

The Way of Knowing Design Management

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Abstract: Though design management has become influential and been viewed as a key element for business success in recent years, it still is considered as an under-researched and under-developed discipline with a lack of body of knowledge. In this instance, survey and case study were initially considered as the best research methods for accumulating information. Moreover, a new research approach has emerged recently: a mixed method with qualitative and quantitative. Within studies of design management, however, few explained the reasons for employing these research methods. This paper explored the reasons through analyzing previous studies of design management. As a result, three ways of knowing design management: qualitative, quantitative, and combined approach, were obtained. It is indicated that they not only emerge as a response of different recognizing stages, also represent different epistemologies of design management.

Keywords: *Case study, Design Management, Mixed Method, Qualitative, Quantitative*

1. Introduction

Design management is a subject combining design with management to study how design can be managed and utilized in a project, an organization or a nation. It is independent from other management content because of the nature and characteristics of design. The comparative cognitive structure between design and management is another reason for the emerging of design management, to study the controversy and to bridge the gap [5].

However, design management is still considered as an under-developed and under-researched discipline, which lacks its own body of knowledge [27, 56]. Despite plentiful research, there is still no concise definition because of its complexity and wide range of contents [9]. As a consequence, the majority studies of design management focus on obtaining information from practice. This can be proved by the study of Kim and Chung [26]. According to their report, among 765 articles published by *Design Management Review* and the *Academic Review* between 1989 and 2006, 458 authors were practitioners in firms. Only 205 of the authors were from academic background, including professors, students, and researchers. Moreover, some of those researchers had also gained practical design experience in their previous careers. For example, the President of the Design Management Institute (DMI), Dr. Thomas Lockwood, is a professional researcher. Previously, he worked in both design consulting and corporate design management, his experience including running a design consultancy for ten years [14].

As an under-developed and under-researched discipline, collecting first-hand information from practice and transforming it into basic knowledge for theory building are the major works of design management research. Survey findings and case study data are influentially utilized in related studies, because of their efficient effect in collecting information and building theory as inductive techniques for a young field [56].

Survey and case study represent two independent research approaches. A survey is for quantitative purposes, while case studies require qualitative methodology and corresponding analysis. These two approaches dominated the majority of studies of design management in the early stages. In an analysis of previous studies of design management in the last twenty years, it was discovered that a third approach had emerged in last few years, this being a combination of qualitative and quantitative research methodologies. Today, these three approaches cover all studies of design management. In this instance, studying the objectives and logic of these approaches can help to achieve an understanding of the development of design management.

2. Research Method of Design Management: Survey and Case study

2.1 Survey

In studies of design management, it may be seen that a survey is one of the most important and efficient research methods. A sample survey is particularly useful when individual participant's information should be avoided. It can offer an overall result, which covers the whole studied topic. It is considered especially valuable in studying commercial and competitive performance [32]. In most cases, the results can help to uncover patterns of effective design management, as well as to test and refine an expanding body of design management theory [56].

To obtain information in a survey, data is normally achieved by face-to-face visits, telephone interviews, or postal questionnaires. With designed questionnaires, a large quantity of data may be obtained from each subject. Although compared with case study, survey method is more expensive and takes a longer time, researchers still prefer to conduct surveys when budget and time span are not too limited. This is because the results are supposed to cover broad and diverse categories, which is useful for accumulating first-hand general information for future theory building in this young field [32].

2.2 Case study

In this stage of design management, case study research is viewed as a persuasive medium for bringing design management concepts into the current body of knowledge about management practice [32]. It can provide a hands-on, insiders' perspective on how a company addresses design issues [17,56]. According to the analysis by Kim and Chung [26], design management research was conducted largely focused on the practical case studies of firms. Since there is no existing body of literature or theoretical framework, the advantage of employing case study research is to help collect material for developing a framework. Once there is a sufficient number of case studies, researchers can begin to develop a framework for comparing key issues in the field [17].

Although case study research is considered suitable for design management research and has been influentially conducted in previous studies, its disadvantages are still argued by other scholars. As Walsh, Roy and Bruce [54] stated, it tended to a 'snapshot' of design, instead of a holistic view, and too specific for general validity. Potter

[32] indicated a similar opinion that case studies were limited in number and lacked generalizability. Moreover, the interviewed firms usually do not prefer to answer certain questions relating to their business secrets, such as profit margin, sales and organization structure.

To avoid the limitations of case study and improve the options for generalization, three solutions are nominated by Bryman [8], including conducting multiple case studies instead of a single case study, using triangulation of research methods in case examination, as well as combining quantitative with qualitative research in designing the research approach for producing a general picture.

Survey and case study not only represent different research objectives, but also imply ways of understanding design management. In this paper, previous studies of design management were sorted and analyzed for an overview of the research methods employed. Based on this, three ways of knowing design management are illustrated via their utilization of survey or case study as the major research method.

