

# Development of Value Chain Model for Design Consultancies - Focus on Product Design Consultancies -

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## Abstract

**Background** This study aims to develop a value chain model of design firms based on Michael Porter's value chain model through a literature review of prior studies on the operation of design firms and a statistical validity test.

**Methods** First, we identify the operational characteristics of design firms through a literature review of prior studies. Subsequently, we categorize them into similar groups through statistical analysis with the data drawn from a free-grouping test performed by design experts. Finally, we suggest a value chain model for design firms. We then statistically validate the model using data from the questionnaire survey and performing regression analysis.

**Results** The literature review revealed the value chain model of design firms, which consists of 9 categories and 54 value chain factors. A categorization test with design experts classified 54 value chain factors into 4 supportive activities and 5 primary activities. Each factor in the value chain model of design firms accurately reflects the characteristics of the design firm's operation.

**Conclusions** The overall frame of the value chain model of design firms suggested in this study is similar to that of Michael Porter's. However, each factor in the model is quite different from Michael Porter's according to the characteristics of design firms, and they would practically contribute to the operation and management of design firms in the future.

**Keywords** Design Firms, Value Chain Model, Design Management, Design Consultancies, Product Design

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## 1. Introduction

Since the establishment of the first design firm in Korea in the 1980s, design firms have witnessed significant growth in numbers. However, despite this quantitative growth, there has been no qualitative growth in design firms. According to the Industrial Design Statistical Survey, in 2013, the average sales of design firms in Korea were 600 million won. This figure were actually less than the average sales in 2008. In 2008, there were 2,493 design firms, but average sales were 6.2 billion won. In addition, in 2013, the average number of employees at design firms was 5.02, which had also decreased from 2008, when the average was 5.1. Thus, these figures show that although the size of Korea's design industry is increasing, the number of design firms is also increasing at similar rates, worsening competition. Consequently, the average sales of design firms have decreased but the average number of employees has not increased, and qualitative growth has not occurred. (KIDP, 2010).

However, note that the fundamental reasons impeding qualitative growth lies in the unstructured management of design firms. Generally, manufacturing companies have company-wide management models and evaluation models for corporate management. Therefore, professional managers are in charge of corporate management. However, in the case of design firms, rather than a professional corporate management system, operations are based on the expansion of individual freelancer activities centered on a business owner. Most design firms have rule-of-thumb styles of management that are owner-centered instead of operating systematically or rationally as professional companies.

In future, design firms must do away with performing design development for clients through individual projects. They require the ability to provide comprehensive consulting services based on design, including decision-making problems such as design strategy, and so on. Thus, the issue of systematic business management requires more focus, as the industry is gradually expanding and developing in a similar direction as management consulting companies (Walton, T., 1996).

This study attempts to develop and propose a value chain model for design firms that can guide effective business management based on Michael Porter's value chain. This is a systematic management model for design firms for creating profit. It identifies and classifies the operational activities of design firms from the perspective of Michael Porter's value chain model and provides concepts and specific implementation details for each activity. A "value chain model for design firms" will be developed that allows for systematic business management in operating design firms.

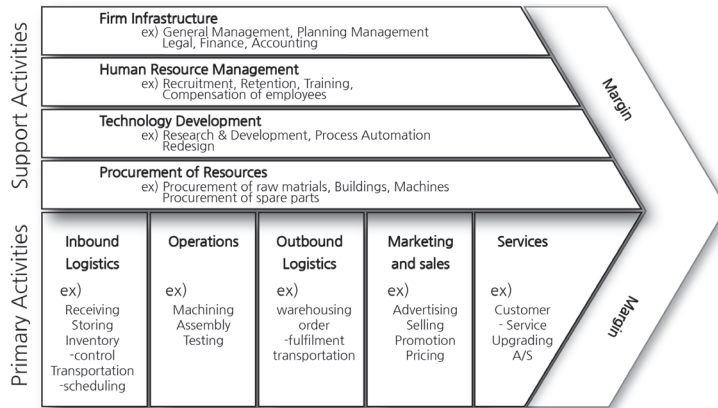
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## 2. Study of Prior Research on the Value Chain Model

### 2. 1. Concepts and application of the value chain model

The value chain model is a widely used theoretical framework. It was developed when Michael Porter of Harvard University modeled the Business System developed by the McKinsey consulting company using a frame he created. The value chain model refers to the linkage of a series of activities, functions, and processes directly or indirectly related to the creation of

added value. This value chain model is based on the concept that the functions of a company can be classified into five Primary Activities and four Support Activities that directly create added value, and that value can be created through the interconnection of these activities. In essence, the value chain model refers to a series of company activities implemented by the company to develop, manufacture, and sell products and services. It emphasizes the need to apply and integrate different resources and abilities at each stage of the value chain. The following figure shows the value chain model.



