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AN ANALYSIS OF DESIGN MANAGEMENT PRACTICES IN EUROPE - A CRITICAL INVESTIGATION OF THE DESIGN MANAGEMENT STAIRCASE MODEL

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The research presents a critical investigation of the Design Management Staircase model to assess current Design Management practices and capabilities of European businesses. Based on the literature it assesses the Design Management Staircase model regarding its suitability as a method to assess current DM practices of European businesses. Furthermore, it applies the Design Management Staircase model to four different datasets obtained from European Businesses each year from 2008-2011. It explores the development of the trends in the Staircase model scores. Further analyses are conducted examining differences in Staircase scores of businesses recognizing design and design management as an important tool for innovation.

Keywords: Design Management capabilities, Design Management Staircase Model; Innovation

INTRODUCTION

This paper presents a critical investigation of the Design Management Staircase model (Kootstra, 2009). The Design Management Staircase model was developed during the Award for Design Management Innovating and Reinforcing Enterprises (ADMIRE) programme as part of the PRO-INNO Europe initiative formed by the European Commission (EC) Directorate General for Industry and Enterprise. Despite finding evidence of a positive correlation between Design Management (DM) and business performance, the EC identified a substantial lack of knowledge concerning the manner and extent to which European businesses integrate design into their management structures. Therefore, it was one of the key objectives of the ADMIRE programme to investigate the current DM practices of European businesses and to identify obstacles preventing businesses from implementing DM structures.

In the absence of a validated model to assess European businesses' DM capability, the Design Management Staircase model was developed by Kootstra (2009). The model aims to enable European businesses to assess and improve their DM capabilities in order to increase their effective use of design and improve their competitiveness and business

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success. To assess DM capabilities a process perspective was taken, classifying the DM capabilities of businesses into four different levels, ranging from an immature stage, level 1, through to level 4, where design is managed strategically. All four levels are further defined by five factors influencing the success or failure of design and indicating good DM. The level ranking is dependent on the extent to which businesses implemented these five factors.

Each of these factors are explained through three to four multiple choice questions.

Subsequently, the Design Management Staircase model was tested on a large scale study amongst 605 European businesses. The results of this study were presented in Kootstra's (2009) report "The Incorporation of Design Management in Today's Business Practices".

However, the rationale for the model's levels and factors has never received any academic interrogation, leaving the model open to criticism regarding its validity. In order to address such potential for criticism the first part of this paper will critically comment on the five factors and the construction of the DM capability levels on the basis of a literature review. This critical analysis focuses on the suitability of the model as a method to assess current DM practices of European businesses.

The second part of this paper will concentrate on the practical application of the Design Management Staircase model to datasets derived from the Design Management Europe (DME) Award. The DME Award originates from the ADMIRE programme and is bestowed for excellence in DM practice, honouring the DM structures of businesses rather than a designed output. The DME Award adopted the Design Management Staircase questionnaire as part of its entry procedure. Altogether the DME Award gathered 321 completed questionnaires from 2008-2011. This provides a unique opportunity to apply the Staircase model to four different datasets obtained from the questionnaires and to analyse the DM capabilities amongst European businesses. Particular attention will be given to the trend of the DM capabilities of European businesses reflected in the Staircase scores between 2008-2011. This includes an analysis of the performance of businesses recognizing design and DM as an important tool for innovation.

In summary, this paper draws upon the following approaches:

- Presenting the Design Management Staircase Model and its development
- Critical investigation of the Design Management Staircase Model and its five underlying factors based on a literature review
- Application of the Staircase Model to the DME Award datasets of European business gathered from the years 2008-2011
- Analysing the trend of the DM capabilities of European businesses reflected in the Staircase scores between 2008-2011
- Analysing the performance of businesses recognizing design and DM as an important tool for innovation reflected in the Staircase scores

DESIGN MANAGEMENT STAIRCASE MODEL

STAIRCASE LEVELS

Kootstra (2009) describes the structure of the Design Management Staircase Model. He states that the Design Management Staircase model is based on a method comparable to the Design ladder (Ramlau & Melander, 2004) of the Danish Design Centre. The Design Management Staircase model describes the characteristic DM behaviour and capability of businesses at four levels. The level classification ranges from the lowest level "No DM" to the highest level where DM is used strategically and is part of the business culture (Figure 1). This ranking implies that businesses reaching higher levels of the model assign a higher strategic use of design than businesses in lower levels. However, businesses do not necessarily have to strive for the highest level, as various external factors determine the

particular needs of each business and the most sufficient level of the Design Management Staircase model (Kootstra, 2009).

The four levels are presented as:

- Level 1: No Design Management
- Level 2: DM as a Project
- Level 3: DM as a Function
- Level 4: DM as a Culture

LEVEL 1: NO DESIGN MANAGEMENT

In this level businesses make no use of DM. Design has no role in the business objectives and is only applied occasionally with no or limited objectives. All design results are highly unpredictable and inconsistent due to a lack of a clear defined process. Design knowledge and experience is accordingly absent or very limited.

LEVEL 2: DESIGN MANAGEMENT AS A PROJECT

In this level is the use of design still very limited to meeting direct business needs. Design is not recognised as a tool for innovation or implemented in the New Product Development (NPD) process. Therefore, the use of design is restricted to adding value to existing products through styling, packaging etc. and is only used as a marketing tool with minimal coordination. The responsibility of design remains at an operational level.

