

# What Conditions are Needed to Develop Middle-level Design Managers' Competences: Enabling and Catalytic Factors

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## Abstract

**Background** The competence development of middle-level design managers (MLDMs) is essential since they may encounter the challenge of cultivating competences different from those of practical design. The question of which competences to develop was answered in the prior research on the Competence Model for Design Managers (CMDM). Thus, this study aimed to respond to the question of how to develop those competences, namely, what conditions (influential factors) would be required. Hence, this study firstly identified the IFs on developing design managers' competences in a general perspective. In Study I, the influence level of each IF on the competences of CMDM were examined from the view of Korean MLDMs. In Study II, the detail conditions of IFs were further investigated.

**Methods** The IFs were identified from management literature and adjusted by six design experts. Subsequently, the influence level of each factor on the 26 competences of CMDM were determined through an online survey distributed to 70 MLDMs belonging to in-house design organizations of Korean major corporations. The detail conditions of catalytic factors were investigated through semi-structured interviews with 9 MLDMs.

**Results** From Study I, IFs were classified into two distinct types. First, "enabling factors" primarily influenced the cognitive, functional, and social competences. However, the second type of "catalytic factors" mainly influenced social and meta-competences. Moreover, the necessity of detail conditions was found only in the catalytic factors. Accordingly, the relation between catalytic factors and competences was investigated in Study II. Particularly, social awareness and the social skills of personality, cultural and social aspects of the work environment had influence on the social-tactical competences. Moreover, personal appreciation for and organizational appraisal of the values and contributions of design managers' invisible works (e.g., managing, directing, and bridging) were essential to motivate MLDMs.

**Conclusions** The findings of the research can make contributions in two ways. First, a professional contribution would be suggesting an appropriate and precise combination of IFs to cultivate certain competences for MLDMs, which could be helpful in designing an action plan. Second, this study may make an academic contribution to the knowledge body of design management by identifying the influential levels of IFs on the competences from the perspective of MLDMs, and by providing the classification of IFs according to the enabling and catalytic factors.

**Keywords** Competence Development, Middle-level Design Managers, Influential Factors, Enabling and Catalytic Factors, Korean Case

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## 1. Introduction

As design is used as a strategic tool for product differentiation and innovation in the corporate environment (Borja de Mozota, 2002; Lockwood, 2004; von Stamm, 2004), the boundaries of designer activities are enlarged (Bruder, 2011; Perks, Cooper, & Jones, 2005; Stevens & Moultrie, 2011). Accordingly, design managers, as the next step of designers, are required of complex design management activities: such as strategic (e.g., corporate design, policy, mission, and agenda), tactical (e.g., design organization, teams, processes, and systems), or operational (e.g., design project, tangible design outcomes of product/service/experience) (Best, 2006; Chung, 1998; Lockwood, 2010).

### 1. 1. The importance of Middle-Level Design Managers (MLDMs)

Design managers embody a wide range of hierarchical levels. Managers in general sense are divided into three levels: supervisory manager–middle manager–top managers (Hellriegel, Jackson, & Slocum, 2005; Spencer & Spencer, 1993). Design managers could also be classified into a comparable hierarchy: junior designers (supervisory)–senior or project designers (middle)–design executives (top) (Chung, 2010).

In management research, the value of middle managers has been accentuated as having strategic roles both in management (e.g., facilitating adaptability, implementing deliberate strategy, fostering communication) and leadership (e.g., promoting corporate entrepreneurship efforts, championing strategic alternatives) (Delmestri & Walgenbach, 2005; Floyd & Wooldridge, 1994, 2000; Huy, 2002; Metheny, 2013). Furthermore, as illustrated in Figure 1, middle managers need widespread competences related to strategic (conceptual), human resource, and technical tasks, while supervisory managers with more emphasis on technical skills and top managers more on strategic skills. Shortly, they require all levels of management skills in one position.

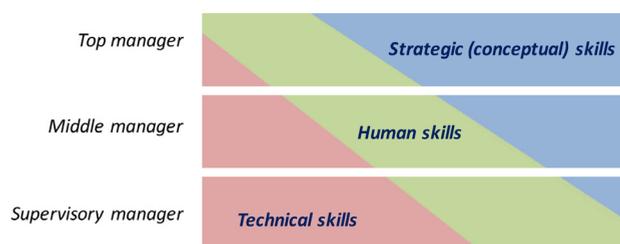


Figure 1 Different management skills required by manager level (Adapted from Daft, 2003; Dance, 2011; Katz, 1974)

Whereas, in design management research, most studies have used the general term of design managers (or design leaders) not specifically dividing top and middle design managers. Briggs, Green, and Lombardi (1998) emphasized three essential elements for a design manager: design skills, knowledge of human dynamics, and knowledge of basic business practices. Negotiation skills, business savvy, understanding of people and processes, and expert knowledge of design were also suggested as the competence set for design managers

(Green et al., 2004; Peters, 2012). Several research did with a focus on top design executives or design leaders. Design leadership abilities were specified as envisioning the future, directing and nurturing creativity, strategic thinking (McCullaph, 2008; Turner & Topalian, 2002), business awareness, and relationship/communication (Han & Bromilow, 2010). Miller and Moultrie (2013) categorized design leaders' skills as design, cognitive, interpersonal, business, and strategic skills. Despite those studies, middle-level design managers (MLDM) has scarcely been the focus of design management research.