**Figure 1** Michael Porter's Value Chain Model

Source: Porter, E. M. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: Press, 37.

Here, primary activities refer to on site tasks such as the production, transportation, marketing, distribution, services, etc., of products. Support activities refer to tasks that support on site activities such as purchasing, technology development, human resources, financial affairs, planning, etc. Thus, primary activities refer to parts that directly create added value, and support activities refer to parts that play intermediary roles in creating added value

The model is used to analyze the cost and value creation factors of these two activity categories. It is possible to identify the core activities related to added value creation at each stage of value activities, using this model. It can be used to analyze the strength, weakness, and differential factors of core activities at each stage as well as analyze the cost drivers at each activity stage and be used as a tool for building competitive advantage (Jung, & Park, 2010).

The significance of the value chain analysis is that it understands and analyzes the nature and extent of synergy between internal activities in the company to better understand the strengths and weaknesses of the company. In addition, it can act as a management model to draw synergy effects of internal factors for value creation. Thus, it has been widely used as a business management model for value creation in various sectors including manufacturing, service, etc.

Traditionally, the value chain model has been widely used in manufacturing firms for value creation management (Simon, Francis, Boulakis & Fearne, 2003), through value chain factor analysis. However, recently, it is being widely used in the technology management sector (Castillo & Salem) to increase technical efficiency, service sector (Lee, Sohn, & Lee, 2015;

Baek et. al., 2014), knowledge information security industry, such as mobile communications service businesses and hospital management, and the industry structure sector (Jun, & Kim, 2013; Rye, Choi, & Park, 2014) such as the wind industry. Thus, it is used as a management model to increase operational efficiency in various fields. Furthermore, in recent years, attempts have been made to understand and interpret the value of design using the design value chain model in the design sector.

## **2. 2. Theoretical study on research related to the value chain model of the design sector**

Mozotta, B., a leading researcher in the field of design management (Mozotta, 1998) approached the value of design based on Michael Porters value chain model. Mozotta approaches design activities within the firm using three levels in the value chain model. He categorizes activities related to design development (Operational Design) as Primary Activities, collaboration activities between departments for design development (Functional Design) as Support Activities, and future-oriented design investment activities as Anticipative Design. He argued that these three levels of design activities should be linked organically in terms of value creation.

Jeong Kwang-ho and Park Moon-hyung (Jung, & Park, 2010) viewed corporate design management from the perspective of the value chain model in their study. They suggested a company-wide “design mind,” cooperation and abolition of organizational selfishness, building charismatic leadership for design implementation, etc., within company management for value creation.

Although all these studies prescribe design activities for general manufacturing companies and were unable to suggest a value chain model that can classify and manage the activities of design companies, they are significant in that they approached design activities from the perspective of value chains and suggested that they can be classified and managed as components of the value chain model.

Cho Dong-seong (Cho, 2003) is a researcher who approached design activities from the perspective of the value chain model not in the general manufacturing industry but in the design industry. He classified support activities in the value chain of the design industry as sub-organization activities, technology research, development and design, and human resources management. Primary activities include consumer research activities, product design activities, product manufacturing activities, product packaging activities, and advertising activities.

This classification is significant in that it classifies design activities from the perspective of the value chain model and as detailed elements that create profits in the design industry. However, it is difficult to apply as a model to manage the profits of a design firm. This is probably because it is appropriate for manufacturing-oriented industrial production activities as suggested by Michael Porter’s value chain, but consumer research activities and product, design, manufacturing, and packaging activities cannot cover all the management domains of design firms. Furthermore, although Cho Dong-seong’s design industry value chain model may be useful for design development, as it follows the design development procedure, it is difficult to directly relate to the profit of design firms.

To overcome these problems, Choi Soo-jin (Choi, 2004) classified the management elements of design firms into conceptual elements, personal relationship elements, and executive

elements. Choi Soo-jin suggested that management Support Activities of design firms include planning, finance, technology research, development, education, and service. Primary Activities include design management, process, and marketing required to implement conceptual factors and personal relationship factors.