LEVEL 3: DESIGN MANAGEMENT AS A FUNCTION

In this level businesses start to recognise design as a tool for innovation. Design is integrated in the NPD process and several disciplines and specialists become involved in the design process. The formal responsibility for design lies with an assigned staff member or department managing all involved groups.

LEVEL 4: DESIGN MANAGEMENT AS A CULTURE

In this level businesses are highly design driven and potentially established market leaders through design driven innovations. Design is an essential part of their differentiation strategy, generating a distinct competitive advantage. For this reason, design is an integral part of the business processes with the involvement of a wide range of different departments. A design literate top management is reinforcing the support and significant value of design amongst the entire business. This results in design being a part of the businesses' corporate culture.

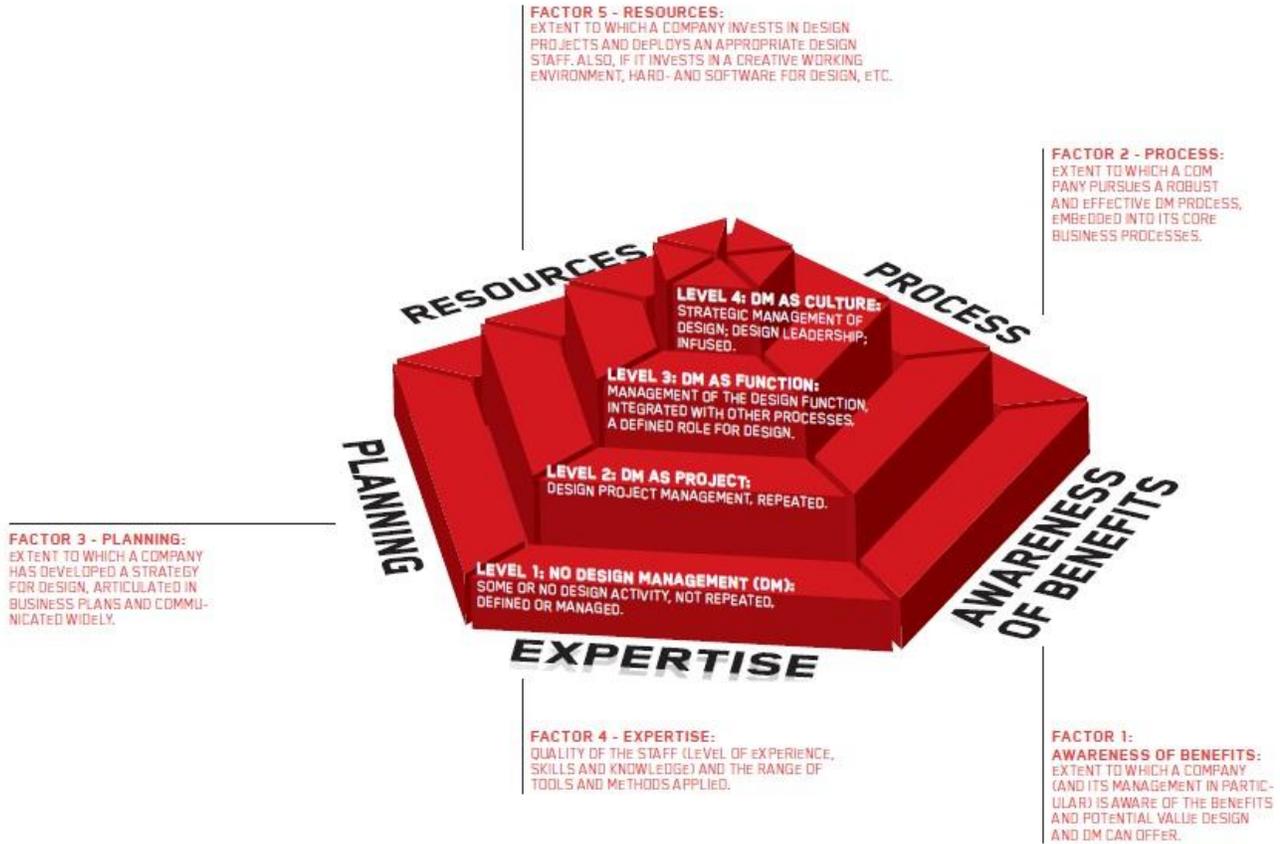


Figure 1 Design Management Staircase model
Source: Design Management Europe Award (2011)

STAIRCASE MODEL FACTORS

All four levels of the Design Management Staircase model are further defined by five factors influencing the success or failure of design and indicating good DM (Figure 2). The level ranking is dependent on the extent to which businesses have implemented these five factors.

