

# Greening the Design Brief

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## Abstract

Front End Innovation is a hot research topic, but there is still little research done on its relationship to design for sustainability. This paper explores the challenges of integrating environmental sustainability in this early stages of an innovation process and the design brief. The study is based on a content analysis of 35 design briefs from Belgian SMEs and multinationals, and a practitioners session with representatives from 14 Belgian companies. This results indicate a limited uptake of sustainability in Belgian design briefs. Furthermore, it argues that the use of certain strategies, such as front-loading, pushing sustainability upstream in the briefing process and sustainability opportunity identification in the front end, could help in greening the design brief.

## Keywords:

Design Brief, Sustainable product innovation, Front End Innovation, New Product Development

## 1 INTRODUCTION

With an overpopulated planet, hungry for electricity and resources, sustainability will be one of the biggest challenges in the future. The challenges and opportunities for sustainable innovation are immense. And the time horizon is shrinking. Companies can play an important role in the transition process towards a sustainable and smarter world with an improved quality of life. Such a transition will likely require powerful new business models, with a rich playground for visionary ideas, products and services. Sustainability can be the ultimate fuel for long-term growth. Progress towards this goal will require a multidisciplinary approach; political, social, economic and technical solutions must work in symbiosis to obtain sustainable development.

Staying competitive in an uncertain world is quite a challenging task. Companies must seek new ways of looking at products. The choices they make for which products to develop, and which targets to set for their sustainability performance will have a significant effect on the successfulness of our transition to a more sustainable world.

The very early phase in the innovation process, the so called front end of innovation, is often described as being the root of success for any company hoping to compete on the basis of innovation [1]. It is the phase with the largest impact on the end result of the project [1] [2] and the highest payback to one's investments [2]. It is in this phase that businesses determine which development projects to start and which targets to set for those projects. The outcome of that process is usually reflected in the design brief. The decisions made in the design brief influence all the subsequent phases of the innovation process. It is a common sense that one can significantly

improve products' sustainability by focusing on it already in the front end. This paper argues that sustainable design projects would be far more effective if commencing from an environmentally responsible brief, providing guidance to the design, engineering, marketing and management team.

Notwithstanding the logic behind integrating sustainability in the early stages of an innovation process and the design brief, in practice it is flawed. Front End Innovation is a hot research topic, but there is still little research done on its relationship to design for sustainability. There are a number of tools available to guide designers, engineers and managers in the design process after the specifications of the product or service are already set, but methods supporting goal finding for sustainable innovations are rare [3]. There is still little understanding on how to best bring environmental considerations into the design brief. Little guidance is given in literature how to effectively translate a sustainable commitment into project proposals that are both sustainable and make business sense [4].

The research in this paper aims at gaining understanding on how a design brief is established in the early stages of an innovation process and how environmental sustainability is integrated. The first part elaborates what is meant by a design brief, and how it is integrated in the early stages of an innovation process. The second part looks to the current practice of integrating environmental considerations in a design brief. Different research results are described and discussed in order to identify successful patterns for further research.

## 2 LITERATURE REVIEW

### 2.1 Front End Innovation and the Design Brief

The innovation process may be divided into three areas: the front end, the new product development process, and commercialization [2]. In this classification, a written brief that links the creative objectives with the business objectives can be seen as the point of transfer between the front end and the new product development [5] [6].

Formulating a design brief in the front end of an innovation process is a creative, iterative and interactive process and is best developed in partnership [7]. Ultimately briefing does not progress linearly, the development shifts and jumps back and forth between different departments in a company and the design team.

Figure 1 shows the relationship between influence, cost of change, and available information during the innovation process. At the front end, the degree of freedom and influence on the project outcome is high, while little information is available and the cost of changes are low. At later points in the process one has more information available, but now the cost of change has increased.