The value chain model proposed by Choi Soo-jin (Choi, 2005) is significant in that it classifies support and primary activities from the management perspective of design firms taking into account the characteristics of design firms, which are different from general manufacturing firms. However, the classified elements are quite limited and it does not provide specific details on the applicability of each of the detailed elements in creating profit for design firm management.

This study aims to provide a value chain model for design firms that targets product design firms by studying preceding research and expert analysis. This study limited the target to product design firms in developing value chain models because the characteristics and processes of design tasks can change depending on the type of design firm, and thus, it is possible that the design value chain model can also change as well. Thus, as primary research, the scope was limited to product design firms.

### 3. Development process of value chain models of design firms

#### 3. 1. Development process of value chain models

This is a systematic management model for design firms for creating profit. It identifies and classifies operational activities of design firms from the perspective of Michael Porter's value chain model and provides concepts and specific implementation details of each activity. In this study, a "value chain model for design firms" will be developed that allows for systematic business management in operating design firms. To implement this, the study was carried out in the following five steps.

Table 1 Process of this Research

Step	Goal	Research content
STEP 1	Identifying operation characteristic factors of design consultancies through review of prior research	Gathering Korean and international prior research on the management of design consultancies through the RISS keyword search of "design consultancies," "design firms" issued later than 1990 when interest in the management of design consultancies heightened
STEP 2	Analyzing the concept and execution of operational factors of design consultancies	Analyzing the factors, concepts, and execution of operations of design consultancies through content analysis on research data gathered in STEP 1.
STEP 3	Grouping management factors of design consultancies by design expertise	Categorizing the operation characteristics into similar groups through Homogeneity Analysis by design expertise to identify the meaning of each factor in detail
STEP 4	Suggesting value chain model of design consultancies	Interpreting the concepts and meaning of each factor in all categories and allocating them in Porter's Value Chain Model and finally suggesting a new value chain model for design consultancies
STEP 5	Performing a validity test of the newly suggested Value Chain Model of design consultancies	Performing Regression Analysis for the validity test of the newly suggested Value Chain Model with the data gathered through a questionnaire survey, which consists of operational factors in STEP 4 and sales data of design firms

### 3. 2. Scope of data analysis and contents of analysis

In Step 1, to understand the management characteristics of design firms, Research Information Sharing Service (RISS), provided by Korea Education and Research Information Service, was used to search for prior research using the keywords “design firms,” “management,” “operation,” “business,” of “design firms,” “Design Consulting Firm,” and “Design Firm Management,” limiting the time frame from 1990 to 2017 and the spatial range to domestic and overseas. A total of 639 prior studies were found of which 498 were domestic studies, and 141 were overseas studies. After a detailed review, material related to design firms other than product design firms were excluded, as this study limited the value chain model target to product design firms. In addition, studies on simple design development cases or consumer survey cases, etc., which were not related to the management of specialist firms were excluded. Consequently, 75 prior studies were analyzed in this study. Concepts and contents of the management characteristics of design firms were drawn from the 75 prior studies. In the first derivation process, 26 categories and 197 items were drawn.

In Step 2, Content Analysis was conducted on the 197 management characteristics of design firms drawn from the material analysis in Step 1 to understand these characteristics. They were coded, quantified, and analyzed. Content analysis is “a research method that produces repetitive and plausible reasoning about the context of its use from the text itself” (Krippendorff, 2012). By analyzing the elements, concepts, and execution of design firm management characteristics through content analysis, it is possible to identify the factors needed to build a value chain model for design firms. Furthermore, the components to be listed as detailed items of the value chain model can be defined through understanding the concept and execution contents. In analyzing the contents of the 197 elements that were analyzed, duplicates or similar elements were simplified, and the final 54 elements were derived after reinterpretation from the comprehensive viewpoint of the “development of the value chain model” of design firms. The derived elements are shown in the following table.