The five factors are presented as:

1. Factor Awareness: degree of awareness of benefits
 - The extent to which businesses are aware of the benefits and the potential value that design and DM can offer
2. Factor Planning: whether design plans and objectives are developed
 - The extent to which businesses have developed a strategy for design, articulated in business plans, and communicated widely
3. Factor Resources: people (design staff), funding (budgets) and means of production (facilities)
 - The extent to which businesses invest in design. Resources are considered as the sum of all design investment
4. Factor Expertise: the level of DM experience, skills and expertise
 - The quality of the design staff and the range of tools and methods applied
5. Factor Process: whether an effective process is followed

- The extent to which businesses follow a professional and effective design management process, embedded in core business processes

FACTORS	DESIGN MANAGEMENT CAPABILITY LEVELS			
	LEVEL 1: NO DM	LEVEL 2: DM AS PROJECT	LEVEL 3: DM AS FUNCTION	LEVEL 4: DM AS CULTURE
AWARENESS (OF BENEFITS)	Not aware of benefits and potential value of design (unconscious use or no use)	Some functional specialists are aware	Most are aware that it is important to remain competitive	All are aware that it is fundamentally important to gain a leadership position
DM PROCESS	No idea where design fits within current processes	Performed inconsistently and late in development process; not repeatable across projects	Performed consistently and early; formal DM process drives performance	Ongoing activity; business is engaged in continuously improving DM process
PLANNING	Company / marketing plans do not mention the use of design	Limited plans and objectives exist at the individual project level	Plans and objectives exist which set direction and integrate design in various activities	Design is part of strategic plans; design planning is a dynamic process that drives the business
DM EXPERTISE	Little or no skills to handle design activity; no DM tools applied	Some skills; basic DM tools applied inconsistently; lots of room for improvement	Standard DM tools applied consistently; some room for improvement	Appropriate expertise; use of advanced DM tools; appropriate metrics used
DESIGN RESOURCES	The business has not committed resources to design activity (may not appreciate the potential return of design investment)	Limited resources are allocated for individual projects; one-off design investments with no review of potential returns	Sufficient resources are allocated on the basis of potential return, but with limited procedures in place to assist in decision making	Substantial resources are allocated, with financial procedures in place to assist in appraising investments, assessing risk and tracking returns

Figure 2 Design Management Staircase model maturity grid

Source: Kootstra, Gert. (2009)

LITERATURE REVIEW

MATURITY GRID

As described above the Design Management Staircase model framework is based on a process maturity model. Each level of the model builds on the previous level. It suggests that each business can undergo a development process to reach the subsequent level. A wide range of maturity and growth models can be found in the literature (Crosby, 1979; Greiner, 1998; Nolan & Gibson, 1974). These models commonly classify development in different stages. Each of the stages has its own challenges to overcome and reaching the subsequent level results in better control. However, it is not essential for businesses to attempt to reach the highest level but rather to settle with the best fit for their specific needs (Nolan & Gibson, 1974).

THE DESIGN MANAGEMENT STAIRCASE MODEL

The Design Management Staircase model was developed to address the lack of knowledge concerning the way businesses in Europe manage design. The main research question was formulated by Kootstra as (2009: 16): 'How do European SMEs manage design in practice,

and how can they further develop their (design management) skills to increase the effectiveness of their design activities?’

Various studies have shown that design has a positive contribution to business performance. For example, Kotler and Rath (1984) argued that design can create a distinct competitive advantage for businesses, and, Gemser and Leenders (2000) analysed how industrial design affects the performance of businesses. Despite finding evidence for a general positive effect of industrial design on performance, it was found that this impact is unconditionally positive. In fact, the impact of industrial design depends largely on the industry and in particular on the strategy by which industrial design is integrated into the NPD process. Similarly, Hertenstein, Platt and Veryzer (2005) were able to show that good industrial design which enhances the value, utility and appearance of a product improves the performance of businesses in a range of metrics. Industrial design is hereby understood as a process in liaison with multiple departments and stakeholders. The emphasis is clearly that industrial design has to be seen as a design process. Alike Kotler and Rath (1984) argued that design is an active planning and decision making process resulting in a finished product. This design process is seen as a part of the NPD process with the involvement of designers from early stages such as idea generation onwards. Although the design process is closely related to the NPD process there is a clear difference between the two. The design process can be applied to all types of creative activities and focuses on the generation, evaluation and implementation of solutions. It forms the set of technical activities within the NPD process to meet marketing and business aims (Moultrie, Clarkson, & Probert, 2006; Moultrie, Clarkson, & Probert, 2007). Giving designers a more fundamental role can enhance the entire NPD process, creating a more synergistic versus individualistic environment. However, once a part of this process, it will also be necessary to implement management skills such as motivation and persuasion, relationship management and negotiation and the ability to effectively market a product (Perks, Cooper, & Jones, 2005). This highlights the importance of management at any level. The article of Ahire and Dreyfus (2000) showed that managing the design process has a positive input on product design performance and process quality management. It appears that good design emerges as a result of well managed processes, such as a development process that embeds organisational activities, practices and skills. Such a managed process might be considered as DM. This view is supported by Chiva and Alegre (2009) in their assessment of the effect of design investment on business performance and how this effect is mediated by DM. It was revealed that DM improves business performance and that design investment is positively related to DM. However, it is emphasized that purely investing in design does not consequentially lead to improved business performance but rather a well managed and effective process.

According to Borja de Mozota (2003: 70) DM has two objectives: ‘1) To train partners/managers and designers; 2) To develop methods of integrating design into the corporate environment.’

According to Peter Gorb (cited in Mozota, 2003) DM primarily concentrates on allocating all available design resources to businesses to achieve their strategic objectives. This discipline oversees and directs a business’ creativity and manages the business itself in accordance to their design principles. Therefore, DM has got a design educating role by communicating the value of design and integrating it into the business strategy but also a managerial task by allocating necessary resources to design and managing the design process.