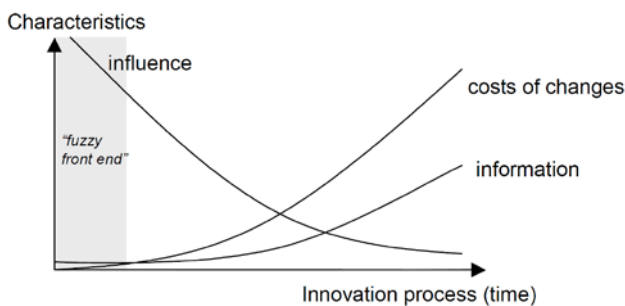


Fig. 1: Influence, cost of change, and available information during the innovation process [6]

It is at this early stage and under these circumstances that the design brief is defined. Also quality, costs, and timings are mostly set during the front end [6]. Important decisions are made here, and will follow the product through the project. Formulating a design brief has a lot to do with decision making in uncertain conditions and dealing with so-called 'wicked elements'. One strategy to deal with this is 'front-loading', where one attempts to shift the information curve to the left. Front-loading is defined as "a strategy that seeks to improve development performance by shifting the identification and solving of problems to earlier phases of a product development process" [8]. By spending more energy in the front phase on analysis and strategic design one gets more information while the influence is high and the cost of change is low.

### 2.2 The Design Brief

In the past, briefing had been dominated by a highly mechanistic view of the design process, it seemed, that a good brief could turn design into something close to

painting-by-numbers [9]. But the landscape changed. Today, designers know there is an intimate connection between briefing and design. Defining a design brief has become an integral part of the design process.

A design brief is a written description of a project that requires some form of design. It is an agreement, or contract between the parties involved in the project. Often times, it is also a point of transfer between different professionals, where the project is handed over from marketing to design, or from a product manager to an external design agency. It is also a roadmap and project-tracking tool, that defines the various steps that will be followed [7]. The role of a design brief is to provide the foundation to the entire design process in the shape of a functional document that can efficiently capture the information of the final product's attributes [10].

Ultimately briefing is the capture of knowledge of the user and the client, the expert, and the design and management team. Successful briefing is about clear and comprehensive communication and how information is structured [9]. It is important that the brief contains all the information and data necessary for every stakeholder in the process [7].

Previous research by Boks [11], based on data collected from major electronics multinationals in Japan and South Korea, has identified the use of environmental checkpoints, reviews, milestones and roadmaps as a most important success factor regarding the integration of sustainability considerations in the early stages of the product development process. The design brief can play an important role in achieving this.

The focus of this paper is 'Industrial Design Briefs', briefs for the design of a new consumer product or a product-service system. Design is a broad term, with a variety of design disciplines (e.g. industrial design, package design, communication design). Each discipline requires different information in a truly useful design brief [7].

It should also be mentioned that design assignments are not always called 'design briefs'. There is a lot of diversification of terminology among literature and practice. People use a variety of terms, they also refer to them as new product development brief, creative brief, project brief, project sheet, innovation brief, or marketing brief [7] [9] [12].

#### *Essential Elements of the Design Brief*

When it comes to design briefs, there is no magic formula. If design is a problem-solving discipline, then design must start with a thorough understanding of the problem to be solved, which is best found in a design brief [7]. A single one-size-fits-all design brief format does not exist, but there are some key ingredients that any good design brief should contain. Kim Zarney [13] compares design briefing to stir-fry cooking, a rapid process that works best when you have all your ingredients ready before beginning to cook. It is helpful to start a design process with the information the design team really needs. While in

practice the structure of design briefs may vary, Phillips [7] describes 8 elements that he deems essential for a good design brief: (1) project overview and background, (2) category review, (3) target audience review, (4) company portfolio, (5) business objectives and design strategy, (6) project scope, timeline and budget, (7) research questions, (8) appendix. The *'project overview and background'* serves as an executive summary of the project, it clearly articulate the scope, the business needs, objectives, desired outcomes and ownership of the project in terms non-design business partners can understand. It contains all the essential information: what, why and who of the project. The *'category review'* refers to the industry in which the product or service is involved. Designers need to understand their audience before beginning the design process. This part is represented in the *'target audience review'*. The company and its activities are described as completely as possible in the *'company portfolio'* chapter. The section *'business objectives and design strategy'* provides a clear understanding of how design strategy is matched to business objectives. Time and budget requirements in every phase of the project are presented under the chapter *'project scope, timeline and budget'* in order to complete the project successfully. During the discussions with the design brief team, it is quite likely that a number of questions that are critical to the success of the design project remain unanswered. One can find these questions under the second last chapter. The *'appendix'* is an optional section and might contain documents that summarize research data, competitive analyses and visual material.

#### *Insights*

This paper argues that doing a sustainable design project would be far more successful when starting from discussing and identifying sustainability opportunities in every chapter of the design brief. More research is needed how to best bring environmental sustainability in every section of a design brief.

