made from corn but it hasn't got the technical back-up and that's what you'd expect they'd be marketing that is has 90% natural material, its recyclable etc – but there's no mention of that"

Architect 03: "it sounds as if it should be biodegradable, if it's made from corn, but not all of it is made from corn"

Architect 03: "I would have thought that that is as natural as you can get. I mean there aren't that many steps between it growing in the fields and being made into the tiles. But on the other hand if it doesn't perform particularly well...."

Q: Do you perceive then that if the performance isn't very good you will have to replace it sooner?

Architect 03: "yes that is an issue"

Architect 04: "that's one of the key things with sustainability is that it looks at the whole lifecycle, if that product only lasts 10 years, instead of typically 20 years, then maybe it's not so sustainable if it cannot be recycled or doesn't biodegrade. If it costs the same price on day one, but you have to replace it twice as much as another product which costs the same price, then the lifecycle costs are twice as much" "we have to look beyond day one"

Architect 03: "I think it needs some honest comparisons with a market norm on those issues"

Q: Is that something that should come from manufacturers or is it something that needs to be external?

Architect 03: "the easier you make it for people the more likely they are to go along with it".

Architect 04: "If it [sustainability information] was published there as part of that technical information then I would believe it"

Architect 03: "I mean manufacturers are not going to print actual data that is misleading" "Therefore, if it is written on a brochure people then people will tend to go along with it" "it stands to reason that if you make it easy for somebody to say right there it is, all the information we need, I mean they

might check the figures with regards to market standards for other products, some of the things they have just specified to make sure they have not just chosen a really bad example. But that makes it a lot easier to explain and to convince somebody else"

Q: Do you find out the majority of your information on products from sample packs like these, or do you tend to follow it up with a salesperson? How do you find out information about products?

Architect 04: "usually we have some company contact"

Q: Is this where the 'questioning' will come in?

Architect 04: "yes, but we don't have any standard process yet, we are in the process of developing these systems for selecting materials. So at the moment we are very much dependant on the individual within the project"

Architect 03: "we have in mind a number of ways of doing something and for maybe two or three of those ways we ask for some product literature, and if we are interested we follow it up and get an individual to do a budget price and provide some technical information. Then we way it all up and maybe propose it to the client and the planners"

Q: In terms of this product, what kind of information would you present to your client? Is that it would work?

Architect 03: "I think we would probably not bore them with the details..." "We would say it fulfils all those technical criteria, we are happy with that. We wouldn't specify anything that didn't. But there are two or three aspects to this that we would put forward for you to think about, one is the colour and one is the durability and one is the sustainability"

Architect 03: "probably in Interior Design offices, people would tend to talk about the colour mostly or the texture" "durability would just be well 'it will be a certain standard' and sustainability, probably in Interiors, in the marketplace generally it would probably not be on the agenda"

Architect 03: "my perception is that Interiors are treated as a temporary thing"
Architect 04: "aesthetic driven" Architect 03: "it's driven by aesthetics and particular functions of making people feel good" Architect 03: "but it will all be replaced in a few years time"

In my personal opinion, with interiors there is probably a greater need to consider sustainability, because there is such a quick turnaround

Architect 04: "that's what we discussed the other day. All these building refurbishments last probably about 10 years, even less sometimes, and then people rip it out and chuck it in a skip"

Architect 03: "But then convincing people that it lasts longer isn't necessarily going to work because, it might work some cases because then you don't need to replace it, but in a lot of cases people will renew things on a regular

basis. A building will be taken over by somebody else and they will want to put their mark on it" "so actually recycling or buy-back, in those cases will be more important than longevity"

Architect 03: "it may be difficult to take it out and install it somewhere else, unless it's donated to charitable organisations"

Isn't there certain kudos for businesses though, to say, 'when we refurbish we renew our carpet or we donate it to a charitable organisation'

Architect 03: "But then that has to be handled carefully"

I think there is a lot of difficulty in businesses making steps towards sustainability, because some companies are afraid to make a step, because it may be the wrong step.

Architect 03: "I think there is massive potential" "and it hadn't really dawned on me how much [potential] until you mentioned it the other day" "we are architects therefore we usually think about buildings and so we do usually think much longer term" "I don't work in Interiors, but it did strike me that there is a potential, a massive potential" "millions of stuff ends up in landfill sites" acres of carpet, lights and suspended ceilings, partitions all end up in skips and then taken away to landfill sites....because people don't know what to do with them"

Architect 04: "but it isn't going to stay that way for very long, because it can't" "it isn't going to go away, that's the key, it's only going to get more and more focused on these types of issues"

Architect 04: "Interface are perceived, I think, as one step ahead of other manufacturers, but they have to stay that one step ahead"

Appendix F: Criterion for Materials Selection

i. Perceptions of Performance Issues

ii. Perceptions of Cost Issues

Criterion for Materials Selection

Introduction

As described in section 4.3.3 in the main body of the thesis further discussion was undertaken by interviewees regarding performance and cost factors in relation to the decision making process of specification. The following tables provide further evidence and discussion of the key findings.