The management and foremost integration of design can take place on three different levels in any business, the operational level, the functional level and the strategic level. Design on an operational level is considered as the initial stage towards integrating design, the second level is presented as creating a design function in the business and the strategic level is

characterised by the transformation of the business strategy through design. Each of the design integration levels are characterised by eight underlying factors which vary in their specification and execution depending on the levels. (Mozota, 2003) The factors are presented as:

- Strategy (Design strategy)
- Planning (Defining design procedures and briefs)
- Structure (Design process)
- Finances
- Human Resources
- Information (Developing a design understanding in business)
- Communications
- R&D

Possible impacts on the business have been identified in four key areas. Design can act as a facilitator bringing the cost, quality and time to market into rough parity with competitors; as a differentiator making products more attractive, distinctive, relevant and easier to use; as an integrator implementing design effectively with other functions and as a communicator articulating businesses' personality, purpose, and standards to internal and external audiences. However, the impact of design on these four key areas is largely dependant on the style of managing design, the employment of the right expertise and the allocation of the right resources (Hayes, 1990).

Further influential factors for the effective management of the design process have been uncovered. Especially, a set of five skills have been found being essential to the design process. These are on one hand the general ability to manage the activities within the design process. This can be on a very basic level as in managing the design process to produce high quality products but also the ability to manage specialised activities such as the ability to assess manufacturability. Further, essential skills are the ability to involve different stakeholders such as customers and suppliers in the design process. Closely related is the ability to manage change, which can refer to general organisational change but as well to the ability to manage cross-functional teams. Foremost, is the ability to manage innovation. This skill is closely related to cultural factors and especially awareness, as it involves the establishment of a creative environment, raising the awareness and generating ideas for innovation (Dickson, Schneier, Lawrence, & Hytry, 1995). Montana, Guzman and Moll (2007) describe in their brand design management model how creating a design management culture is crucial to unleash the full potential of design. A key point in creating a design culture is a strong involvement of the top management to manage the design process efficiently. Awareness and understanding of the potential of design is hereby a vital precondition. Four further activities have been identified as important DM factors, namely concept generation, design strategy, resource allocation and implementation. Olson, Slater and Cooper (2000) developed a process approach for managing design. The first step in the process is raising the awareness by articulating the business objectives and strategies amongst the entire business. The second step involves the understanding of the design requirements but foremost identifying what skills, resources and financial requirements will have to be allocated to the design process. The third step is mainly concerned with ensuring good communications between different involved departments. The fourth step consists of finalising a detailed design brief including taking into account the business strategy, design specifications and positioning against rival products. The final step is the measurement of design performance. This can include both the evaluation of the output product and the evaluation of the design process itself.

Several attempts have been made to classify design activities and capabilities. The Design Ladder presented by Ramlau and Melander (2004) and in the report of the Danish Design

Centre (2003) developed a framework to assess the degree of design activity implemented by businesses. The ladder categorises the design activities into four different levels. An important finding of the framework was that the performance of businesses improves relative to their ranking on the Design Ladder. However, the model fails to explain the criteria for placing businesses on the ladder.

The levels are presented as:

- No use of design. In these businesses, design is a hidden aspect of product development. It is generally the task of non design disciplines to develop the functionality and aesthetics of a product.
- Design as styling. Design is seen as the final styling of a product. The task may or may not be undertaken by professional designers.
- Design as process. Design is not an end result, but rather a work method adopted at an early stage of product development and requiring the involvement of several different disciplines, including design.
- Design as strategy. Design has been adopted as a central aspect of the company's business base, used as a means of encouraging innovation, for instance (Ramlau & Melander, 2004: 50)

The Design Atlas was developed to assess business capabilities and the contribution of design (Summers, 2000). It assesses businesses in five key design areas. These are planning, process, resources, skills and design culture. These five factors are assessed on the basis of 15 underlying questions. Depending on the answers given businesses can score between one to four points for each answer, while one is the lowest score and four the highest (Inns, 2002).

Moultrie and Fraser (2004) contributed the Design process audit model. This design audit is based on process maturity principles where design performance is classified into four levels. Each level is further defined by five factors. These factors respond to 24 key design activities in which businesses can achieve scores from one to four according to the levels. Maturity is defined as (Moultrie & Fraser, 2004: 34): 'The degree to which processes and activities are executed following 'good practice' principles and are defined, managed and repeatable.' The maturity levels are defined as:

Table 1 Design process maturity model

Source: Moultrie and Fraser (2004)

Factors	Level 1: Not performed or ad hoc	Level 2: Partially performed	Level 3: Formally performed	Level 4: Culturally embedded
Degree of awareness of benefits	Not aware of the benefits	Some are aware of the benefits	All are aware of the benefits	Fundamentally important to success
The people involved	Individual heroics	Functional specialists	X-functional or core team involvement	Extended team including external specialist
The timing of the activity	Typically not performed	Performed inconsistently or late	Performed consistently and early	Ongoing activity
Whether an effective process is followed	No process	Partial process-not repeatable across projects	Formal process drives performance	Continuously improving process
The level of expertise	Little or no expertise No tools applied	Some skills Basic tools applied inconsistently Lots of room for improvement	Standard tools applied consistently Not ingrained across the business Some room for improvement	Use of advanced tools and methods Culturally embedded Appropriate metrics used

