

Oil in water? Explaining differences in aesthetic design emphasis in new technology-based firms

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Abstract

The purpose of this research is to investigate how differences in aesthetic design emphasis among new technology-based firms (NTBFs) can be explained. Four hypotheses are developed based on a synthesis of existing research in the fields of design, strategy and entrepreneurship. The hypotheses are tested based on a survey of 103 NTBFs. The results of the research indicate that aesthetic design emphasis is significantly related with the importance of aesthetic design in a firm's chosen sector, which can be classified as a positioning factor. Aesthetic design emphasis is also significantly related with founder characteristics, which are resources factors, namely founders' technical education and founders' experience of sales and marketing, respectively. The results of the research lend some support to the anecdotal notion that engineers do not appreciate the value of aesthetic design and suggest that the source of this lack of appreciation is their education.

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1. Introduction

There is increasing appreciation that differentiation based on technological factors alone is not sufficient to insure success in today's competitive markets. Instead, the use of aesthetic design as an element of innovation has been proposed as an important means for achieving differentiation, leading to competitive advantage and improved performance (Hertenstein et al., 2005; Gemser and Leenders, 2001; Norman, 2004).

The opinion that aesthetic design is too expensive to justify is common (Hertenstein et al., 2005). This view can be expected to be more pervasive in new firms than in more established firms since new firms are generally more resource constrained than established firms (Murray and Lott, 1995; Garnsey, 1995). At the same time, the ability to use aesthetic design as an element of innovation is particularly important for start-up firms because their strategies are likely to be based on differentiation (Carter et al., 1994; Black and Baker, 1987).

New technology-based firms (NTBFs) constitute a class of firms that should be especially sensitive to the use of aesthetic design to achieve competitive advantage. NTBFs base their existence and success on technological innovation and aesthetic design can create a bridge between technical functionality and the value of products and services (Walsh, 1996; Hertenstein et al., 2005) and improve performance (Gemser and Leenders, 2001). To insure good design Norman (2004) argues that it is not sufficient to focus on functional design, which can be expected to be a prevalent focus in technology-based firms, but that aesthetic aspects of design are equally important. Roy and Riedel (1997) similarly found that commercially successful technological innovation projects involved a multidimensional approach to design.

Despite the importance of aesthetic design for the competitive advantage of NTBFs, little is known about these firms' emphasis on aesthetic design. Moreover, research is still scarce on the antecedents and outcomes of different design management practices (Chiva and Alegre, 2007). The purpose of this study is to investigate how much weight NTBFs put on aesthetic design as an element of innovation and how differences in aesthetic

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design emphasis can be explained. This should contribute to an understanding of how early stage conditions influence design management practices and subsequent performance in technology-based firms.

Before discussing the research methodology, the following chapter provides an overview of the theoretical background for the research followed by the formulation of hypotheses regarding factors explaining variation in aesthetic design emphasis. The paper continues with a discussion of the empirical data and the variables and measures used. The results are presented, and the paper closes with a discussion of these results, the conclusions reached and their implications.

2. Theoretical background

The concept of the NTBF has been used in a number of different ways. Most authors agree that NTBFs base their operations on technology, but make different assumptions with regards to the firms' origins and the newness of the technology. For example, Roberts (1991) refers to NTBFs as spin-offs from university settings that exploit advanced technology, Autio (1995) includes all spin-offs which exploit advanced technology, and Bollinger et al. (1983) define NTBFs as new firms that are established in order to exploit a technological innovation independently of the novelty of the innovation or the underlying technology. For the purposes of this study, we use Bollinger's et al. (1983) definition focusing on NTBFs as venues for technological innovation, and define NTBFs as *new independent firms that develop new products and services based on the technical knowledge of their founders*. In keeping with Bollinger's et al. (1983) definition, such new products and services may be based on new technology or may constitute incremental improvements over existing products and services.

The technological innovation process is sometimes described as a not entirely harmonious integration of two factions (Marsh and Stock, 2003). The first faction is primarily technical in nature (e.g. R&D and engineering), and the second is primarily commercial (e.g. design and marketing). The commercial faction is concerned with providing a bridge from technical functionalities to value in a finished product or service. Design, as part of the innovation process, includes activities which enhance and communicate the value of products or services (Hertenstein et al., 2005; Yamamoto and Lambert, 1994).

As argued by Norman (2004), design encompasses both functionality and aesthetics. While functional design is concerned with the practical concerns of features and utility, aesthetic design is concerned with visceral appeal, or how products and services appeal to the senses, and the experiences created through their consumption or use. Norman further argues that there is a strong connection between aesthetic design and usability. This resonates with the research reported by Van der Heijden (2003) who finds

that the perceived visual attractiveness of web sites influences usefulness, enjoyment and ease-of-use.

3. Development of hypotheses

Firms' emphasis on the use of aesthetic design in the innovation process can be viewed as part of their competitive strategy. Activities are the basic units of competitive advantage and choosing activities and how to perform them to deliver a unique mix of value is the essence of competitive strategy (Porter, 1996). The level of emphasis on aesthetic design will influence to what degree, and how, aesthetic design is used in innovation activities and will, in turn, influence the perceived value of the products and services resulting from this innovation.

Assuming that emphasis on aesthetic design can be a part of a firm's competitive strategy it follows that differences in emphasis across firms can be explained in a similar way as differences in competitive strategy. There are two distinct perspectives within the strategy literature with regard to the sources of differences in competitive strategy. These perspectives can be labelled the *positioning perspective* (Porter, 1980, 1985) and the *resource-based perspective* (Wernerfelt, 1984; Barney, 1991; Peteraf, 1993), respectively. Hypotheses based on each of these perspectives are developed below.

3.1. Hypothesis based on the positioning perspective

According to the positioning perspective, competitive advantage is based on the underlying structure of the industry where firms compete. The primary goal of competitive strategy is to "find a position in the industry where the company can best defend itself against these competitive forces or can influence them in its favor" (Porter, 1980, p. 4). Therefore, the sources of competitive strategy are rooted in the forces of competition within an industry, based on the assumption that managers are able to identify, and willing to secure, a favourable position with regard to these forces. Over time this will lead to relative homogeneity in competitive patterns within industries where less successful firms imitate the strategies of more successful ones (Demsetz, 1973).

Due to homogeneity in competitive patterns specific strategies may be required in order to compete in a particular industry. For example, Ford (1988) classifies 'basic' technologies as technologies on which a technology-based firm depends, and without which it would be unable to compete in its industry. Similarly, the emphasis on design required to compete has been found to vary across industries. Gemser and Leenders (2001) found the relationship between industrial design¹ and various performance

¹Gemser and Leenders' (2001) use of the term industrial design is in conformance with commonly used terminology. This paper uses the term aesthetic design instead of industrial design to avoid terminology, which is commonly associated primarily with product manufacture, as is the case

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