Nevertheless, MLDMs would be the first phase where non-practical design activities such as strategic or human relation tasks exceed the operational activities of design practice as inferred from Figure 1. Consequently, MLDMs could encounter the challenge of cultivating entirely different kinds of competences from those of practical design. Thus, a question of 'why a competent designer cannot always become a competence design manager?' might arise in this phase. With this background, the authors highlight the importance of MLDMs and their competence development. Particularly, the MLDMs in this study were defined as follows to confine the scope of empirical study:

- They have job titles corresponding to MLDMs (e.g., section manager, senior manager, or deputy director in their Korean position names) who have experiences of project management, since the roles and responsibilities of middle managers are usually defined in relation to project management (Floyd & Lane, 2000; Kanter, 2004);
- They belong to the in-house design department among Korean top 30 major corporations. In Korea, major corporations usually have separate and internal design organizations of the enough size to be comprised of diversified hierarchical levels, in which the MLDM positions could be easily found. The MLDMs in those groups could also participate in strategic tasks, since the major corporations usually empower their in-house design groups in internal strategic decision making (Borja de Mozota, 2003);
- Among top 30 major corporations, those which are leading in highly-developed industry sectors such as IT manufacturing, IT service, product manufacturing, and service industries were included.

## **1. 2. Competence Model for Design Managers (CMDM)**

In the prior research, the authors investigated the important competences for MLDMs (Kang, Chung, & Nam, 2015). For this purpose, the competence model for design managers (CMDM) was first established by deductive content analysis of extensive international journal articles relevant to design management (Figure 2). Subsequently, the competences particularly relevant to MLDMs were identified based on this model; the MLDMs required a broad spectrum of competences, especially in the cognitive. Since they act as a mediator to facilitate upward/downward communication, they need to understand the languages and concerns both of top management and actual practice.

Category \ Level		Strategic level	Tactical level	Operational level
Cognitive competences	Knowing	1 Knowledge of new disciplines (PEST; market trend; business/finance; IP)	2 Knowledge of organization/ project management skills	3 Design knowledge (design language/principles/research; professional design practice)
	Understanding	4 Understanding market/ stakeholders/business system	5 Understanding relationships in processes/projects/business	6 Understanding design acumen /aesthetic sense
	Thinking	7 Versatility in analytical and intuitive thinking; Framing; Holistic thinking	8 Facilitating idea generation/transfer	9 Translating needs/requirements into creative ideas
Functional competences	Conceptual work	10 Clarifying vision/design goals & aligning with business strategy	11 Managing design project/ process/team/resources	12 Observing users/context & interpreting latent needs
	Implementational work	13 Creating total experience throughout design touchpoints	14 Visualizing information for effective knowledge sharing	15 Implementing design skills/expertise (Visualization; prototyping; design tools)
Social competences	Communication	16 Creating/sharing brand/vision story among stakeholders	17 Communicating with all stakeholders/different disciplines	18 Visual communication; Visual storytelling
	Relationship	19 Building/managing strategic relationships with partners	20 Facilitating collaboration; Managing team relationship	21 Engaging users/stakeholders in design process
Meta competences	Attitude/ Mind	22 Tolerance for uncertainty/complexity	23 Tolerance for tension/conflict; Embracing diversity	24 Pursuit of high quality
		25 Creativity; Innovation; Challenge; Exploration		
		26 Empathy; Flexibility; Resilience; Persistence		

Figure 2 Competence Model for Design Managers (Kang, Chung, & Nam, 2015: 116)

As the next step to enhance the applicability of CMDM, it is important to investigate what kind of conditions could be needed to develop the competences of MLDMs, namely the influential factors (IFs). Accordingly, this study establishes three aims as follows, also as illustrated in Figure 3:

- (1) to identify the IFs on developing design managers' competences in a general perspective;
- (2) to examine the influence level of IFs on the competences of CMDM from the view of Korean MLDMs in a quantitative way; and
- (3) to investigate the detail conditions of IFs in a qualitative way.

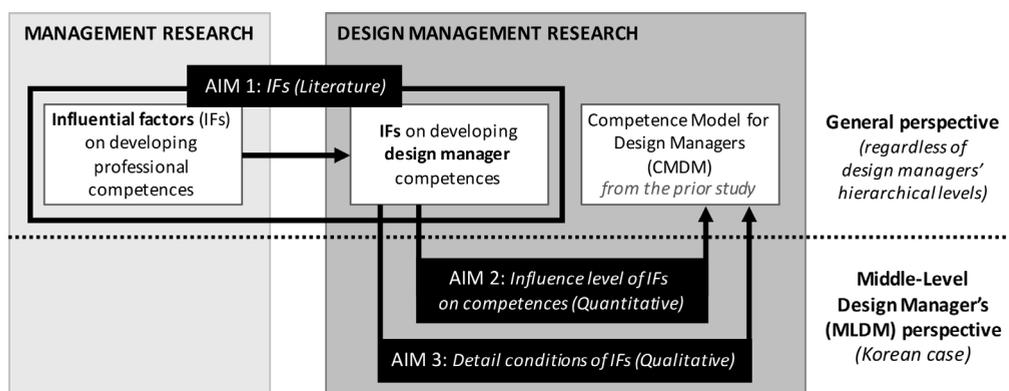


Figure 3 Research framework and three aims of the study

The remainder of this article is organized as follows: First, the theoretical background of IFs is discussed according to aim 1. Then, two empirical studies of aim 2 and 3 are described in separate chapters of Study I and Study II. Study I chapter consists of the survey design,

quantitative analysis result, and the findings determining the enabling and catalytic factors. Based on the necessity to investigate detail conditions of catalytic factors from Study I, Study II chapter comprises the interview design and qualitative analysis results. Finally, the conclusion ends with summary, research values and contributions.