Table 2 Operation Characteristics of Design Consultancies through RISS searching and Content Analysis

No.	Category	Characteristic Factors
1	Development & operation of unique consulting process & design methodology	Development & operation of unique consulting process
2		Development & operation of unique design methodology
3	Database of design task knowledge	Database for material, color, pattern, IP and market trend
4		Database for existing contents of design project
5	Participating in development of client's strategy and product planning	
6	Leadership training & application of CEO & managers	
7	Maintenance & management of long-term partnership with clients	
8	Development & operation of design business model	Development & sales of own products
9		Business portfolio and diversification
10		Development & operation of unique business model
11		Exploiting oversea markets
12	Introduction of new design technologies (3D printing, VR, etc.)	
13	Creation of corporate brand and identity	
14	Operation of re-education system for designers	
15	Focusing on core competences	
16	Collaboration and networking with other organizations	Collaboration with other organizations (client audit, market research, engineering, etc.)
17		Networking with other organizations

18	Development & operation of project management	Management of design project risk
19		Strict scheduling management of design project
20		Management of employee's conflict
21		Guideline operation of design project-team structuring
22	Systemic compensation system	Development of rational design fee calculation
23		Result-based compensation system
24	Structuring multi-disciplinary organization	
25	Structuring multi-disciplinary organization	Recruiting & maintenance of competitive employees
26		Management of designer's design style
27		Management of designer's design style
28		Incentive system for employees
29	Design quality management	Consistency maintenance of design quality
30		Rapidness management of design development
31	corporate vision, philosophy and identity	
32	Creative organization culture & environment	Creative culture of organization
33		Efficient facilities, environment and equipment
34	Management of client response	Communication management of employees (etiquette, appearance, image, rapid response, etc.)
35		Management of efficient communication skills (scheduling of design project, strategy of design development, IP strategy, etc.)
36	Clear task contract and execution	
37	Process development and operation of identifying client's needs	
38	Accurate analysis of market and competitors' environments	
39	Applying design consulting process according to clients' level	
40	Follow-up management for clients	Various collaboration with existing clients
41		Follow ups for clients (manufacturing)
42		Reinforcing on/off-line accessibility of existing clients
43		Continuous providing industry information to existing clients
44		Providing expanded suggestion value to clients
45	Management of finance and cash-flow	
46	Systemic control criteria for employee's task (teleology, efficiency and responsibility)	
47	Marketing & promotion	Distribution and periodic up-dates of corporate portfolio
48	use of outside information	Reinforcing usability and efficiency of corporate homepages
49		On/off line exposure expansion through CEO's public activities and speeches
50		Expanding articles of corporate information and design, reinforcing promotion and PR
51		Promotion through expansion of design awards
52		Expanding exposure of corporates through SNS
53		Secret maintenance and IP management of clients
54		Expanding design IP's

### 3. 3. Material analysis process

In Step 3, the analysis contents of the concepts and implementations of the management characteristics of design firms were divided into similar areas and material required to develop a “value chain model” for “design firms” were secured. The analysis material was explained and discussed in depth with 10 experts in the field of design management. Then classification processes were conducted in which individual experts classified them into similar items. Materials used in the classification process included cards with concepts, meanings, and specific implementation methods of the 54 factors derived as management



characteristics of design firms and dummy cards of the 9 categories originally suggested in Michael Porter's value chain to develop the value chain model. The two groups of cards were combined for a total of 63 cards. The free grouping method was used to classify the materials. The 10 experts participating in the process of classifying the 63 cards grouped each card freely into similar items. The grouping data was coded using the Multinomial scale<sup>1</sup>, which gives the same value to similar values, and the Homogeneity Analysis was performed. Subsequently, homogeneity analysis of the spss pc+20 version was conducted. Through the homogeneity analysis, the meaning of each category was analyzed for data classified into similar categories, and a value chain model of "design firms" was constructed based on Michael Porter's value chain model. The 9 value chain model factor categories derived through the analysis process are shown in <Figure 2>.