METHODOLOGY

APPLICATION OF THE STAIRCASE MODEL

THE DATA

The data is derived from the DME Award entry questionnaires from 2008, 2009, 2010 and 2011. The DME Award entry questionnaire is largely identical to the original Design Management Staircase model questionnaire and features the same questions which underlie the calculation of the Staircase scores. This data relates to the DM practices employed by the entrants, their economic performance and business details. The DME Award received 153 completed questionnaires in 2008, 64 in 2009, 60 in 2010 and 44 in 2011. Though the questionnaire sets of 2008 and 2009/10/11 do not feature identical questions, the questionnaire structure and the questions for the calculation of the Design Management Staircase scores remain largely the same. The questionnaires from all four years give data that can be broken down into four subcategories. These subcategories are:

1. Business data (e.g. business size, employee count)
2. Financial data (e.g. turnover, investments)
3. Design approach (e.g. selection for design, use of design)
4. Self-assessment (e.g. affects of DM on performance, customer satisfaction)

CALCULATION OF THE DESIGN MANAGEMENT STAIRCASE SCORES

For the calculation of the total Staircase score and for the scores of each of the five underlying factors, numbers are assigned to each question. All five factors are calculated as the weighted average of these numbers. The total Staircase is subsequently derived from the average of the five factor scores.

DATA SAMPLE

Businesses were grouped following standard set in the DME Award entry guidelines (Figure 3) :

1. Micro Companies (1-9 employees)
2. Small Companies (10-49 employees)
3. Medium Companies (50-249 employees)
4. Large Companies (250+ employees)
5. Non-Profit Organisations (NPO)

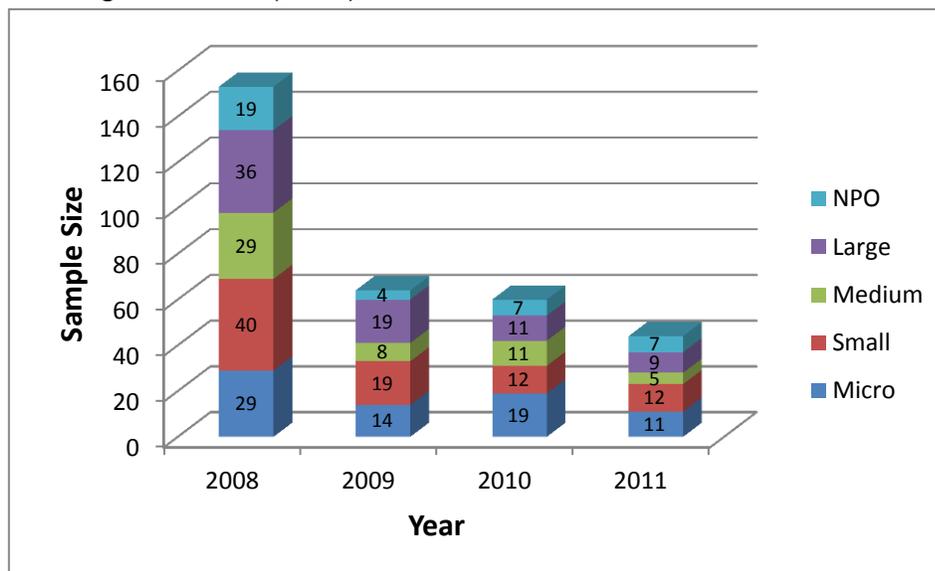


Figure 3 Sample size according to business groups for 2008-2011

DM CAPABILITY TRENDS

The average score for all Staircase categories was calculated for each year and is presented in Figure 5.

DM AS A TOOL FOR INNOVATION

Businesses were grouped following their recognition of design as a tool for innovation (Figure 4).

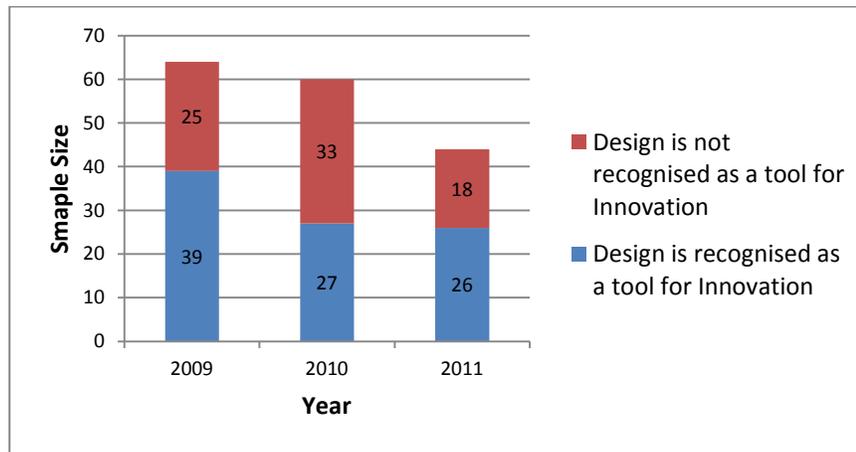


Figure 4 Sample size according to businesses recognising innovation as a tool for innovation for 2009-2011

Non-parametric tests were used since all datasets did not show a normal distribution. All significance levels were set at $\alpha=0.05$.

Datasets for 2009-2011 included additional information regarding businesses' recognition of design and DM as important tools for innovation. The Mann-Whitney test was used to compare the scores of each staircase category for businesses that did or did not recognise design as an important tool for innovation for each year (Table 2, Figure 6, Figure 7, Figure 8, Figure 9).