## 2. Theoretical background

### 2. 1. Influential factors (IFs) on developing design manager competences

With the first aim of identifying the IFs on competence development of design managers, literature on this issue in the management field was investigated because there has been little research in design management area. As presented in Figure 3, the IFs were examined from a general perspective regardless of design managers' hierarchy to match up with the general perspective of CMDM. Consequently, the IFs on developing professional competences were identified as shown in Table 1: personality, motivation, theoretical knowledge, professional experience, and opportunity as individual factors; job demand, work environment, and macro-context as organizational or external factors.

Table 1 Influential factors on developing the design manager's competences

Influential Factors		Source						
		[1]	[2]	[3]	[4]	[5]	[6]	[7]
Individual	<b>Personality</b> (personal philosophy, value, vision, interest, characteristics, etc.)		○		○		○	
	<b>Motivation</b> (for learning or achievement)	○	○		○			
	<b>Theoretical knowledge</b> (through education)				○	○	○	
	<b>Professional experience</b>				○	○	○	
	<b>Opportunity<sup>a</sup></b>				○			
	<b>Aesthetic talent</b> (gifted or trained)	<i>Added after verification by design experts</i>						
Organizational	<b>Job demand</b> (goals, tasks, functions, roles, technical knowledge and skills required to the position)			○		○	○	○
	<b>Work environment</b> (culture/climate of work context, structure/system of organization)	○	○		○	○	○	○
	<b>Macro context<sup>a</sup></b> (industrial, economic, social, political, environmental)			○				

[1]Noe and Wilk (1993); [2] Cheetham and Chivers (1998) ; [3] Hoffmann (1999); [4] Khomeiran, Yekta, Kiger, and Ahmadi (2006); [5] Grangeat and Gray (2007); [6] Boyatzis (2008); [7] Jani and Sawhney (2012).

<sup>a</sup> Excluded in this study due to the lowest mention in literature and the characteristic that might not be controllable with personal/corporate intention

Specifically, ‘personality’ is an individual characteristic including personal philosophy, value, vision, interest, and so on. ‘Motivation’ is an individual desire to learn or cultivate competences relevant to accomplish one’s professional performance; it could be activated not only by personal desire but also by organizational incentives. Professional competences can be cultivated by ‘theoretical knowledge’ through education, and can also be trained by ‘professional experience’. They might be influenced by personal ‘opportunity’. Meanwhile, ‘job demand’ in organizational level that clearly describes goals, functions, knowledge and skills would have leverage on developing competences. ‘Work environment’ such as cultural and structural circumstances could be also influential, so could the ‘macro context’. However, the opportunity and macro-context were mentioned at the lowest rate among seven relevant articles. Moreover, those two factors could be characterized as external inputs that an individual or a company might not manage or control with intention. For these reasons, they were excluded in this study.

Since the IFs were investigated from a general perspective as previously mentioned, they were also verified by design managers of a broad range of hierarchies and industries. The list of IFs was sent by e-mail to six design managers: one from each of manufacturing, IT manufacturing, telecommunications, IT portal service, UX design consultancy, and branding/visual design consultancy, with 13.67 years of experience on average. They were asked to verify and confirm the IFs from the perspective of design field, thus aesthetic talent was added to the list of individual factors.

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### **3. Study I: The influence level of IFs to the competences of CMDM from the perspective of Korean MLDMs**

#### **3. 1. Research method: online survey & quantitative analysis**

##### **3. 1. 1. Questionnaire development and sample selection**

According to Aim 2, online survey was conducted to examine the influence level of seven IFs on each of 26 competences of CMDM. The questions were asked as “How much do you think the XX factor has influence on developing the XX competence?” on a 7-point scale, ranging from “not at all influential (1)” to “extremely influential (7)”.

The survey’s sample criteria followed the definition of MLDMs in the Introduction: those whose job titles correspond to MLDMs (e.g., section manager, senior manager, or deputy director in their position names) and who belong to the in-house design department of Korean top 30 major corporations among IT manufacturing, IT service, product manufacturing, and service industries. Additionally, their functions correspond to one of three representative design functional groups, since the major corporations usually separate wide spectrum of product development activities into different functional groups: (1) front-end focused (e.g., design strategy/planning), (2) intermediate (e.g., UX design), and (3) back-end focused (e.g., product styling/graphic design).

The abovementioned sample criteria are precise, and the in-house design organizations of major large corporations are not easily accessible by random distribution. Therefore, a mixed method of purposive sampling and snowball sampling was adopted. The respondents selected by purposive sampling were asked to identify other people in the group or organization satisfying the criteria and to forward the questionnaire, which is snowball sampling. Finally, 70 MLDMs answered the survey and Table 2 shows their profiles.

Table 2 Respondents profile

		Total	Group 1. Front-end focused design	Group2. Intermediate Design	Group3. Back-end focused design
	N	70	23	25	22
Gender	Male	36	11	15	10
	Female	34	12	10	12
Groups of professional experience	4-6 yrs	18	3	8	7
	7-11 yrs	40	14	14	12
	12 yrs+	12	6	3	3
Industry	IT mnfg.	31	11	14	6
	IT service	17	6	11	0
	Product mnfg.	17	5	0	12
	Service	5	1	0	4
Age	Mean	33.04	34.09	31.92	33.23
	SD	3.79	3.44	3.40	4.34
Avg.years of professional experience	Mean	8.84	10.09	8.00	8.50
	SD	3.28	3.48	2.78	3.33

### 3. 1. 2. Quantitative analysis: classification of influence level

Above all, grand means of each IF on developing 26 competences were calculated. Professional experience ( $M=5.58$ ) was the most influential factor, followed by personality (5.32), work environment (4.96), motivation (4.92), job demand (4.78), theoretical knowledge (4.47), and aesthetic talent (4.11) as the least influential; they were identified as significantly different by one-way ANOVA ( $F_{(6, 13223)} = 229.19, p < .05$ ).