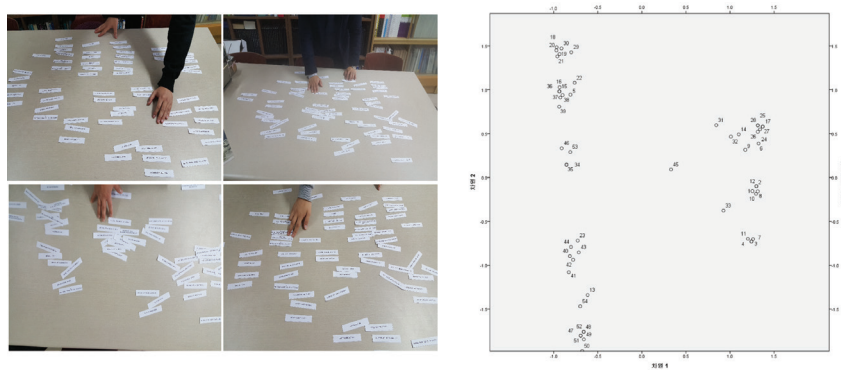


Figure 2 Procedure & Results of Homogeneity Analysis

## 4. Suggestion of a value chain model for design firms and validity analysis

### 4. 1. Suggestion of a value chain model for design firms

In Step 4, a "value chain model" for "design firms" based on the classified contents in Step 3 was suggested. The value chain factors of design firms that were categorized into the same categories through the homogeneity analysis were derived into 9 categories, same as the "value chain model" by Michael Porter. Support activities were classified into 4 categories, and primary activities into 5 categories. Support activities included firm infrastructure, human resource management, technology development, and procurement activities. Primary activities included input activities, production activities, output activities, marketing and public relations, and service activities. The overall structure is similar to Michael Porter's 'value chain model,' but factors in each categories show completely different category characteristics, as they are characteristics of design firms. The value chain model of design firms based on the analysis results is shown in <Figure 3>.

1) Multi-nominal scaling:  
Similar to nominal scale in that there is no specific value or sequence, but different in that if scales are to be understood from multiple dimensions at the same time rather than from one dimension, regardless of the order given of the data in the first dimension, this order cannot be associated with another dimension. Based on each difference from the characteristics of the nominal scale, scales in which associations with dimensions cannot be considered are called multi-nominal scaling.



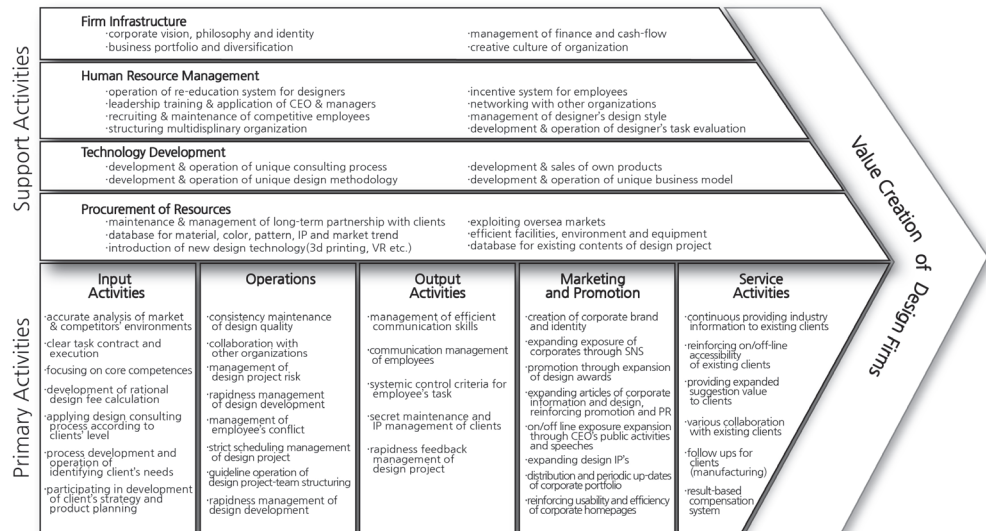


Figure 3 Suggestion of Value Chain Model for Design Firms

#### 4. 1. 1. Support activities of design firms

① Design firms' firm infrastructure includes traditional accounting management that involves financial management and cash flow (liquidity) management. It also involves developing the firm's vision, philosophy, and identity, building and managing a business portfolio, business diversification, and management of a creative organization culture. This refers to maintaining a stable financial situation, managing the firm's identity, and building and managing a business portfolio for profit creation and business development for business diversification. Maintaining a creative organizational culture has significant meaning considering the characteristics of design firms.

② For human resource management, the leadership of the CEO and managers must be considered first. In preceding research, transformative leadership and servant leadership were mostly suggested for types of design leadership. However, selecting the appropriate leadership based on firm type is important, and continuous training and practical application is required for this. The importance of a multi-disciplinary organizational structure that includes various fields of study is emphasized as a management characteristic of design firms. This is because specialist knowledge of various fields is required for design firm tasks. In addition, it is necessary to operate a system that can actively utilize external resources required by work related to design development through continuous networking development and maintenance with internal organizational members as well as external companies in the same and different fields. Furthermore, a systematic designer personnel management system for selecting and managing competent employees, maintaining the design style of designers, and developing and operating a systematic design work evaluation system is needed. Actively utilizing an incentive system based on work performance is very important to motivate designers and give them a sense of belonging.