3. Three Approaches of Design Management Research

As Borja de Morzota [3] stated, the body of knowledge of design management consists of three levels: action, function and vision (Table 1). Though the term used to describe each level may vary in sources and researchers, its contents are same [1,3,5,54].

Concerning the three levels, themes of previous design management studies can be divided into macro and micro according to the scope of subjects. These scopes range from micro, such as individual designers, design teams, product projects and companies, to macro, such as clusters of firms and nations [7]. The research content of macro themes includes discipline and vision of design management, and relationship between design and economy, such as how to improve international competitiveness via design policy and design. The micro level focuses on practice of design and business, such as design implementation, design consciousness, design value and design investment in a team or an organization.

Table 1. The three levels of design management

Design ACTION	Design FUNCTION	Design VISION
The differentiating value of design	The coordinating value of design	The transforming value of design
Design is an economic competency that changes the primary activities in the value chain.	Design is a management competency that changes the support activities in the value chain.	Design is core competency that changes the value chain of the sector and the vision of the industry.
“3” brand marketing Production Communication	“3” Structure Technology management Innovation management	“3” Strategy Knowledge management Networking management
Operational design management	Functional design management	Strategic design management

Source: Borja de Mozota, B. *Design management: using design to build brand value and corporate innovation*. New York: Allworth Press, 2003, pp. 258-9.

In this study, forty studies of design management and related topics were collected to review the research methods used (Appendix A). These studies were conducted between 1974 and 2005. The majority of them were published as books, journal articles and reports. Three pairs of factors were employed to analyze these studies:

- Research approach: quantitative or qualitative
- Research scope of topic: macro or micro
- Research method: survey or case study

In addition, the time factor is also involved to study the transferring trend of the above factors.

According to the analysis of these previous studies in design management and related topics, three main trends were found, which are summarized in the following.

1. For issues at a macro level, quantitative approach is primarily employed, while qualitative approach is normally applied for investigating micro topics.
2. Case study method was utilized in the study of design management at an early stage. About ten years later, survey emerged as another major research method. Since the 1990s, the combination of survey and case study has appeared as the third approach (Figure 1).
3. There are three ways of conducting research in design management: quantitative, qualitative and the combination of both.

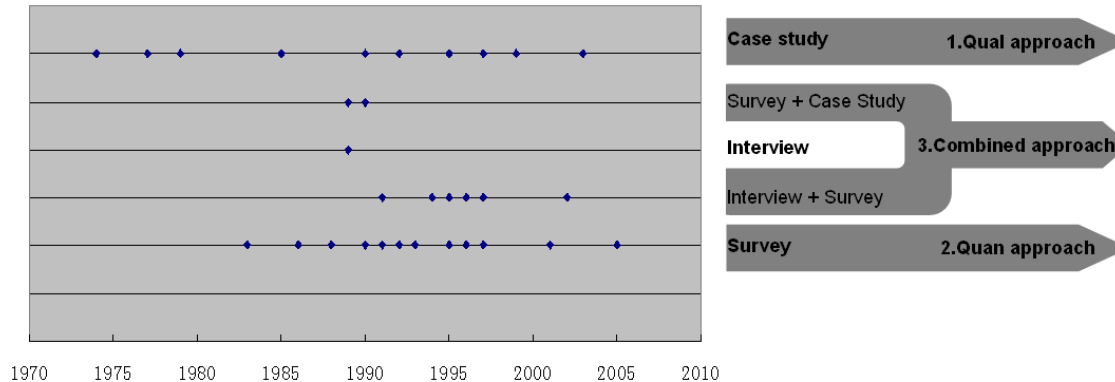


Figure 1. Development of research methods in design management

In this study, quantitative and qualitative approaches are employed as key clues to analyze previous research. It was held that their relations of topic scope and research methods would contribute to the understanding of research epistemology of design management. The two approaches not only involved different strategies and data collection procedures, but they also represented different epistemological frameworks [8]. Bryman [8] states that quantitative research is associated with a number of different approaches to data collection, while the qualitative approach is to the study of the social world which seeks to describe and analyze the culture and behaviour of human beings. A similar logic can also be applied in the third combined approach. These are the three ways of knowing design management.

3.1. Qualitative research

In the early stages, qualitative research of design management is usually conducted by using case study methodology. Case study method was initially utilized in the 1970s, focusing on the study of industrial innovation or technology innovation [11,37]. At that time, the majority of these studies were conducted by government or for national politics related to design. Today, although case study is still considered to be a main research approach of design management, its objective has been transferred for academic studies, instead of government reports.