However, one-way ANOVA showed that the differences of means among the three design functional groups were not significant in all IFs. This means that each factor perceptually has similar level of influence regardless of design groups. Therefore, further analysis was conducted without separating three design functional groups.

The purpose of the quantitative analysis was to simplify the influence level of each IF on the competences such as high, medium, and low influence to understand general patterns. The comparison of an individual mean value with the grand mean value of all competences through the paired-samples *T*-test was conducted. When the mean value of a competence was greater than the grand mean and the result of paired-samples *T*-test was significant, the competence was classified as high influence group (H). Conversely, the mean value lower than the grand mean with significance was categorized to low influence group (L); that with no significant difference from the grand mean to medium influence group (M). Figure 4

shows the result of classification of influence level.

Competence variables	Influential factors	Professional experience	Personality	Work environment	Motivation	Job demand	Knowledge	Aesthetic talent	
Cognitive	Strategic	1. K-S	H	L	H	M	M	H	L
		4. U-S	H	L	H	L	M	H	L
		7. T-S	H	H	L	L	M	H	L
	Tactical	2. K-T	H	L	H	L	H	M	L
		5. U-T	H	H	H	L	H	L	L
		8. T-T	H	H	H	H	L	L	M
	Operational	3. K-O	H	L	L	M	L	H	H
		6. U-O	H	H	L	L	L	L	H
		9. T-O	H	H	M	H	L	M	H
Functional	Strategic	10. CW-S	H	L	M	H	M	L	L
		13. IW-S	H	L	L	L	M	M	L
	Tactical	11. CW-T	H	M	H	L	H	L	L
		14. IW-T	H	H	L	L	L	L	H
	Operational	12. CW-O	H	H	L	L	M	H	L
		15. IW-O	H	M	L	L	L	M	H
Social	Strategic	16. C-S	H	H	M	M	H	L	L
		19. R-S	H	H	H	M	M	L	L
	Tactical	17. C-T	H	H	M	M	M	L	L
		20. R-T	H	H	H	M	M	L	L
	Operational	18. C-O	H	M	L	L	L	M	H
		21. R-O	H	L	M	H	M	M	L
Meta	Strategic	22. AM-S	H	H	M	M	M	M	L
		23. AM-T	M	H	H	M	L	L	L
		24. AM-O	M	H	H	H	L	L	H
		25. AM-M1	L	H	H	H	L	L	M
		26. AM-M2	M	H	H	H	L	L	L

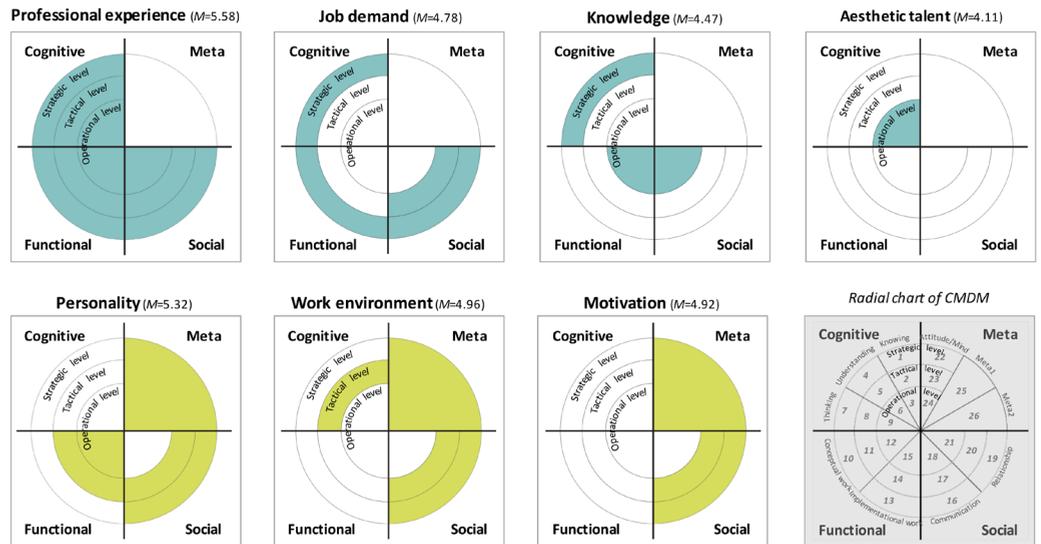
Figure 4 Simplified grouping of the influence levels between competences and IFs

Note. The abbreviations of competence variables were formed combining the head letters of competence subcategory (see Figure 2) and management level (e.g., 1. K-S = Knowing-Strategic; 5. U-T = Understanding-Tactical).

To identify the overall patterns of influence level in a simple way, the 26 competence variables were grouped by the same management levels within each of the four competence categories. For instance, knowing-strategic, understanding-strategic, and thinking-strategic competences were gathered as cognitive-strategic competences; meta-competences were grouped together as one trans-level competence. Figure 4 presents this simplified grouping. The light blue cells within a blue rectangular borderline represent the simplified high group composed of only high or medium influences. For example, cognitive-strategic competence category is highly influenced by professional experience since its all sub-competences represent high influence.