### **3 RESEARCH DESIGN AND QUESTIONS**

The research in this paper aims at gaining understanding on how a design brief is established in the early stages of an innovation process and how environmental sustainability is integrated in the design brief and in the front end. Based on the insights from literature and previous explorative studies [4], [12], [14] three main research questions has been formulated in order to address the research objective: Do companies take environmental parameters into consideration in their design briefs, and if so, how? And where is the focus placed? What are the drivers and barriers for companies for integrating environmental sustainability in the design brief?

To understand this phenomenon and the relationships between key elements, two exploratory studies has been conducted with a focus on Belgium SMEs and multinationals at varies industries.

In study 1, a practitioners session was organized with representatives from 14 Belgium SMEs and multinationals in May 2011. Because relatively little research has been conducted regarding environmental parameters in a design brief, a qualitative approach has been chosen to get insights in themes and patterns which are relevant.

In study 2, a content analysis of 35 industrial design briefs from 35 Belgium based companies was used as research methodology.

The grounded theory has been chosen as underlying strategy both for research and analyzing data.

## **4 RESEARCH**

### **4.1 Practitioners Session**

#### *Research Background & Methodology*

In order to get more insights in the drivers and barriers for integrating environmental sustainability in the design brief, a 3h practitioners session was organized with representatives from 14 Belgium SMEs and multinationals in May 2011. All participants were members of VOKA, Flanders' Chamber of Commerce and Industry, and VOKA's Learning Network on Product Development and Design. All persons volunteered on the focus group after a call for participation. Background of the participants ranged between senior management, project management, R&D, product design and engineering.

During the first part (1.5h) of the session a presentation was given on sustainable product innovation with a special focus on the design brief and integrating environmental considerations in the early stages of an innovation process.

The second part of the session (1.5h) was organized as a interactive group setting where participants were divided in teams of 4 to share their experiences and insights in integrating sustainability in the early stages of a design process and the design brief. Each team could make notes and schemes on big sheets of paper in order to visualize their thoughts to the other team members. Findings were summarized and presented plenary to the whole focus group at the end.

The second part of the focus group session was recorded with notes and partly with audio.

#### *Analysis and results*

The session and final presentation was transcribed chronologically by use of sentences, key words and statements. The relevant parts of the sheets of paper were analyzed and summarized.

Two general outcomes could be defined out of this focus group session. Firstly, integrating sustainability in a design brief is for many people a matter of 'want' and/or 'need'. Either you want to do it because you see opportunities (market demand, cost reduction, product differentiation, marketing), or you need to do it because it is required (legislation, retailer demands). 'What are the risks of this activity and what will be the return?' is a question often

heard. Answering this question is not obvious, due to the characteristics of the front end phase as explained in Figure 1. Trying to have a clear view on this topics in the very early design brief stage (cfr. Front-loading in chapter 2.2) can give a real boost to the integration of environmental sustainability in a design brief.

Secondly, there is a huge difference between a ‘request for proposal’, a strategic brief and the real design brief.

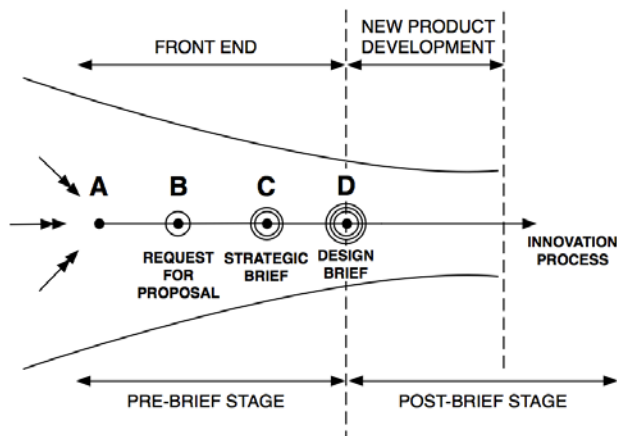


Fig. 3: The various stages of a design brief in an innovation process

Though processes differ from company to company, in general a multi-step process, as described below, can usually be recognized. The briefing process starts when someone in the company defines a business objective or need. This ‘need’ (A) can be a ‘gut’ feeling based on previous experience, a recommendation from a client or user, or a result of research. The need will be translated in a document, the ‘request for proposal’ (B), sometimes also called ‘statement of need’. This document contains some basic information and goes to the management level in the organization where the team can decide whether it is worth pursuing, mostly decided after conducting a feasibility study. When the projects gets a ‘go’, the request for proposal will be upgraded into a ‘strategic brief’ (C). This document is usually created for the in-house design team or for an external design agency. The ‘design brief’ (D) is developed and written in the next stage, usually in co-creation with the design group after considerable thought and discussion about the project. Figure 3 shows the various stages of a design brief at the front end of an innovation process. The different elements of the diagram do not represent actual time frames.