In academic and professional research, researchers prefer to conduct qualitative studies for in-depth theory building. To achieve this, they obtain thick descriptions and in-depth discovery of phenomena through qualitative methods, especially case study [4,15,16,23,41]. To understand the role of design in market strategy, Borja de Mozota [6] studied eleven international projects using a qualitative approach. Hart [21] interviewed twenty firms to explore the solution to the successful development of well-designed products as well as establish a climate for design integration in a firm. Design Management Institute [15] compared fifteen cases to discover critical successful factors for managing the product development process. These studies all focused on enhancing understanding of one explicit topic of design management via case study.

3.2. Quantitative research

The majority of quantitative studies are supported by government bodies, such as the Department of Trade and Industry (DTI), and the Design Innovation Group (DIG) at the Open University and UMIST in Britain [10,11,39,51,54]. These studies focus on industry and national competitiveness or design policies. The findings are generally published as working papers or white papers. With government support, these studies normally have enough funds and multiple resources to conduct surveys or carry out substantial quantitative analysis of reported data. For example, Roy [43] surveyed thirty-seven British firms and ten foreign sectors to explore principles and practices for successful design and production in Britain. This was supported by the DIG and published in Report DIG 02. With the co-operation between UMIST, DIG and the Design Council, Walsh and Roy and Potter [42] conducted two studies to describe British design performance in enhancing international competitiveness. Supported by DIG and UMIST, their first study involved sending questionnaires to forty-one British firms. In the second stage, 221 questionnaires were collected by the Design Council. The objective of these studies was to generate a basic knowledge of design management in Britain.

3.3 Combination of quantitative and qualitative

Though both quantitative and qualitative approaches have been influentially employed in previous studies of design management, a combined approach has still emerged since the 1990s [4,16,19,34,46,47,52]. The advantage of the combined approach is to integrate different paradigms at various stages in the research process to better understand a concept being tested or explored [13]. In design management research, this kind of combined approach is considered rather special, as it involves a mixture of quantitative and qualitative data of varying complexity. In implementation, there usually are two types of combination. One consists of case studies and a survey; another combines a survey with qualitative interviews.

Since design management remains an underdeveloped, under-researched field, researchers prefer to achieve a full picture of any design management subject. This requires both detailed qualitative information from in-depth interviews or case studies, and breadth provided by sample surveys [17,32,56]. However, this also raises another difficult point in applying the combined approach, that being, how to organize the different paradigms in a single study.

According to Creswell [13], there are three models for the combined approach: two-phase design, dominant-less dominant design and mixed-methodology design. These three models cover the majority studied with a combined approach. In design management research, a combined approach is usually conducted as dominant-less dominant design.

The relationship between quantitative and qualitative research varies its form in the dominant-less dominant design of a combined approach. According to the definition by Creswell [12], the relationship can be divided into two types, QUAL-quantitative illustration and QUAN-qualitative illustration. The former employs a quantitative method to analyze data, based on qualitative research. The latter utilizes qualitative method to study, based on the preliminary quantitative results. These two types of research have developed their own context in design management studies.

In QUAL-quantitative illustration, a survey is usually conducted based on qualitative interviews. In implementation, survey typically takes form of face-to-face visits, telephone interviews, or postal questionnaires [32]. Hollins and Hollins [24] wrote that when interviews were utilized with a questionnaire, the purpose often was exploratory and diagnostic to provide information for a structured questionnaire. Interviewing can be conducted under the headings of either qualitative or quantitative. Concerning four forms of interviewing - telephone, postal, computer based and personal interviewing - the former three are effective methods of collecting information for a questionnaire. However, in a combined approach, the interview refers to a qualitative type, which involves personal interviewing, either in small group or in large group. It is usually conducted as an open-ended interview to achieve qualitative data. For example, to study the organization, communication and operation of product design in the context of design management, Teng [48] combined qualitative in-depth interviews with a quantitative questionnaire for three cases.

In most cases, QUAN-qualitative illustration refers to case studies based on the results of survey in design management topics. Potter [32] indicated that in this type of research, sample surveys complement case studies by providing statistically valid information and help to provide a contextual understanding of individual case studies. To explore practice and attitudes towards the management of design in industry in Britain, Dumas and Whitfield [16] employed four steps of research to combine their results of a questionnaire and case study materials. First, a pilot study to establish focus; secondly, the development and piloting of a questionnaire; thirdly, a company study to examine the design process in depth; finally, administering the questionnaire to companies. With the QUAN-qualitative illustration, researchers preferred to explore in-depth problems based on an objective overview of background. In this instance, a survey is conducted to offer focus or basic understanding of studied objects. With it, case studies can avoid the criticism of lacking generalizability and validity.

4. Conclusion

After the term ‘design management’ first emerged in the 1960s, related studies were conducted over a period of thirty years. During this period, research methods were adapted at different stages, according to the accumulated knowledge. Figure 1 demonstrates this change, based on the research methods of related studies during the stated time period.