### 3. 2. Findings: Two different patterns of IFs-Enabling and Catalytic factors

Figure 5 illustrates the influential level of IFs on the competence groups based on the simplified grouping of Figure 4 in a radial chart form. Bottom-right of Figure 5 explains the radial chart legend of CMDM. Cognitive, functional, social, and meta competence categories are allocated to each quadrant in order, and they are divided by competence sub-category and by management level. The numbers correspond to those of competences in the CMDM of Figure 2.



**Figure 5** Highly-influenced competence groups in the CMDM by each IF (Top: Enabling factors; Bottom: Catalytic factors; Bottom-right: legend of radial chart)

*Note.* Colored part represents the general high level influence by each IFs on the development of respective competence categories.

The IFs fell into two distinct types of patterns according to the influential competence categories. The first type (top four of Figure 5: professional experience, job demand, knowledge, and aesthetic talent) predominantly influenced the cognitive, functional, and social competence categories. Though the influential scope of aesthetic talent was not broad as other factors, it could be also included in this first type because it partially includes the cognitive competence category. In contrast, the second type (bottom three of Figure 5: personality, work environment, and motivation) principally influenced social and meta-competence categories.

In the first type, ‘professional experience’ strongly influenced all cognitive, functional and social competence categories. It could be obvious that most of design manager competences are those relevant with professional practice, thus they are largely influenced by pertinent professional experience. ‘Job demand’ showed high mean values particularly in the strategic and tactical-level competences. Considering that designers might not be usually educated or trained on the strategic or tactical competences, it could be important to clarify those competences with an organizational intention. By doing such, design managers could recognize exactly what competences they need to cultivate. Theoretical ‘Knowledge’ influenced the cognitive–strategic (e.g., business knowledge; market understanding), the functional–operational (e.g., user observation and interpretation by user research methods; implementation of design skills), and the social–operational competences (e.g., visual communication; user engagement in design process). In other words, aforementioned competences required pertinent knowledge through education either in academic curricula or in extracurricular activities. Last in the first type, ‘aesthetic talent’ mainly influenced on the cognitive-operational competences such as design knowledge or design acumen. Given that design expertise is essential for MLDMs to direct designers (Lockwood, 2011; Miller & Moultrie, 2013), aesthetic talent could be fundamental for their competence development.

The second type—personality, work environment, and motivation (bottom three of Figure 5)—influenced commonly on the strategic and tactical levels of social competences relevant to communication and relationship management, and on the meta-competences of attitude and mind. Especially, ‘personality’ was additionally influential on the functional–tactical (e.g., design project/process management) and the functional–operational competences (e.g., user observation and interpretation). ‘Work environment’ was also influential on developing the cognitive–tactical competences (e.g., organizational knowledge, understanding various relationships). Lastly, ‘Motivation’ showed the basic pattern of the second type. To develop the competences of communication and relationship management (social-tactical), it could be essential to have motivations either in a personal or an organizational level.

Examining the two types of IFs, it was discovered that they act as enabling or catalytic conditions for fostering the design manager’s competences. The first type factors could be enabling conditions. It would be difficult to cultivate certain competences without relevant professional experience, knowledge, or aesthetic talent; the design manager could not clearly recognize what competences to develop without explicit job demands. Therefore, having pertinent professional experience, knowledge, aesthetic talent, and being provided with precise job demands could enable MLDMs to develop certain competences. Therefore, the first type factors could be classified as ‘Enabling Factors’. Whereas, the second type factors could be catalytic conditions. Having positive personality and motivation, and being provided with advantageous work environment would be favorable to develop certain competences. Yet, having those factors would not always guarantee that the design manager could have relevant competences. In that sense, the second type factors work as catalyst in competence development, thus they could be categorized as ‘Catalytic Factors’.

During the analysis, it could be inferred that the object of enabling factors, that is, ‘what’ of enabling factors could be the exact contents of CMDM. For instance, to develop the competence of ‘4. market understanding’, professional experience and knowledge about ‘market understanding’ are required and it needs to be explicitly described in job demand. Whereas, the condition of catalytic factors, that is, ‘what kind’ of catalytic factors is not the contents of CMDM. For example, to develop the competence of ‘20. facilitating collaborations’, the CMDM does not demonstrate what kinds of personality, motivation, or work environment are required. Therefore, the catalytic factors needed to be further investigated to understand what kind of conditions of them can influence on developing competences. In the Introduction, the exploration of detail conditions of IFs was determined as Aim 3. Since the necessity of detail conditions was found only in the catalytic factors through Study I, Study II focuses on the in-depth investigation of catalytic factors in a qualitative way.

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## 4. Study II: Detail conditions of catalytic factors

### 4. 1. Research method: in-depth interviews & qualitative analysis

#### 4. 1. 1. Semi-structured interviews and sample selection

Personality, work environment, and motivation are associated with various spectrum of personal experiences and organizational conditions. Therefore, it is indispensable to explore and understand design managers' actual experiences and their related opinions in a qualitative way, through interviews. Accordingly, in-depth interviews were prepared in a semi-structured format with an interview guideline. Basic questions were "what kinds of (1) personality/ (2) work environment (physical, cultural, social, and structural)/ (3) motivation (personal, and organizational) give influence on developing competences of design managers in one's respective domain/function?". Especially for personality and work environment, their meanings are so comprehensive that it might be hard to induce interviewees to bring up their pertinent experiences only with the basic questions. Thus, reference materials from the widely acknowledged theories were prepared to help interviewees in case they have difficulties in reminding relevant experiences: the Big Five personality dimension (Goldberg, 1990) and the Emotional Competence Inventory (Boyatzis, Goleman, & Rhee, 2000; Wolff, 2005) for the personality; the Work Environment Inventory (Amabile, Conti, Coon, Lazenby, & Herron, 1996) and the Team Climate Inventory (Anderson & West, 1996) for the work environment.