Pushing environmental sustainability upstream in this briefing process could result in a higher success rate on integrating sustainability into the design brief.

## 4.2 Analysis of 35 Design Briefs

### Research Background & Methodology

A design brief is a crucial communication document between the client organization and a design agency, and

usually provides a good insight into the level of environmental sustainability a company wants for the future product. But do companies take environmental parameters into consideration in their design briefs, and if so, how? And where is the focus placed?

To answer this question a content analysis of 35 industrial design briefs from 35 Belgium based companies was used as research methodology. Among those companies, 25 are categorized as small and medium-sized enterprises (SMEs), while the other 10 are classified as multinationals. Divers sectors and industries are covered, varying from the electric and electronic industry, lighting, furniture, medical equipment, building, engineering, technology and plastic industry.

All the described design assignments are performed by the design team of the Industrial Design Center Howest (IDC Howest) in Kortrijk, Belgium, a knowledge and research center specialized in Industrial Design Engineering. IDC Howest offers several design services for the industry, working in close collaboration with the master’s program Industrial Design Engineering at Howest University. The level of innovation proposed in the design briefs varies from average to high. Projects with a low innovation level, such as product upgrades or incremental innovation design projects, are not accepted by IDC Howest due to a strict mission statement. At this point, 35 design briefs were random selected among the total design assignments performed in the period between 2009 and 2011 by IDC Howest.

The IDC Howest standard design brief template contains 7 chapters, including project overview, objectives, quality requirements, policies on intellectual property, budget, design methodology and timing. There is no section explicitly devoted to the environmental impact of the product. Environmental requirements can only be noted under the quality requirements section by answering a yes or no question.

In most cases, the client organization firstly contacts IDC Howest with a request for proposal or strategic brief. This document becomes a design brief after reviewing and discussing the problems and needs with both parties. Various meetings are preceded before the two parties sign the design brief. All projects studied in this case have one project owner from the company itself and one project leader from the IDC design team, each with specific tasks. Both are responsible for completing all the relevant sections of the design brief format.

The classification of the Life Cycle Design Strategies is utilized during the content analysis of the design briefs, as shown in Table 1.

The Lifecycle Design Strategies Wheel or LiDS Wheel, also called EcoDesign Strategy Wheel [15] presents eight EcoDesign strategies: new concept development (0), selection of low-impact (1), reduction of materials usage (2), optimization of production techniques (3), optimization of distribution system (4), reduction of

impact during use (5), optimization of initial lifetime (6), and optimization of end-of-life system (7). Strategy 1 to 7 represent the product life cycle. Strategy 0 is either ‘strategic’, working on the product concept level, while strategy 1 and 2 relates to the product component level, strategy 4, 5 and 6 to the product structure level and strategy 6 and 7 tot the product system level. All life cycle design strategies are divided in multiple sub-strategies.

Table 1: Life cycle design strategies

Lifecycle Design Strategies			
Product Level	Strategy	Substrategy	
Product Concept Level	0	New Concept Development	Dematerialisation
			Shared use of the product
			Integrations of functions
			Functional optimisation of product
Product Component Level	1	Selection of low Impact materials	Cleaner materials
			Renewable materials
			Lower energy content materials
			Recycled materials
			Recyclable materials
	2	Reduction of materials usage	Reduction of weight
Product Structure Level	3	Optimization of production techniques	Alternative production techniques
			Fewer production steps
			Lower/cleaner energy consumption
			Less production waste
	4	Optimization of distribution system	Fewer /cleaner / reusable packaging
			Energy-efficient transport mode
	5	Reduction of Impact during use	Energy-efficient logistics
			Lower energy consumption
			Cleaner energy source
			Fewer consumables needed
Product System Level	6	Optimization of initial lifetime	No waste of energy / consumables
			Reliability and durability
			Easier maintenance and repair
			Modular product structure
	7	Optimization of end-of-life system	Classic Design
			Stronger product-user relation
			Reuse of product
			Remanufacturing / Refurbishing
			Recycling of materials
			Safer incineration

Every design brief is systematically scored on each dimension of the Strategy Wheel. Also the way how strategies are handled, is indicated as being quantitatively or qualitatively. No distinction is made in the analysis between projects that are initiated with the intention of doing something sustainable vs. projects without a specific sustainability focus.

