



The importance of design for firms' competitiveness: A review of the literature



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ARTICLE INFO

Available online 4 February 2014

Keywords:

Design
Strategy making
Consumers' needs
Value creation
Literature review
Firm competitiveness
Research gaps

ABSTRACT

Scholars dedicated increasing attention towards appreciating how design has changed individuals' perception of new products, firms' understanding and formulation of strategy, or other relevant actors' approach to innovation and technology management. By emphasising the importance of design for the definition of consumers' needs, the restructuring of firms' organisational structures and strategies, and the evolution of firms' value creation processes, this review paper identifies relevant research gaps and questions that would benefit from future scholarly attention. In particular, it is suggested that such effort should address the analysis of how design consumption can help better comprehend consumers' needs; what are the implications of design thinking on the skill sets of design professionals; the organisational structure of firms, including the reconfiguration of other business functions, and their strategy; and whether and how design thinking can shape firms' value creation processes and contribute to the formalisation of design tasks.

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1. Introduction

It is widely recognised that design is an important factor contributing to firms' success because of its potential to boost their competitiveness (Hertenstein et al., 2013; Roy and Riedel, 1997). However the influential role of design extends beyond the performance of the actors directly involved in the manufacturing of products (e.g., manufacturers, retailers) and pervades different spheres of action of individuals (e.g., consumers, users), organisations (e.g., professional designers, firms), and other types of entities (e.g., nations). For instance, scholars have examined how design has changed individuals' perception of new products (Creusen and Schoormans, 2005; Rothwell and Gardiner, 1983), firms' understanding and formulation of strategy (Gemser and Leenders, 2001; Hertenstein et al., 2005; Roy and Wied, 1986), or governors' policy design (Berger et al., 1989; Wray, 1991). Stating that design has impacted the world around us should then come of no surprise. To draw on some real life examples, one could think of how the iPod has changed our attitude to listen music, the Kindle eReader our attitude to reading, or the recent success registered by Tiffany & Co's jewellery (i.e., quarterly increase in sales of 7.5 per cent, November 2013, Financial Times). As the senior luxury goods analyst Mario Ortelli (Bernstein Research) states, "when it comes to watches and jewellery, the value and appeal of a piece can lie as

much – if not more – in craftsmanship and expertise as opposed to the superficial design" (Paton, 2013a, 2013b). Thus designers have to create products which not only look good but also create value that can be appreciated by the actors involved (Utterback et al., 2006; Verganti, 2009).

Such widespread interest towards various aspects of design has led to the blossoming of multiple definitions of design, all of which are a testimony of its versatile nature (Johansson-Sköldberg et al., 2013; Schön, 1983; Simon, 1969). Although scholars agree on the centrality of design for firms' innovativeness, there is still uncertainty about the channels or mechanisms whereby design exerts its 'power'. Creativity is indeed a major component of design, which translates into a high degree of subjectivity and tacitness, hence the difficulty to measure its actual contribution (Dorst and Cross, 2001; Walsh and Roy, 1983).

This conceptual paper about design in management science tries to address this gap by exploring how design phenomena changed not only firms' strategy making but also the way they interpret and, at the same time, inspire consumer behaviour. This latter effect is further amplified by the establishment of non-technological innovations, that is, those new products the success of which depends on more subjective and intangible factors such as aesthetics or symbolic values (Hirschman, 1982; Ravasi and Rindova, 2008). Design is understood as part of a problem-solving activity, beginning with the perception of a gap in a user experience, leading to a plan for a new artefact, and resulting in the production of that artefact. In practical terms, this means that, to better comprehend the role of design in both the development

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of new products and their commercialisation, a process view would account for the required activities as well as the players involved (along with their specific characteristics) to carry them out (Simon, 1969). Differently from extant innovation and management literature, the current paper proposes a new angle of analysis, that is, how the design 'lens' can help learn about consumers' emotional responses, and how it can push firms to think differently about user needs. It is also argued that these aspects will indirectly affect firms' organisational structure and strategy making along with their value creation processes.

The remainder of the paper is structured as follows. Section 2 reviews the various definitions of design available in the literature and specifies how it is understood for the aims of this research. Then Section 3 reviews the innovation literature by illustrating how design influenced firms' ways of thinking about consumers' needs, firms' approach to new product development (NPD) and strategy making, and the overall impact on the mechanisms of value creation at firm level. By building on these contributions, Section 4 discusses emergent research gaps and discusses possible avenues for future research. Final remarks and reference to the limitations of the study will conclude the paper.