Table 3 shows sample selection maintaining the criteria of MLDMs and design functional groups as Study I. Among the survey respondents in Study I, the interviewees were re-contacted for in-depth interviews considering their companies and functions. As the sample number of service industry was quite lower than others in the previous survey, it was excluded from the quota. Moreover, two samples were allocated in Group 2 of IT service since UX design would cover both intermediate and back-end-focused functions in the targeted companies. In total, 9 MLDMs were interviewed and the interview records were written down as script data.

Table 3 Sample selection for interviews

		Total	Group 1. Front-end focused design	Group2. Intermediate Design	Group3. Back-end focused design
In-house design of leading corporations	<i>IT mnfg</i>	3	ID01	ID02	ID03
	<i>IT service</i>	3	ID04		ID05, ID06
	<i>Product mnfg.</i>	3	ID07	ID08	ID09

#### 4. 1. 2. Qualitative analysis: identification of catalytic factor conditions and relevant competences

This study adopted a combination of grounded theory and framework analysis (Lacey & Luff, 2007). First, the interview data were open-coded by ground theory. Second, several frameworks from literature (i.e., various inventories utilized for the reference materials of interviews in this study) were referred as the category labels of code. Moreover, the category labels from literatures were refined and adjusted throughout coding processes. According to the purpose of interviews, the analysis was focused on identifying the relations between the detailed conditions of catalytic factors and competences according to the co-occurrence of codes. If the codes are assigned in the same quotation, namely 'co-occurred', they could have high probability to have relations which consist of a relevant context together in that same

quotation (Friese, 2014). Moreover, the competence groups influenced by catalytic factors were mainly concentrated on the strategic and tactical levels of social competences and the meta-competences as presented in Figure 5. Hence, the catalytic factor conditions relevant to those highly-influenced competence groups were mainly probed.

#### 4. 2. Findings: detail conditions of personality, work environment, and motivation

Table 4 describes the co-occurred codes of personality, work environment, and motivation with each competence group which implies probable relations.

Table 4 Detail conditions of catalytic factors and their relevant competence groups

Catalytic factors	Detail conditions	Relevant competence group	
Personality	Trait	Outgoing and sociable	S-S, S-T
		Flexible and open-minded	F-T, M
	Cognition	Holistic perspective, connected thinking	F-T, M
		Empathy ( <i>Sensing other's needs/strength/ weakness</i> )	S-T, F-T
	Social awareness	Organizational awareness ( <i>Understanding customer/partner needs and satisfying them</i> )	S-S, S-T, F-O
		Making people understood, eliciting consensus	S-T, M
	Communication	Creative/effective delivery of design intention/outcome	M
		Building bonds	S-T
		Information gathering from broad personal network	S-S, S-T
	Relationship management	Teamwork & Collaboration	S-T, M
Cultural		Influential equality (flat hierarchy in idea generation)	C-T
		Information sharing for synergy	C-T, S-T
	Open, flexible climate to diversity, challenge	C-T	
	Frequent interaction and feedback	S-T	
	Clear vision and direction	S-T	
Social	Social environment for multidisciplinary cooperation	S-T	
	Respect/trust from other organization/functions	S-T	
Physical	Relevant functions in the same location	S-T	
Structural	Distinct boundary of work scope/responsibility	S-T	
Motivation	Personal	Pride of personal professionalism (name value)	S-T
		Satisfaction from physical outcome/visible creation (ownership)	-
	Organizational	Appreciation for the role of invisible strategy/management/bridging	-
		Low motivation by incentive/rewards	-

Note. The abbreviations of competence groups were formed combining the head letters of competence category and management level (e.g., S-S = Social-Strategic; F-T = Functional-Tactical; M = Meta (without management level); see Figure 5 for the influenced competence groups by each IF.

As for personality, basically outgoing and sociable trait was relevant to social competences. Flexible and open-minded trait and the cognitive personality of holistic perspective and connected thinking were pertinent to develop the functional-tactical competence (e.g., 14. Visualizing information for effective knowledge sharing) and meta-competence (e.g., 25. Creativity; Innovation; Challenge; Exploration). To connect conceptual information

into visible one effectively might require cognition-related personality (ID 07). Moreover, Personality of social awareness, communication, and relationship management were highly related to strategic and tactical levels of social competences. For example, empathy and organizational awareness in social awareness, building bonds, information gathering from personal network, teamwork and collaboration in relationship management were pertinent to those competences. Especially ‘making people understood and eliciting consensus’ which is one of communication skills was accentuated being mentioned by 7 interviewees. It was also influential to the meta-competence such as ‘23. Tolerance for tension/conflict and embracing diversity’. Besides, the personalities of communication and relationship management were obviously required for the competences of managing project, process, team, and resources (social–tactical). Moreover, ‘Sensing other’s needs/strength/weakness was additionally required of this project management competence, because it is important to consider team members’ capabilities sufficiently when managing human resources (ID 02).