*Limitations of the content analysis*

It should be mentioned that the used methodology, design brief content analysis, has some limitations which are important to acknowledge when interpreting the results. A design brief says nothing about the sustainability of the final product, as earlier research already showed. Petala et al. [12] concludes in the Unilever case study report on ‘The role of new product development briefs in implementing sustainability’ that the incorporation of sustainability in the new product development briefs does not guarantee results. Several organizational issues could function either as success or failure factors for the entire

process. The opposite is also possible, projects where environmental sustainability was not a fundamental concern in the design brief can turn out in environmental friendly products or services when new insights are obtained during the innovation process.

Secondly, the chosen methodology does not provide deep insights in push and pull mechanisms regarding sustainability, that can show up in meetings and discussions with the project team prior to the design brief. Also the influence of the project leader(s) or other design team members on the final outcome of the design brief remains unclear.

*Results and findings*

An overview of the results of the content analysis is shown in Fig. 4 and 5.

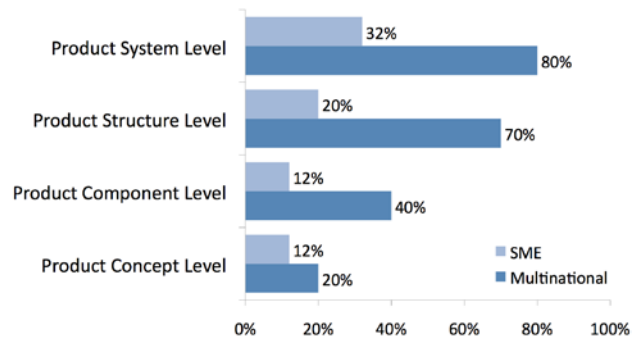


Fig. 4: Environmental profile of the design briefs on product level

Figure 4 gives an insight in the environmental profile of the design briefs on the different product levels. Figure 5 presents the most frequently used strategies in the design briefs. A distinction is made between SMEs and multinationals, demonstrated in the two bars.

The strategies ‘optimization of initial lifetime’ and ‘reduction of impact during use’ are most commonly found in the overall design briefs. While the most popular sub-strategy is ‘reliability and durability’ followed by ‘modular product structure’, ‘lower energy consumption’ and ‘cleaner / recyclable materials’.

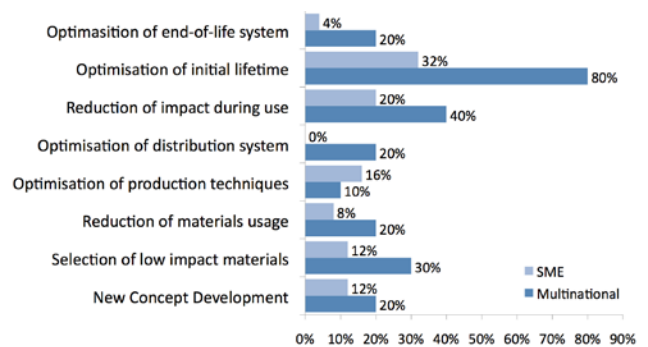


Fig. 5: Environmental profile of the design briefs on strategy level

This study shows that the uptake of environmental considerations into design briefs is still very limited in the analyzed briefs. In 14 SME design briefs there was no uptake at all. The findings suggest that multinationals more frequently integrate environmental considerations into the design brief comparing to SMEs. Quantitative environmental targets were absent in all the design briefs. This appear to be related to the innovation level. Defining quantitative environmental targets in the early stage of an innovation project appears to be very difficult for innovation projects with an average or high innovation level.

## 5 CONCLUSIONS AND FUTURE RESEARCH

This study indicates a limited uptake of environmental sustainability in Belgian design briefs. Due to the limited number of research entities, and the fact that all participating companies where Belgian, no general conclusions could be made. More research is needed on how to best bring environmental sustainability in every section of a design brief.

The study in this paper is part of a larger research at Delft University of Technology that is focusing on front end sustainable product innovation. New research studies are planned to answer the question on how to best green the design brief and the front end. This paper is a first step in answering this question. The insights provide by this paper will serve as the basis for future research.

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