RESULTS

STAIRCASE SCORES CATEGORY TRENDS 2008-2011

All category scores, except for resources, show a general positive trend over the four year period. The resources scores show a negative trend, scoring highly in 2008 then declining until 2010 with a slight recovery in 2011. Despite this negative trend, the scores still remain high overall. Furthermore, the scores for process and planning are higher than the other factor scores overall throughout the 4 year period (Figure 5).

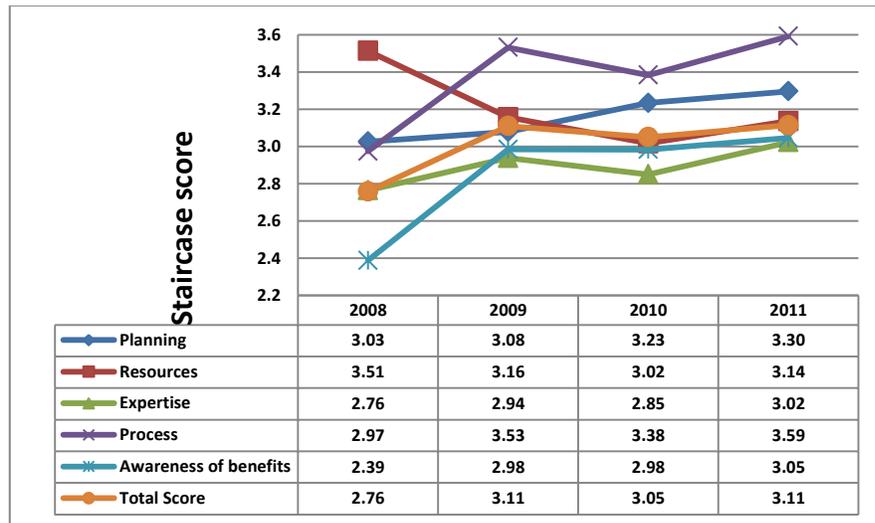


Figure 5 Development of Staircase scores 2008-2011

RECOGNITION OF DESIGN AS AN IMPORTANT TOOL FOR INNOVATION 2009-2011

A comparison was made between the scores of companies that indicated a recognition of design as a tool for innovation, and those that did not. Across these two groups there were significant differences across the factors resources, process and planning in 2009 and for the factor awareness in 2010 (see Table 2).

Table 2 Independent Samples Mann-Whitney test

Staircase factor	2009		2010		2011	
	Significant differences between businesses recognising design as an important tool for innovation or not	P-Value	Significant differences between businesses recognising design as an important tool for innovation or not	P-Value	Significant differences between businesses recognising design as an important tool for innovation or not	P-Value
Resources	Yes	0.038	No	0.526	No	0.533
Process	Yes	0.001	No	0.235	No	0.084
Planning	Yes	0.035	No	0.807	No	0.648
Awareness	No	0.196	Yes	0.040	No	0.327
Expertise	No	0.212	No	0.620	No	0.051

The frequencies for the factors with significant differences between the two groups for 2009/2010 are presented in the Figure 6, Figure 7, Figure 8, Figure 9.