③ Technology development in design firms is different from engineering technology development in manufacturing firms. It involves specific processes for development and technology development related to methodology and design technology. It includes methods of identifying customer needs, analyzing the market and the competitive environment,

and effective communication as well as the development of independent design consulting processes and design methodologies for the firm. The development and operations of active design business and specialized design business models through independent product development, introduction, education, and operations of new design technologies such as 3D-printing and VR are considered areas of technology development as well.

④ Procurement of resources in design firms includes information for excellent design development and securing select design projects for successful design development and building an environment where this can occur. In addition to establishing a continuous DB of design information such as material, color, pattern, patent information, market trend, and trends, it is necessary to build information that can be utilized for future design projects by converting existing design project information in to a DB. The firm must be able to secure high-quality design projects with high success potentials through developing and maintaining long-term partnership with clients. Pioneering overseas markets and securing new clients are also important procurement activities. Establishing efficient facilities, environment, and equipment is also an important procurement activity that should be treated with significance, as it will help promote design development efficiently.

#### **4. 1 .2. Primary activities of design firms**

① Input activities involve input of design development projects to enhance the possibility of a successful design development. Participating in the development of a client's strategy and in the process of product designing are very important input factors in increasing the success of design development. Applying the right design consulting process for clients and selecting specialized design tasks that the design firm can implement well are very important input activities as well. Calculating and abiding by rational design development costs, entering into and fulfilling clear contracts with clients, accurately identifying clients' needs, introducing and using accurate market environment and competition analysis methods for design development are all input activity areas that increase the possibility of success for design development tasks.

② Production activities are the process of design firms implementing design development. To implement effective and successful design development, enhancing expertise in client diagnosis, market research, mass production design, and intellectual property rights by collaborating with similar and different companies is a very important factor in increasing the success of design development. In addition, to successfully implement design development, specialized design project management is required at a high level. Managing risk and rigorous schedules of design projects, conflict management among project team members, and operation of guidelines for forming design project teams must be possible. For this, systematic and effective management for the process of design project participation and the overall process of implementing the design project is required. Quality management to always maintain constant quality of design projects and a systematic process that makes sure that design development occurs at a swift pace are required as well.

③ Output activities include the process of successfully completing design development and effectively delivering it to clients. In the process of completing design development, it is necessary to establish and operate a self-controllable system so that the design project participants can achieve a goal-oriented, efficient, and responsible design development project by operating clear design project control standards. In addition, building and

operating a systematic process that enables managers to confirm design development progress and provide feedback promptly based on consultation with clients is needed.

Furthermore, successful design development requires not only the outcome, but also management of the process so that an amicable relationship can be formed with the client. Thus, training and managing employees' courtesy, appearance, image, and quick response method is required so that the employees can form friendly relationships with customers. In communicating with customers, training and managing processes and methods that enable timely and effective communication of the process and details the client may be curious about such as project schedule and contents, design development strategy, intellectual property rights, etc. Guarantee of confidentiality and support for securing intellectual property rights of design development are also important factors to be considered in output activities.

④ Marketing and PR activities include activities that enable potential customers to recognize that the design firm has a unique identity and is capable of developing good design. For this, the firm must be able to highlight the distinctive characteristics of design development by branding the services of the design firm and periodically updating the firm's portfolio and distributing it online and offline. Many potential clients acquire information from the design firm's website. Thus, by strengthening the contents and usability of the homepage, the client must be able to acquire information on the firm easily, accurately, and quickly. Maximizing the external exposure of corporate information to promote the company is an important factor for the promotional and marketing activities of the company. Public exposure through the CEO's public activities and speeches, promotion through releasing corporate design success stories, exposure through increasing the number of domestic and overseas design awards, exposure through SNS, and exposure of potential clients through securing design patents is included.

⑤ Service activities refer to follow-up management activities implemented by design firms with their existing clients. Important factors in services activities include follow-ups for mass production, a results-based compensation system (bonus, license contracts, etc.) that varies design development cost calculations according to the success of the design results, collaboration with existing clients (joint development of season products, brand promotion and collaboration, etc.) strengthening access to existing clients through on and offline routes such as visit, email, sending promotional materials, etc., visit, email, continuously providing relevant industry information to industry clients, and offering expanded customer value for future design development areas and direction that can be implemented based on results of design development.