Regarding work environment, a cultural environment was essential to cultivate the competence of ‘8. Facilitating idea generation/transfer’ (cognitive–tactical) which is critical to manage projects and cooperation. It was specified as participative safety such as influential equality, namely flat hierarchy in idea generation, information sharing for synergy, and open/flexible climate to diversity/challenge.

Moreover, social-tactical competences (17. Communicating with all stakeholders/different disciplines, and 20. Facilitating collaboration and managing team relationship) were influenced by a large scope of work environment factors. A cultural environment was vital where interactions and feedbacks occur frequently, where information is shared actively for synergy, and where a clear vision is settled and thus distinct directions are provided, to foster these social competences. Furthermore, a social environment for multidisciplinary cooperation also stimulated cultivating the communicating competence with all stakeholders. In addition, a physical environment where relevant functions are disposed in the same location was favorable to these social-tactical competences. Meanwhile, a structural environment where the boundary of work scope, namely the role and responsibility (R&R) of each function is distinctly defined was favorable for those competences of communication or collaboration. Because, the respect for different kind of professional expertise from partners, which is also the condition of social environment, can be shown when the R&R of each partner is clearly defined and differentiated (ID 06).

Meanwhile, motivation-relevant codes were not as many as those of personality or work environment, neither the priority of motivation was. Instead, the conditions of motivation were primarily mentioned in a general context. In global, designers do not tend to be motivated by rewards or incentives at the organizational level (ID 02, 04, 05, 06, 08). Since designers fundamentally have a desire of creation, they were apt to be satisfied and motivated from physical and visible outcomes with their ownership (ID 03, 06, 07). This tendency was found in overall designers, but especially substantial for styling designers in the back-end focused design (ID 03, 09). Consequently, when designers become MLDMs, not a few of them experience demotivation from invisible works as managers such as managing projects and resources, setting strategies and directions, and many kinds of bridging roles between

top and bottom of organization and among various partners (ID 04). For this reason, it is very important (1) at the personal level to change one's mindset to have motivation from and to appreciate the invisible but indispensable contributions and values of design managers' works; and (2) at the organizational level to appreciate their invisible performances and contributions sufficiently and externally to make them experience new kinds of pride and satisfaction (ID 04, 06, 07).

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## 5. Conclusion

The competence development of MLDMs is essential since they may encounter the challenge of cultivating competences different from those of practical design. 'The question of which competences to develop' was answered in the prior research on the CMDM, thus this study pursued to respond to the inquiry of how to develop those competences, namely, what kind of conditions would be required. Accordingly, this study firstly identified the IFs on developing design managers' competences from literature and adjusted them by design experts. Subsequently, two empirical studies followed. In Study I, the influence level of each IF on the competences of CMDM were examined from the view of Korean MLDMs through a quantitative survey. In Study II, the detail conditions of IFs were investigated through qualitative in-depth interviews.

In Study I, the influence levels of IFs on global competence development were identified in order of professional experience, personality, work environment, motivation, job demand, knowledge, and aesthetic talent. Moreover, the IFs were classified into two distinct types according to the influential competence categories. First, 'enabling factors' (i.e., professional experience, job demand, knowledge, and aesthetic talent) primarily influenced the cognitive, functional, and social competence categories. Thus, having those factors could enable to develop certain competences. Whereas, the second type of 'catalytic factors' (i.e., personality, work environment, and motivation) predominantly influenced social and meta-competence categories. Having positive catalytic factors would be favorable to developing certain competences effectively. Moreover, the necessity of detail conditions was found only in the catalytic factors.

Accordingly, the relation between catalytic factors and competences were investigated through interviews of MLDMs in Study II. First, personality of social awareness and social skills influenced on the functional-tactical competences, communication and relationship, and meta-competences. Second, cultural and social aspects of work environment gave influence on the strategic and tactical level competences especially in cognitive and social competence categories. Lastly, one important point about motivation was found that personal appreciation and organizational appraisal about the values and contributions of design managers' invisible works (e.g., managing, directing, and bridging) are essential to motivate MLDMs.

With these findings, this research could find its values contributing toward both professional

practice and academia. First, it could have a professional contribution suggesting an appropriate and precise combination of IFs to cultivate certain competences for MLDMs. Figure 6 shows an exemplary combination of IFs for the social-tactical competences. This kind of IFs combination could be helpful in designing concrete action plans either by the individual MLDM or the organization. The MLDM can determine what kind of professional experiences he/she needs to build in one's career, and what kind of knowledge to learn either by self-development or education programs. Also, the organization can recognize what to clarify and externalize as job demands and what kind of work environment to foster and systematize. Furthermore, despite that personality and motivation are individual IFs, they might not be easily controlled by personal intention. Instead, the organization could refer those conditions, for instance, it can place a person with pertinent personality in a proper position. It can also provide organizational motivations effective to MLDMs, such as the official acknowledgement about the contribution of their invisible works.