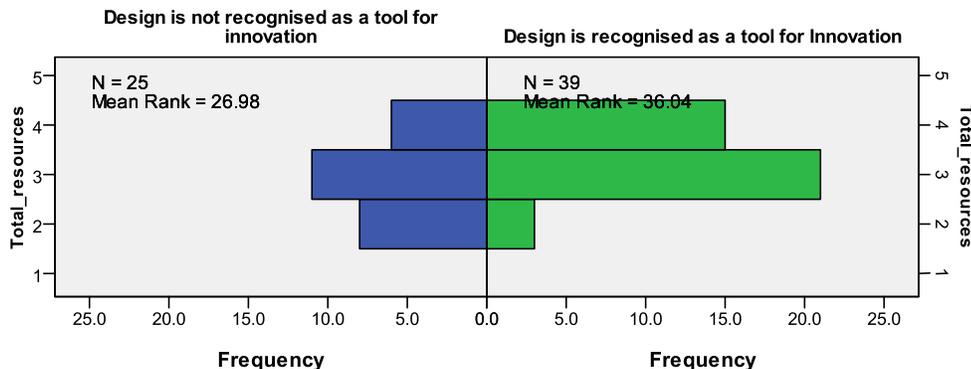


Figure 6 Innovation frequencies for resources 2009

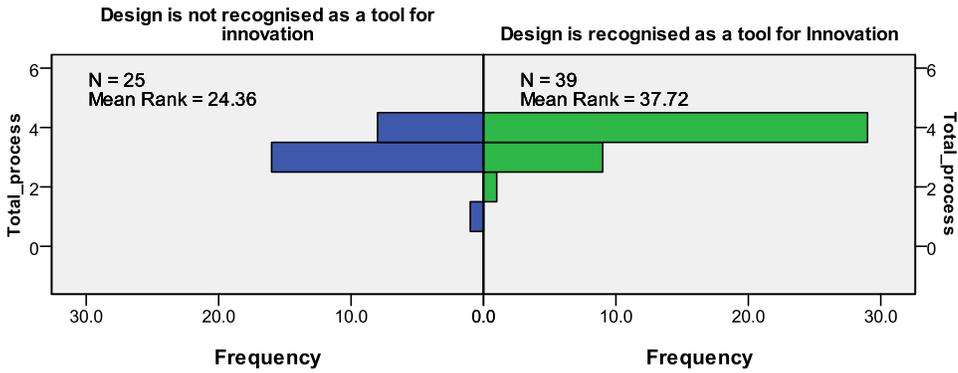


Figure 7 Innovation frequencies for process 2009

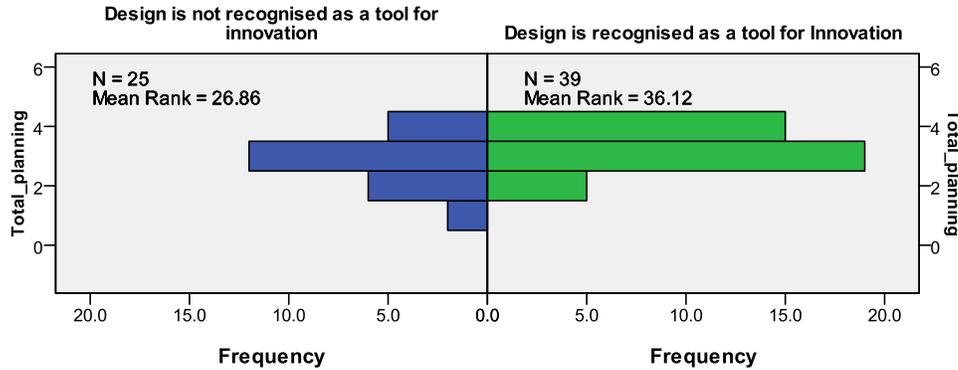


Figure 8 Innovation frequencies for planning 2009

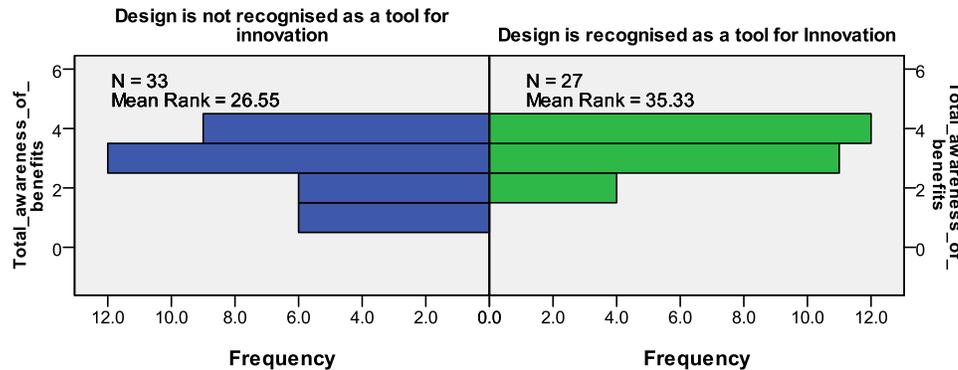


Figure 9 Innovation frequencies for awareness 2010

DISCUSSION AND CONCLUSIONS

To describe and classify DM capabilities a process perspective was chosen for the Design Management Staircase model. Design has been described as a process of active planning and decision making, resulting in a finished product (Hertenstein et al., 2005; Kotler & Rath, 1984; Olson et al., 2000). Therefore, it seems logical to choose a process perspective to classify DM capabilities, especially as recognition of the need for managing this design process emerged into the concept of DM. Further, the choice of a maturity grid implies taking on the process perspective following the definition of Moultrie and Fraser (2004: 34): 'The degree to which processes and activities are executed following 'good practice' principles and are defined, managed and repeatable.'

The structure of the levels of the Design Management Staircase model follow the Design Ladder (Kootstra, 2009). Both rely on classifications in four levels. All four levels are congruent with each other, only differing in classifying design versus DM. However, the

Staircase model does not suggest that to be effective in managing design a businesses must strive for the highest level. An essential implication of the Design Ladder on the contrary is that only businesses that reach the highest level will be benefiting from the full potential of design (Ramlau & Melander, 2004). Further, it remains unclear how businesses are placed on the Design Ladder and especially how they can achieve the next highest level. The Design Process Audit developed by Moultrie and Fraser (2004) provides more insight in this area. Similarly to the Design Ladder and the Staircase model, it classifies the design process into four levels. It presents a working model to assess businesses' current performance state. In principle, businesses can work out how to achieve a ranking in the highest level. However, it is pointed out that not every business has to strive for the highest level, rather the challenge is to be at the right level for the particular needs for the specific business, as is the case for the Staircase model. Further similarities between the two models become apparent concerning the supplementary structure of the model and its content. Like the Staircase model, all four levels in the Design Process Audit are further defined by five factors. Three of these factors are concordant with the Staircase model factors. These are: degree of awareness of benefits; whether an effective process is followed; and, the level of expertise. There are also obvious similarities regarding the definitions of the three factors on the different levels. Further, all factors in the Design Process Audit are determined by questions regarding 24 key design areas. Possible answer options are ranked from one to four corresponding to the four levels of the Design process audit. Although the calculation of the Staircase model scores is slightly more complex, the principle remains the same. The same applies to the Design Atlas (Inns, 2002; Summers, 2000). The Design Atlas is also used as a working model to assess weaknesses and strengths in the design process. Comparable to the Design process audit and the Staircase model it assesses the design process based on five factors. Each factor is based on a set of questions in which businesses can score between one and four. Again, three of the five factors are concordant with Staircase model factors. The concordant factors are: planning for design; process for design; and, resources for design. The fourth factor of the Design Atlas is called 'People for design' and is concordant with the factor 'expertise' of the Staircase model as it explores the skill sets for the design process. The fifth factor 'Culture for design' is similar to the Staircase factor 'awareness'.