2. Defining design

The significance of design has been recognised by scholars from different fields such as artificial sciences and engineering (Hevner et al., 2004; March and Smith, 1995; Simon, 1969), innovation and aesthetics (Petroski, 1996; Verganti, 2003; Walsh, 1996), management (Cooper and Press, 1995; Dumas and Mintzberg, 1989; Walsh et al., 1992), and arts and creativity (Olins, 1986; Potts, 2009; Potts and Cunningham, 2008; Sparke, 1986). These bodies of literature highlight how the drivers for innovation that underpin design can range from purely artistic elements to more problem-solving, engineering-based reasoning. This leads to design impinging on different types of knowledge, from the more rational and formalised, thus objective, knowledge of engineering designers to the

more expressive and tacit, thus subjective, knowledge of graphic designers. As a result, despite a shared understanding that design is a potential enabler of innovation, the spectrum of meanings acknowledged is still relatively wide.

How did design come to gain such recognition? Arguably the first design publications date back to Roman times with work by Vitruvius, a roman writer, architect and engineer active in the first century BC and best known for his multi-volume work *De Architecture* ("On Architecture"). However it was only in the 1960s that major research programmes were initiated by drawing on the systems view and using concepts from operations research (Jones and Thornley, 1963). A desire to 'scientise' design can be traced back to the twentieth century Modern Movement in design, when the protagonists for the movement proactively produced works of art and design based on objectivity and rationality, that is, based on the values of science (Cross, 1993, 2000; Cross et al., 1981). However serious attention towards design being worthy of in-depth, scientific investigation was triggered in the early 1960s by two conferences, one held in London in 1962 and one held in Birmingham in 1965 (Maffei, 2010), both of which raised interesting debates on the need to develop a science of design.

The term 'design science' was officially introduced by Gregory (1966a), who proposed that "design science is concerned with the study, investigation, and accumulation of knowledge about the design process and its constituent operations. It aims to collect, organise, and improve those aspects of thought and information which are available concerning design, and to specify and carry out research in those areas of design which are likely to be of value to practical designers and design organisations" (Gregory, 1966b:123). Herbert Simon's (1969) *Sciences of the Artificial* is yet the landmark contribution that considers the nature of the disciplines dealing with phenomena as if they were artefacts. As he warns us, "we need a science of design – intellectually tough, analytic, partly formalisable, partly empirical and teachable" (Simon, 1969:xii). It is with Simon's contribution that design develops its first roots in engineering and the sciences of the artificial. Under this perspective, design is a problem-solving

Table 1
The evolving nature of design and its dimensions.

	Creative dimension		Shaping dimension		Applicative dimension
	Design as creation of artefacts	Design as problem-solving activity	Design as a reflexive practice*	Design as making sense of things*	Design as a key input to strategy
Definition	Design research consists of studying, researching, and investigating the artificial made by human beings and the way these activities have been explored in academia or employed in manufacturing.	Design is a problem-solving activity involving the definition of the problem, the identification and generation of alternative solutions, and the evaluation and selection of the most suitable one(s).	By complementing Simon's cognitive perspective, the designer is conceived as a practitioner focusing on the relation between creation and reflection-upon-the-creation that allows for constantly improved competence and re-creation.	While in the same tradition initiated by Schön, here abductive processes are used to make sense of and generalise from observations. Thus design finds its expression in practical experience and can be ascribed through practical examples.	Design relates directly to the strategy of the firm. It seeks to optimise consumer satisfaction and company profitability through the creation of form, durability, and values along with products environments, information, and identities.
Source Other relevant sources	Simon (1969) Krippendorff (1989, 2006)	March and Smith (1995) Buchanan (1992), Petroski (1996)	Schön (1983) Bousbaci (2008), Dorst (1996), Rylander (2009)	Lawson (2006), Cross (2006) Cross (1997), Gero (1990)	Kotler and Rath (1984) Dumas and Whitfield (1989), Gemser and Leenders (2001)
Implications	Design is conceived as the activity aiming at exploring the creative input of individuals and/or firms and how it is shaped for the implementation within firms or other entities.	Reconsidering the role of design know-how in new product development and innovation processes.	Managers are well aware of the important areas of practice that fall outside of technical rationality. While dealing with decisions under uncertainty, managers develop a problem-solving ability based on intuition rather than the study of theory or techniques.	Design represents the negotiation between problem and solution through the activities of analysis, synthesis, and evaluation. The designer plays a prescriptive role as (s)he describes how the world might be.	Design is conceived as the means to increase the competitiveness of firms. This dimension of design captures the possibility to apply design reasoning and principles to the formulation and execution of strategy.

* Inspired by Johansson-Sköldberg et al. (2013).

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