Issue	Evidence
Performance	<p><i>"The main criteria considered when specifying" are "performance, longevity and suitability for the function" (Architect 0.01, 2003). In addition;</i></p> <p><i>"There's also going to be the maintenance, durability, wear, [and] it will have to be appropriate for its intended use" (Architect 05, 2003)</i></p> <p>Within the discussions Nylon was continually used as a benchmark material to enable architects and designers to rate the performance of other materials, as <i>"the product that is generally considered most fit for purpose is a modular carpet product of a predominately nylon constituent"</i> (Architect 01, 2003)</p> <p><i>"How a product or material works, functionally and aesthetically iscritical" (Malin. N, 2003, p174)</i> and although many respondents acknowledged that <i>"now the RIBA are insisting that sustainability become part of the education process for architects"</i> there is <i>"a very fast growing awareness of these issues"</i> (Architect 04, 2003).</p> <p>It is acknowledged that <i>"while the environmental burdens resulting from a product's history and its future are important, they are rarely as important as the products performance"</i> (Malin. N, 2003, p174)</p> <p><i>"I think that there is a lot of research and awareness within architecture and building design, but as to interior finishes, I think it's still largely what it looks like rather than the lifecycle implications and sustainability issues"</i> (Architect 05, 2003).</p> <p><i>"if it doesn't do it's job then it doesn't matter how environmentally friendly it is"</i> (Malin. N, 2003, p174).</p> <p>A perceived lack of performance of environmentally considered products has been cited previously within Chick and Micklethwaite (2002) as a concern for specifiers, this was confirmed within the Phase Two interviews in this study;</p>

	<p><i>"in the past there has been a perception that perhaps being sustainable makes a product a second rate good, with less performance" (Architect 05, 2003)</i></p> <p>This has led in part to architects and designers requesting a clearer indication of new materials performance against more traditional products.</p> <p>Referring back to the Background Research chapter, it is clear that this is a concern for Cargill Dow and possibly Interface, who both make attempts to try and tackle what they perceive to be potential future criticism or issues in relation to performance head on in an effort to <i>"compete head-to-head with traditional fibres"</i> (Ends 300, 2000, p19)</p> <p>In some cases, it has been found that <i>"architects who use unconventional materials must be prepared to document their performance"</i> as the materials are likely to be <i>"challenged by contractors and subcontractors"</i> (Malin. N, 1999, p144)</p> <p>Linked to this is perceived risk and liability, which Chick and Micklethwaite (2002) found to be greater for architects and designers when specifying recycled materials.</p> <p>This is echoed in the RIBA Materials survey 2002, where fear of failure was found to be <i>"the main reason for not experimenting"</i> (Young. E, 2002, p61) <i>"Architects want to be innovative, but not at the expense of problems later down the line"</i> (Young. E, 2002, p61)</p> <p>Trust and familiarity also seem to be significant factors in ensuring performance <i>"architects prefer to specify materials they know"</i> (Young. E, 2002, p64) and <i>"can predict the performance of"</i> (Architect 0.01, 2003)</p> <p>As one architect, interviewed by the RIBA, said <i>"we will use materials which through development, experience and use have proved themselves, durable, cost effective and trustworthy"</i> (Young. E, 2002, p63)</p>
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Perceptions of Performance Issues

F: Criterion for Materials Selection
ii. Perceptions of Cost Issues

Issue	Evidence
Cost	<p>Respondents cited cost as one of the key factors;</p> <p><i>“it starts off with quality, but at some point cost becomes an issue” “those are the fundamental issues, cost and quality” “there has to be a very rigorous approach to those”</i> (Architect 02, 2003)</p> <p>In terms of sustainability, cost was perceived to be a potential barrier to client acceptance; <i>“a carpet could have fantastic quality and fantastic environmental credentials, but if it is twice the price and the budget is quite low....”</i> (Architect 02, 2003)</p>

Perceptions of Cost Issues

Appendix G: Further Perceptions of Pathways

i. Specification of Pathways (Cost, aesthetic and performance)

Specification of Pathways

Introduction

As described in section 4.4.1 within the main text of the thesis, further discussion was undertaken by interviewees regarding cost, aesthetic and performance factors in relation to Pathways. The following table provides further evidence and discussion of the key findings summarised in section 4.4.1.