A wide range of important and influential factors for design and DM were described and are reflected in the Staircase model (Dickson et al., 1995; Hayes, 1990; Montana et al., 2007; Mozota, 2003; Olson et al., 2000). The chosen level structure of the Staircase model is widely recognised, for example Mozota (2003) describes operational, functional and strategic levels. Other factors such as strategy are not reflected in the Staircase model, or are only described as part of other factors such as planning. However, the Staircase model aims to assess the DM capabilities of businesses and not the quality or appropriateness of the DM in place, which might explain the lack of consideration of outstanding factors like strategy. Nevertheless, it can be concluded that the Staircase model largely arose out of a combination of the Design Ladder, the Design Process Audit and the Design Atlas, as it follows fundamentally the same principles, structures and factors. The main differences lie in the aims of the different models. Whilst the Design Ladder, the Design Process Audit and the Design Atlas each assess design, the Staircase model examines the design process, and as a result makes a judgement on the management of design. It is arguable that assessing the design process and assessing the capabilities to manage the design process cover the same areas. However, in order to come to a final conclusion it will be necessary to analyse the Staircase model questionnaire in order to determine if the questions aim to obtain insights on businesses' mechanisms for managing the design process. The Staircase model itself does not reveal sufficient information concerning this matter.

Kootstra (2009) claims that design driven businesses are better innovators than other businesses. Various studies have demonstrated that design can be the major force for innovation, influencing innovation on different levels (e.g. Montana et al., 2007; Perks et al., 2005). But only as a well managed process can design unleash its full potential and enable businesses to use design for innovation (Knošková, 2011). Following this argument, the Staircase level classification states that only at levels three and four do businesses start to recognise design as a tool for innovation. Therefore, it would be reasonable to conclude that all businesses that recognise design as a tool for innovation would obtain level three or four, and conversely all other businesses would be limited to levels one and two. Within the available data set there are similar numbers of companies that have both indicated that they do indeed recognise design as a tool for innovation, and those that do not (Figure 4). The analyses with the Mann-Whitney test, comparing the scores of each Staircase factor for businesses that did or did not recognise design as an important tool for innovation, revealed significant differences in the scores for 2009 in the factors resources, process and planning. In 2010 a significant difference uncovered for the factor awareness (Table 2). Possible explanations for these differences lie in the nature of the Staircase model, that is, as it is built on a process perspective certain factors influence other factors. In this particular case it is arguable that a changed perception about design as a tool for innovation changes also the allocation of resources to the design process, the design process itself and the planning process. Similarly, an especially a high level of awareness might lead to the recognition of design as a tool for innovation; Mozota (2003) argued that awareness stimulates innovation (Figure 6, Figure 7, Figure 8 and Figure 9). Businesses which recognise design as a tool for innovation score significantly higher than the businesses which do not. However, the analyses of the interdependencies of the different factors go beyond the scope of this paper and will be addressed in future research. A possible explanation for the lack of significant differences in the other factors, and for all factors in 2010 may centre on an improved selection of businesses for the DME Award in combination with the instruction of the Staircase model that businesses do not have to strive for the highest level. Over time it appears that entrance to the award has become more selective. This is reflected in Figure 3 which illustrates the declining number of participants but also in Figure 5 showing the positive trend in the Staircase scores. A combination of both factors may lead to a greater proportion of entrants having good DM at lower Staircase levels, who still recognise design as a tool for innovation. However, it is indicative of a problem with the Staircase model if the instruction is that one does not need to achieve a high level (only an appropriate one), yet recognition of design as a tool for innovation is a pre-requisite for achievement of the higher levels. Further, it is possible (and demonstrated in the results) to achieve these high levels even if a company indicates that it does not recognise design as a tool for innovation, as the overall score is generated from a simple average across all responses.

LIMITATIONS

It is the nature of models such as the Design Management Staircase that there will always exist a wide range of limitations. The reasons for this are twofold: there is a limited extent to which a model can consider all of the influential factors for each business; and, models are always limited by the current state of research. A further limitation is the data gathering. The answers to the questionnaire that underpins the Staircase scores are largely dependant on the individual's perception. This makes comparison between businesses and the classification in the model itself subjective. Further still, as the questionnaire is linked to a competition, then organisations might bias their self-reporting in an attempt to win an award. In addition, the data sets contain different businesses each year, so there is no potential for examination of business progression over time.

FURTHER RESEARCH

Understanding how the Design Management Staircase model was developed, and what it is based on, is a first step to understanding the potential of the Staircase model in assessing DM capabilities. As a result, this investigation has produced information that can be used to build upon and improve the Staircase model to create a tool that is useful to business and academics in the assessment of DM capabilities. As an immediate action, the authors intend to examine the questionnaire which is used to calculate the Staircase scores. This step will be necessary to analyse how appropriate is the choice of the questions for the provision of insights into the five factors. Further, it would be interesting to analyse the interdependencies of the five factors, in order to gain further insights into which of the factors are the most important or have influence over the others, and, to examine how the scoring reflects the stated criteria for each level. In addition, investigating how business categories differ from each other within the different factors will offer valuable insights into which type of business has the greatest DM capabilities or potential. This will also address one of the limitations of this paper, by examining the influence of the position of the individual on capability level, thus paving the way to establishing the Staircase model as a valuable tool for assessing DM capabilities.

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