#### **4. 2. Validity analysis of the value chain model of design firms**

In Step 5, we verified if the factors of the value chain model derived in Step 4 are actually factors that affect value creation of 'design firms.' In this step, the validity of the model was verified through statistical analysis of whether the implementation level of the value chain model factors derived in Step 4 actually had a positive effect on the sales growth rate of 'design firms.' A questionnaire was written to conduct surveys with design firms. The questionnaire consisted of the 54 elements of the design value chain model derived in this study. The questionnaire was written so that participating design firms can respond to the question: at what level are you implementing these 54 elements, using the 7-point Likert Scale (1 - not implementing very well at all ~ 7 - implementing very well). To secure data on

the performance of design firms, firms taking the survey were asked to submit copies of their financial statements of the past three years (2014 - 2016) that includes the sales data.

The surveys were distributed for 16 days from January 10 - 25, 2018. Survey subjects were 399 design firms registered under the Korea Institute of Design Promotion as product design firms as of January 10, 2018 with more than 3 years of experience and more than 6 employees. Final survey distribution included 217 firms, which stated that they were willing to participate in the questionnaire through cable and email as well as respond that they could provide sales data. Survey collection occurred for 45 days from January 10, 2018 to February 23, 2018. Questionnaires were collected from a total of 113 companies. Of the collected questionnaires, 95 were used in the final analysis. A total of 18 questionnaires were excluded, including 7 that did not submit their sales figures and 11 that did not complete the questionnaire.

For the statistical analysis, regression analysis was conducted using the implementation level data of the 54 elements from the design firm responses was as the independent variable and the three year sales growth rate ((sales in 2016 - sales in 2014) / sales in 2014) x 100) as the dependent variable.

Table 3 Results of Regression Analysis

Category	Characteristic Factors	F	sig.	Affect
Firm Infrastructure	corporate vision, philosophy and identity	4.464	.037	○
	management of finance and cash-flow	5.797	.018	○
	business portfolio and diversification	6.330	.014	○
	creative culture of organization	7.137	.009	○
Human Resource Management	leadership training & application of CEO & managers	4.879	.030	○
	structuring multi-disciplinary organization	6.343	.013	○
	networking with other organizations	7.437	.008	○
	operation of re-education system for designers	4.886	.030	○
	recruiting & maintenance of competitive employees	14.705	.000	○
	recruiting & maintenance of competitive employees	5.901	.017	○
	development & operation of designer's task evaluation	7.017	.009	○
	incentive system for employees	8.928	.004	○
Technology Development	development & operation of unique consulting process	8.112	.005	○
	Development & operation of unique design methodology	10.154	.002	○
	development & operation of unique business model	18.896	.000	○
	development & sales of own products	6.132	.015	○
Procurement	database for material, color, pattern, IP and market trend	4.557	.035	○
	database for existing contents of design project	5.902	.017	○
	maintenance & management of long-term partnership with clients	6.653	.011	○
	exploiting overseas markets	3.429	.067	▲
	Introduction of new design technology(3D printing,, VR, etc.)	7.110	.009	○
	efficient facilities, environment and equipment	3.969	.049	○