Case study method is firstly employed when studies commissioned by government to discover design management related topics and problems were undertaken in the 1970s. At the beginning of the 1980s, survey method was introduced in this new field for describing whole situation, especially in the case of report outputs or advice for the formulation of national policies. It replaced case study in studies of macro issues because of its capability to generalization and validation. At this time, although case study was still a main research method in design management, it was more likely to be employed by professional researchers to explore in-depth topics.

Before the 1990s, survey and case study had developed into two dominant research methods in design management. However, the two methods are different in terms of their researchers, objectives and contributions. Survey is utilized as quantitative research for macro issues with large scale data covering broad topics to offer an overview of the concept of design management. It is influential if conducted by government or institutions. Its findings are usually published in an advisory report for the reference of policy makers or white papers. Case study is employed as qualitative research for micro issues with in-depth description and information for certain topics. In most cases, academic researchers, professors or students would like to utilize the case study for exploring explicit problems. Its results are normally published as professional papers, books or theses.

To date, survey and case study are still two main research methods used in design management. However, information accumulation of this new discipline has achieved its aim in current stage. In this instance, researchers began to transfer their orientation from collecting information into theory building. To research the aim, since the 1990s, a new combined approach appeared in design management research. It consists of two types. One is QUAL-quant, which combines qualitative interview and survey; another is QUAN-qual, which mixes survey and case study methods.

These research methods consist of the three ways of knowing design management: qualitative, quantitative, and combined approach. These ways not only represent different epistemologies of design management at different recognizing stages, they also imply methodologies of design management, which suggests the theory should be based on realization of “reality” in this new field.

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Appendix A. Previous Studies of Design Management

No. Study	Study	Research Method			Research Approach			Reference
		Case Study	Survey	interview	Quan	Qual	Combined	
1	Rothwell, R., Freeman, C., Horsley, A., Jervis, V.T.P., Robertson, A.B., Townsend, J. (1974)	Y			Y			[38]
2	Robertson, A. (1977)	Y				Y		[37]
3	Topalian, A. (1979).		Y		Y			[50]
4	Corfield, K. G. (1979)	Y			Y			[11]
5	Rothwell, R. and Zegveld, W. (1982)		Y		Y			[40]
6	Walsh, V. and Roy, R. (1983)		Y		Y			[53]
7	Borja de Mozota, B. (1985)	Y				Y		[6]
8	Roy, R., Salaman, G.. and Walsh, V. (1986)		Y		Y			[43]
9	Walsh, V. and Roy, R. and Bruce, M. (1988)		Y		Y			[55]
10	Hart, S. and Service, L. (1988)		Y		Y			[20]
11	Ughanwa, D.O. and Baker, M.J. (1989)	Y	Y				Y	[51]
12	Hart, S., Service, L. and Baker, M. J. (1989)			Y	Y			[21]
13	Hollins, B, and Pugh, S. (1990).		Y		Y			[25]
14	Roy, R. (1990)		Y		Y			[41]
15	Rothwell, R. (1990)	Y				Y		[42]
16	Dumas,A. and Whitfield, A. (1990)	Y	Y				Y	[16]
17	Potter, S., Roy, R., Capon, C. H., Bruce, M., Walsh, V. and Lewis, J. (1991)		Y	Y			Y	[33]
18	Arbonies, Angel L (1991)		Y		Y			[2]
19	DMI (1992)	Y				Y		[15]
20	Walsh, V., Roy, R. and Bruce, M. (1992)		Y		Y			[54]
21	Cooper, R. (1993)		Y		Y			[10]
22	Teng, C. L. (1994)		Y	Y			Y	[48]
23	Walsh, V. (1995)		Y	Y			Y	[52]
24	Lovering,T. (1995)	Y				Y		[28]
25	Press, M. (1995)		Y	Y			Y	[34]
26	Svengren, L. (1995)	Y				Y		[45]
27	Price and Alun (1995)		Y		Y			[35]
28	Riedel, J., Roy, R., and Potter, S. (1996)		Y		Y			[36]
29	Teng, C. L. (1996)		Y	Y			Y	[47]
30	Guimaraes, L., Penny, J. and Moody, S. (1996)		Y	Y			Y	[19]
31	Sentence, A. and Clarke, J. (1997)		Y		Y			[44]
32	Hertenstein, J. and Platt, M. (1997)	Y				Y		[23]
33	Teng, C. L. (1997)		Y	Y			Y	[46]
34	Thackara, J. (1997)	Y				Y		[49]
35	Paul, J. and Fricke, P. (1999)	Y				Y		[31]
36	Hertenstein, J., Platt, M. and Brown, D. (2001)		Y		Y			[22]
37	Gemser, G. and Leenders, M. (2001)		Y		Y			[18]
38	Borja de Mozota, B. (2002)		Y	Y			Y	[4]
39	METI (2003)	Y				Y		[29]
40	Park (2005)		Y		Y			[26]