Issue	Evidence
Cost	<p>Respondents acknowledged that cost would be a primary consideration;</p> <p><i>"in terms of this carpet, I think the quality is absolutely fine, but the question that I would almost certainly ask is how much is it"</i> (Architect 02, 2003) and that the <i>"client would probably ask...how much does it cost"</i> (Architect 04, 2003)</p> <p>There was some speculation that the perception of the aesthetic of Pathway may affect the cost;</p> <p><i>"we sell carpet tile like that for about £8 a metrefor quick office refits and that [Pathway] doesn't look much different"</i> (Interface Sales 02, 2003)</p> <p><i>"The client's that we work with would perceive this as a very low cost carpet, and it is a low cost carpet"</i> (Architect 02, 2003)</p> <p>Upon what criteria is that assumption based: <i>"It's actually quite thin, it doesn't have much backing, I would have thought it would be relatively hard, and that would be perceived on that basis as a relatively cheap carpet"</i> (Architect 02, 2003)</p>
Aesthetic	<p>There is a perception that the aesthetic would not be a determining factor in specifying Pathway; <i>"a designer wouldn't put this forward from an aesthetic perspective"</i> (Interface Sales 02, 2003)</p> <p>There was also a perception from salesperson that Pathway will not be able to compete on the range of colour ways, therefore it has to be able to sell on the concept (Interface Sales 01, 2003)</p> <p>This assumption was justified, as one of the interviewees did express a view that specification of Pathway <i>"will be dependent on how large the colour range is"</i> questioning <i>"will we see the same range as other materials?"</i> (Architect 05, 2003)</p> <p>another confirmed that they <i>"would be interested in how well it fits into the scheme, in terms of colour and texture"</i> (Architect 03, 2003)</p>

	<p>The feel of the material seemed to be one of the determining factors in the assessment of the aesthetic value,</p> <p><i>"It's quite a flat pile, I don't know whether that is because of the type of yarn it is trying to achieve" "In terms of the yarn I can't see any problems, although it does have a very 'plastic' feel (Architect 05, 2003)</i></p> <p>Respondents seemed keen to compare Pathway to existing carpet materials to try to classify or rate the aesthetic against something they were familiar with; <i>"It has a very different feel to it, like a cross between carpet and jute in a way" (Architect 01, 2003).</i></p> <p>The aesthetic appeal was also measured in relation to an existing product, Nylon;</p> <p><i>"In terms of appearance, it looks quite acceptable I would say" "It's not as plush as some of the nylon products" "but it certainly has a good appearance, an acceptable appearance" (Architect 01, 2003)</i></p> <p>However, adjustments to the product could be made to increase the feeling of luxury and therefore improve perceptions of the aesthetic, giving Pathway the edge it needed to compete on an aesthetic level;</p> <p><i>"The only other way this would be marketed, as a design product and as having environmental benefit, is if it had a cushion back". "a cushion back makes a product feel more sumptuous, more luxurious" "If we had a 'green' cushion back system, then this [Pathway] would get to wider audience"</i> (Interface Sales 02, 2003)</p> <p>Some of the architects interviewed described a sense of 'trade-off's' between aesthetics and sustainability in the way in which they would market Pathway to a client;</p> <p><i>"As it exists" "I think I'd have to caveat it, I'd have to say to them [the client] that it doesn't have quite the luxurious nature of nylon, or a good quality wool, but it has another selling proposition" (Architect 01, 2003)</i></p> <p>In terms of the aesthetic factors involved, one respondent voiced concerns about potential limitations due to the material base;</p> <p><i>"some of these products, particularly with carpets, in the past there has been a very limited range of types, aesthetics, colours and textures due to the recycled nature" "so that does affect the decision making" "if it was an equal footing, if you could get exactly the same finishes, but one had a higher recycled content or lower environmental impact, then we would definitely choose that one" (Architect 04, 2003)</i></p> <p>This viewpoint is echoed by architects and designers interviewed as part of the research by Chick and Micklethwaite (2002) who found that the 'recycled aesthetic' was an issue.</p>
Performance	<p>It was recognised internally that using 100% PLA would not give heavy duty rating, and that although may be possible to achieve heavy contract by mixing in post consumer recycled Nylon, combining the two materials would bring up other issues in separation such as the biodegradability/recycling aspect (Interface Sales 02, 2003)</p> <p>The performance was an issue which respondents seemed to find difficult to analyse as they had no comparison material or performance</p>

	<p>statistics to refer to, however, it was recognised that longevity in relation to the performance of the material could be a concern;</p> <p><i>"If it [Pathway] didn't perform for 10 years or maybe 7 years, there would probably be an issue as to whether it would be suitable for an office refurbishment"</i> (Architect 01, 2003)</p> <p>Again, comparisons to a standard product, such as Nylon, were made to try and classify the performance;</p> <p><i>"I think we would have to table with the user; the maintenance and the durability issues, so that we could show it performs equal to or better than a nylon product. I think if we can do that then people may be more willing to use it in the future"</i> (Architect 05, 2003)</p>
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Perceptions Related to the Specification of Pathways