

HOW DO SMES DESIGN?

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ABSTRACT

This paper describes the work of the Design Knowledge Network project based in Birmingham City University (formerly the University of Central England), Birmingham, UK. The project aims to increase innovation in small and medium sized enterprises (SMEs) through increased use of design, better product development and improved marketing.

Company activities on both a strategic and practical level were investigated and detailed recordings taken of current design and marketing practice in over 60 SMEs (Burns and Ingram 2008). This generally exposed informal and chaotic business processes. For some companies, models of their design processes were constructed and compared with more formal models, with written recommendations to improve design and marketing processes, incorporating British Standards design management guidelines.

When assessing the impact of this work, it was noted that in the main the models provided were not used by the company. After further investigation it became clear that the formal models provided by the project were often inappropriate for a small company. The research suggests that conventional models of the design process are not appropriate for small companies and that there is value in creating simpler and more flexible design process models that reflect realistically the needs and capabilities of small companies. Simple models that combine design and marketing functions would be of use to companies and could be created and supplied to companies as part of a business assist programme. Further work could include getting companies to embrace more front end thinking in design.

Keywords: design process, SME, design process model

1 BACKGROUND AND CONTEXT

Design Knowledge Network (DKN) is based in Birmingham City University (formerly the University of Central England), Birmingham, UK and is part-funded by the European Union Regional Development Fund and the regional development agency, Advantage West Midlands.

DKN provides assistance to small and medium sized enterprises (SMEs) to help them become more innovative through encouraging them to adopt a managed design process. This is achieved through a series of five day, or 30 hour, interventions. The majority of companies worked with are small, with under 50 employees. Once company needs have been determined through an initial analysis, a range of services can be provided, one of which is help with implementing a formal design process. Finally, the impact of the work is reviewed. Recommendations for changes and improvements to the design process were based on comparison and analysis of company design activity with BS7000, Design management Systems Part 2 - Guide to managing the design of manufactured products (1997). This was chosen as it offers a great deal of detailed advice at all stages of the design process. It contains a model of the design process, which is divided into four main phases: concept stage, feasibility, implementation and termination.

2 METHODOLOGY

DKN used a multi-stage process when working with companies:

1. An initial general needs analysis determined areas where the company needed help. At this stage, it was possible to identify the need for design process improvements.
2. If design process improvements were thought necessary, a design audit was carried out.
3. A model was then created of company's design process.

4. The model was compared with BS7000 – Part 2. Design recommendations were presented in report format.
5. A follow up meeting took place some time later to assess the impact of the work.

The design audit consisted of two main stages. The first stage comprised meeting with the company and conducting a detailed design process questionnaire. The interviews were conducted by two researchers, with the person in the company most involved with the design process. It captured details of all relevant processes and activities relating to the company’s design process, from initial idea generation to design support for manufacturing. It also captured information relating to marketing activity, customers and competitors and the company’s attitude to, and value placed on, design as a key factor in innovation.

The second stage comprised a detailed analysis of the findings. The assistance included creating a model of the company’s design process, based on information taken from answers to the questionnaire. This model was compared to the ideal design process model as described in BS 7000 Part 2. Recommendations were then suggested for those areas where the company’s design process was perceived to not match up to the standard model. The new design process model showed activities to be included in the company’s design process. This model was supported with detailed written guidelines.