INPUT Activities	participating in development of client's strategy and product planning	6.143	.015	○
	applying design consulting process according to clients' level	34.710	.000	○
	focusing on core competences	5.024	.027	○
	development of rational design fee calculation	4.900	.029	○
	clear task contract and execution	8.690	.004	○
	process development and operation of identifying client's needs	18.063	.000	○
	accurate analysis of market and competitors' environments	10.588	.002	○
Operations	Collaboration with other organizations(client audit, market research, engineering etc.)	4.939	.029	○
	strict scheduling management of design project	5.3210	.27	○
	management of design project risk	4.873	.030	○
	management of employee's conflict	8.284	.005	○
	guideline operation of design project-team structuring	5.551	.021	○
	consistency maintenance of design quality	6.647	.013	○
	rapidness management of design development	8.314	.005	○
OUTPUT Activities	systemic control criteria for employee's task(technology, efficiency and responsibility)	4.880	.030	○
	Communication management of employees(etiquette, appearance, image, rapid response etc.)	7.201	.009	○
	rapidness feedback management of design project	4.473	.037	○
	Management of efficient communication skills(scheduling of design project, strategy of design development, IP strategy etc.)	6.787	.011	○
	secret maintenance and IP management of clients	6.395	.013	○
Marketing & Promotion	creation of corporate brand and identity	6.153	.015	○
	distribution and periodic up-dates of corporate portfolio	6.111	.015	○
	reinforcing usability and efficiency of corporate homepages	5.221	.025	○
	on/off line exposure expansion through CEO's public activities and speeches	9.072	.003	○
	expanding articles of corporate information and design, reinforcing promotion and PR	5.537	.021	○
	promotion through expansion of design awards	4.127	.045	○
	expanding exposure of corporates through SNS	4.148	.045	○
	expanding design IP's	7.267	.008	○
Service Activities	follow ups for clients(manufacturing)	4.187	.044	○
	result-based compensation system	4.793	.031	○
	various collaboration with existing clients	5.681	.019	○
	reinforcing on/off-line accessibility of existing clients	4.914	.029	○
	continuous providing industry information to existing clients	6.884	.010	○
	providing expanded suggestion value to clients	3.869	<b>.052</b>	<b>▲</b>

○ Significance level (significant at p<.05)

▲ Significance level (marginally significant at p<.10)

Statistical analysis results showed that the 54 design firm value chain factors derived in this study all have significant influence on sales growth of design firms. However, pioneering overseas markets ( $F=3.429$ ,  $p=.067$ ) and extended value offers for clients ( $F=3.869$ ,  $p=.052$ ) was not significant at significance level .05, but was marginally significant at  $p<.10$ . In the case of pioneering overseas markets, it seems that from the perspective of domestic design firms that have yet to actively enter the foreign markets, expectations for future profit creation is large, but they have not yet reached the stage where profit creation

occurs smoothly. Also, extended value offers for clients did not show significant effects at the significance level of .05, but showed significant effects at the significance level  $p < .10$ . Thus, it seems that efforts to provide direction for various design development tasks to be implemented by firms in the future in the process of design development are not leading to follow-up projects. However, as presented in the value chain model of this study, by increasing participation in the development of client companies' strategy and product development, leading the design development of design firms, and characterizing design development tasks, the quality of design development outcome increases and long-term partner relationships are maintained. If continuous follow-up design development tasks are pursued, the provision of extended customer value during the design development process is very likely to play an important role in enhancing the performance of the design firm. In this study, the value chain model of design firms drawn from the value chain factors derived from the study of previous research and the specialist surveys and statistical analysis of these factors. We can state that this is a statistically valid as a model for creating profit in design firms.

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## 5. Conclusion and suggestions

Along with the growth of the design industry since the 1980s, the number of design firms has increased enormously. However, a systematic business management model of 'design firms' has not yet been established. This hampers the qualitative growth of "design firms." This study has developed and suggested a 'value chain model' that can be used by 'design firms' using systematic methodology including analyzing domestic and overseas preceding research that deals with the management of 'design firms,' collecting expert opinions, statistical analysis, etc.

Through previous research and considerations, 54 value chain model factors of design firms were presented. These include Support activities: firm infrastructure, human resource management, technology development, and procurement activities; and Primary activities: input activities, production activities, output activities, marketing and public relations activities, and service activities.

Overall, the structure of the value chain model presented in this study is similar to the value chain model proposed by Michael porter. However, the supportive and primary activities factors are quite different. They can be attributed to the characteristics of design firms, which are different from those of manufacturing companies.

The 'value chain model of design firms' presented in this study is a structure of factors required for profit creation in managing 'design firms.' At the same time, it can be regarded as the target area that must be managed for profit creation. Thus, in the future, if a design firm manages the factors presented in this study in managing their firm and improves on lacking elements through evaluation for each area, this will greatly help in creating profits and strengthening competitiveness of the design firm. In addition to these practical contributions, the results of this study will contribute to managing design firms and revitalizing the study of value chain models by providing guidelines for managing design firms in the follow-up and wider research on value chain models in the future.

This study developed a value chain model for product design companies only. However, we hope to develop value chain models for various types of design firms in future research. In addition, we expect that various case studies on the specific management and operations of the 54 value chain model factors presented in this study will be carried out in follow-up research. Through this, we hope that the practical knowledge of managing design firms based on the design value chain will spread and that there will be many developments in the management and profit creation of design firms in the future.

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