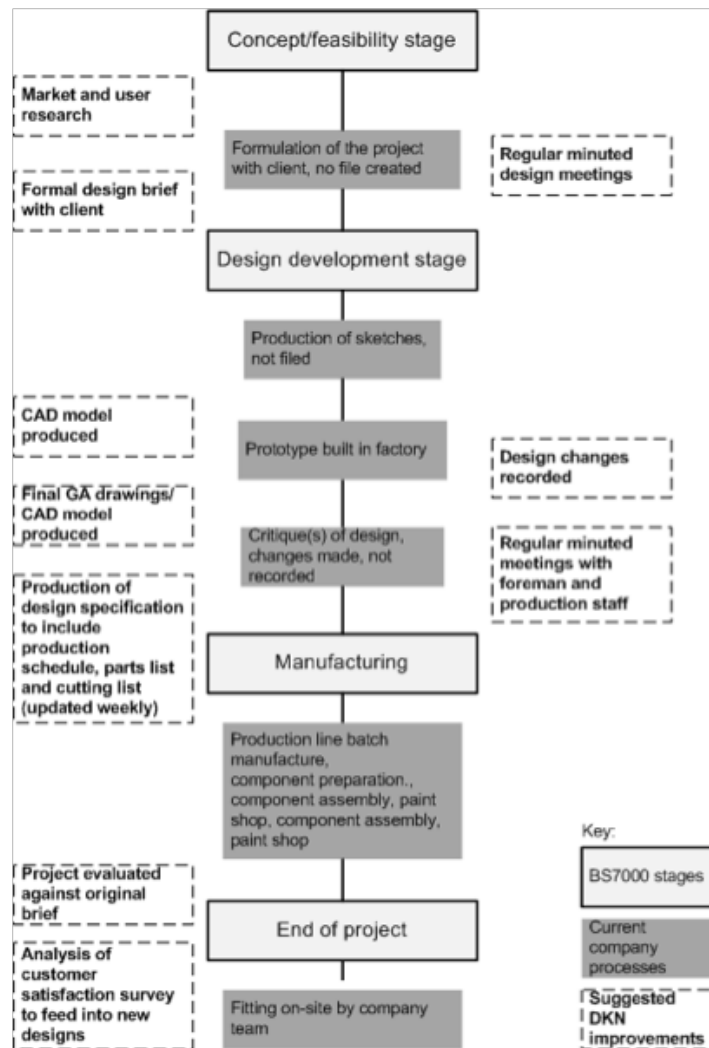


Figure 1 - an example of suggested company design process improvements based on BS7000

Figure 1 shows a typical design process. Suggestions for process improvements focus in this case on helping the company formally record its process using a design brief, minuted design meetings and CAD drawings. It also encouraged the company to explore user needs at the beginning and end of the project, as a means of gathering inspiration for product improvements or new product ideas.

3 RESULTS AND ANALYSIS

3.1 Needs analysis

The project carried out initial needs analysis meetings with companies. Many types of decisions, including those concerning design, were often made reactively and informally, with principals unwilling or unconvinced of the benefits of implementing new processes. It was also found that companies often lacked an understanding of marketing, with limited formal marketing activity, and had frequently placed little importance on understanding its own business environment, including monitoring competitor activity. They can be defined as 'low innovators' (Burns and Ingram 2008), in that they were reluctant to introduce any new process to the company, but had some understanding that new design and marketing processes could nevertheless add value to their products.

3.2 Design audit

The design process questionnaire revealed that many of the companies exhibited a number of similarities in their approaches to management of new product development (NPD). Frequently, although design was often stated to be a crucial part of economic competitiveness, minimal time was devoted to managing the NPD process, with little understanding shown of how to use design strategically. Vagueness about company vision or direction was common. Design processes were often ad hoc and informal; companies had little or no design talent in house with inadequately trained staff for design support; the principal often took responsibility for design activity; as previously mentioned, companies had inadequate knowledge of their key competitors; there was little marketing or brand communications activity, although companies were conscious of this lack and wanted to improve. Several of the companies stated that they wished to develop existing product ranges or to create new products, which suggested there was value in assisting them further to develop design strategies and processes. However, these companies were often reactive in the way they used design, using it to solve customer problems on demand. They did not, in the main, have the skills to identify, analyse and select suitable business opportunities, ideas and concepts to create products with added value.

3.3 Design recommendations

Recommendations generally included:

- Creation of a company design policy or vision that clearly outlines its stance and commitment towards design
- Establish a structured design process using the design process model and recommendations provided
- Delegation of duties
- Formally record design work and design meetings and changes
- Use of CAD to streamline process
- Implementation of design planning phase
- Creation of a design brief for each project
- Reviewing of designs against original brief
- Reviewing of design process regularly to identify areas for improvements

3.4 Follow up meetings

The design audits were intended to provide companies with a basic structured framework for design activity and it was acknowledged that the interventions would be unable to solve the full range of design problems faced by the company. However, when assessing the impact of this work, it was noted that the models provided were not implemented by the companies. The assessments, in the form of face to face structured interviews, revealed that the majority of companies found the models too formal and complex for their current working practices, with the accompanying guidelines often time consuming to read.

However, there were several cases of informal adoption of new design process directly as a result of the DKN interventions. In one case, after struggling with failing design projects for two years, a follow-up interview found that the director of the company had recently reread the work and had found that the recommendations had become more relevant to the company. This company had continued to work on a range of new design projects, with its main stimulus for design activity coming from clients. Another admitted that the new design process model had been partly adopted, but in an informal manner. After the intervention, this company had gone on to work with an established designer.

The results of the follow up meetings suggest that the design process models and advice provided were either inappropriate or that there were other underlying issues that meant that the companies were unable to absorb or use the help provided. While this may be related to the limitations imposed by project restrictions on time spent with companies, Burns and Ingram (2008) investigate notions of absorptive capacity as possible reasons for companies being unable to take onboard external advice and assistance. It was noted that factors influencing the reluctance to adopt more formal design processes included: shortage of time to devote to implementation of new processes, lack of design skill within the company, thus hampering attempts to produce new products; and lack of company long term vision and direction for design. In apparent opposition to this, belief in the importance of design was still often clearly stated.

4 DISCUSSION

Central to successfully managing design is an understanding within the company of how it can use design as a key part of its business strategy and to drive innovation. An understanding of how to synthesise front end elements into products that successfully support the company's vision and design direction is also needed. To properly support decision making at the front end, it became clear that the company must also have an understanding of a range of external issues, such as customer needs, market forces, strengths and weaknesses of competitor products and marketing and brand communications activities. The results suggest that a simple design process model, which includes front end issues, could help companies understand the activities that need to be undertaken to produce successful products concepts. Not least of these is a strong vision for the company that includes design.

Not all design process models represent idea and concept development as a single step. The Design Council's 'double diamond model' (2005) emphasises the divergent and convergent nature of the design process, although it does use a linear format. Front end activity is defined by Koen et al (2004) as non-linear and circular, where research activity feeds opportunity discovery and analysis, idea and concept development and selection. It is further described by Hohenegger et al (2008) as 'the process where customer needs and market opportunities are determined, ideas for new products are generated, product concepts are developed and evaluated until a decision is made whether to proceed or not with the development.' This is the stage of the design process that DKN had found most lacking in companies and is closely linked with marketing activity, in the form of market, competitor and customer research.

Koen (2004) describes the front end innovation stage of the design process as 'fundamentally different' to the new product development process. The nature of the work is defined as experimental and chaotic. Activity is research-based and can be in individuals or teams, funding amounts needed are variable, revenue expectations are uncertain, as is a commercialisation date. Outputs from this stage are strengthened concepts. When compared with the British Standards model- a linear sequence of events- it was clear the two were very different.

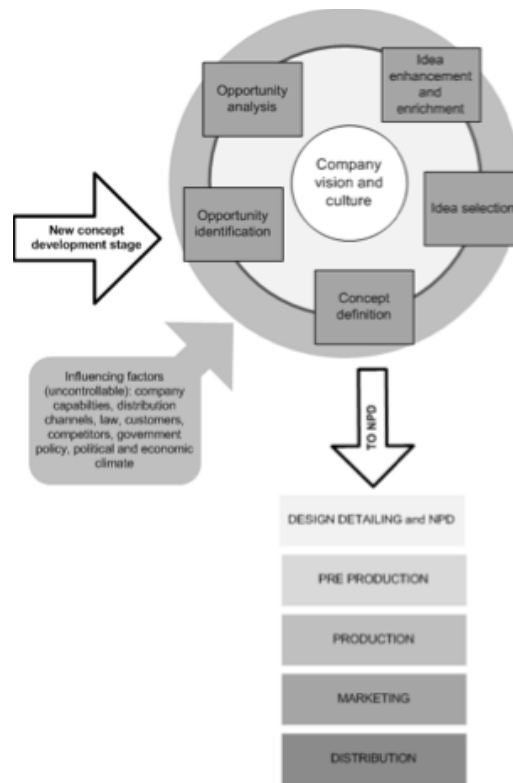


Figure 2 - design process to include elements of front end innovation, based on Koen et al 2004

The model in figure 2 was developed as a response to the findings of the design audits. The model incorporates non-linear front end innovation strategies into a traditional linear design process, as a means to show how front end elements can be incorporated into the design process to produce stronger product concepts, which can be fed into the NPD process. The diagram purposely simplifies the design process, as the model is chiefly a method of creating an initial understanding of the non-linear nature of front end activities compared to the more formal NPD process.

One challenge that DKN experienced, throughout the project, was the communication of complex ideas to business people that have little time to spare. The visual models, presented during meetings as part of a larger report, helped get the information across. However, the challenge is to create models that are relatively simple to understand and to absorb. Figure 2 is intended to be used for this purpose, but with the possible drawback of oversimplifying a complex process.

5 CONCLUSION

The aim of the design audit generally was to raise awareness within the SMEs of the important role design could play in creating innovative products and thus gaining market competitiveness. More specifically, it aimed to give practical advice about how to effectively manage what were often informal and unrecorded design processes. The research suggests that conventional models of the design process may not be appropriate for small companies and micro businesses and that there is value in creating simpler and more flexible design process models that reflect more realistically the needs and capabilities of small companies, as well as capturing the non linear nature of front end design activity.

It does not seem unreasonable to suggest that SMEs would benefit from an increased understanding of how to manage the front end elements of the design process. The research suggests that simple models that combine design and front end marketing elements would be of use to companies and could be created and supplied to companies as part of a business assist programme. Identifying knowledge gaps in more detail could form the basis for further work.

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