Competences	Influential factors	
<b>Social-Tactical competences</b> (17. Communicating with all stakeholders/ different disciplines; 20. Facilitating collaboration; Managing team relationship)	<b>Enabling factors</b>	
	<b>Professional experience</b>	Professional experiences of competence #17, #20
	<b>Job demand</b>	Job demand of competence #17, #20
	<b>Catalytic factors</b>	
	<b>Personality</b>	<i>[Trait]</i> Outgoing and sociable trait <i>[Social awareness]</i> Empathy (Sensing other's needs/strength/ weakness) <i>[Social awareness]</i> Organizational awareness (Understanding customer/partner needs and satisfying them) <i>[Communication]</i> Making people understood, eliciting consensus <i>[Relationship management]</i> Building bonds <i>[Relationship management]</i> Information gathering from broad personal network <i>[Relationship management]</i> Teamwork & Collaboration
	<b>Work environment</b>	<i>[Cultural]</i> Information sharing for synergy <i>[Cultural]</i> Frequent interaction and feedback <i>[Cultural]</i> Clear vision/direction <i>[Social]</i> Social environment for multidisciplinary cooperation <i>[Social]</i> Respect/trust from other organization/functions <i>[Physical]</i> Relevant functions in the same location <i>[Structural]</i> Distinct boundary of work scope, R&R
<b>Motivation</b>	Pride of personal professionalism (name value) Appreciation for the role of invisible strategy/management/ bridging	

Figure 6 Exemplary combination of IFs for the social-tactical competences

Second, this study could have an academic contribution to the knowledge body of design management. The influential levels of IFs on the competences were identified from the perspective of MLDMs who have been underestimated as a research target in design management research. Moreover, it provided the classification of IFs according to the enabling and catalytic factors. Though the concept of enabling and catalytic factors already exists, the adoption of them to categorize and to specify the IFs of MLDM's competence development could contribute to design management knowledge.

## References

1. Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of Management Journal*, 39(5), 1154–1184.
2. Anderson, N. R., & West, M. A. (1996). The Team Climate Inventory: Development of the TCI and its applications in teambuilding for innovativeness. *European Journal of work and organizational psychology*, 5(1), 53–66.
3. Best, K. (2006). *Design Management: managing design strategy, process and implementation*. Lausanne: AVA publishing.
4. Borja de Mozota, B. (2002). Design and competitive edge: A model for design management excellence in European SMEs1. *Design Management Journal Academic Review*, 2(1), 88–103.
5. Borja de Mozota, B. (2003). *Design management: using design to build brand value and corporate innovation*. New York: Allworth Press.
6. Boyatzis, R. E. (2008). Competencies in the 21st century. *Journal of Management Development*, 27(1), 5–12.
7. Boyatzis, R. E., Goleman, D., & Rhee, K. (2000). Clustering competence in emotional intelligence: Insights from the Emotional Competence Inventory (ECI). In *Handbook of emotional intelligence* (pp. 343–362). Cleveland, OH: Case Western Reserve Univ.
8. Briggs, B., Green, L., & Lombardi, J. (1998). What Makes a Design Manager? A Conversation with the Design Management Journal. *Design Management Journal*, 9(2), 18–21.
9. Bruder, R. (2011). Mutual Inspiration and Learning between Management and Design. In R. Cooper, S. Junginger., & T. Lockwood (Eds.), *The Handbook of Design Management* (pp. 144–160). Oxford, New York: Berg.
10. Cheetham, G., & Chivers, G. (1998). The reflective (and competent) practitioner: a model of professional competence which seeks to harmonise the reflective practitioner and competence-based approaches. *Journal of European Industrial Training*, 22(7), 267–276.
11. Chung, K. W. (1998). The Nature of Design Management: Developing a Curriculum Model. *Design Management Journal*, 9(3), 66–71.
12. Chung, K. W. (2010). *Design Management Story* (in Korean). Seoul: Brand Acumen.
13. Daft, R. L. (2003). *Management* (6th ed.). Mason, OH: Thomson South-Western.
14. Dance, A. (2011). *The ambiguity of the middle management role*. Retrieved Dec 22, 2016, from Manager Performance <http://www.managerperformance.co.uk/wp-content/uploads/2017/02/Ambiguity-of-the-Middle-Manager-Role.pdf>.
15. Delmestri, G., & Walgenbach, P. (2005). Mastering techniques or brokering knowledge? Middle managers in Germany, Great Britain and Italy. *Organization Studies*, 26(2), 197–220.
16. Floyd, S. W., & Lane, P. J. (2000). Strategizing throughout the organization: Managing role conflict in strategic renewal. *Academy of management review*, 25(1), 154–177.
17. Floyd, S. W., & Wooldridge, B. (1994). Dinosaurs or Dynamos? Recognizing Middle Management's Strategic Role. *The Academy of Management Executive (1993–2005)*, 8(4), 47–57.
18. Floyd, S. W., & Wooldridge, B. (2000). *Building strategy from the middle: Reconceptualizing strategy process*. Thousand Oaks, CA: Sage.
19. Frieese, S. (2014). *Qualitative data analysis with ATLAS.ti*. London: Sage.
20. Goldberg, L. R. (1990). An alternative "description of personality": the big-five factor structure. *Journal of Personality and Social Psychology*, 59(6), 1216.
21. Grangeat, M., & Gray, P. (2007). Factors influencing teachers' professional competence development. *Journal of Vocational Education & Training*, 59(4), 485–501.
22. Green, L. D., Smith, J., Bryant, G., Cooper, R., Chung, K. W., & Finiw, M. (2004). Perspectives on designing design managers. *Design Management Review*, 15(2), 74–79.
23. Han, J. Y., & Bromilow, D. (2010). Graphic Designers Win the Leadership Game. *Design Management Journal*, 5(1), 20–31.

24. Hellriegel, D., Jackson, S., & Slocum, J. (2005). *Management: a Competency-Based Approach, international Student Edition* (10th ed.). Mason, OH: Thomson/South-western.
25. Hoffmann, T. (1999). The meanings of competency. *Journal of European Industrial Training*, 23(6), 275-286.
26. Huy, Q. N. (2002). Emotional balancing of organizational continuity and radical change: The contribution of middle managers. *Administrative science quarterly*, 47(1), 31-69.
27. Jani, H., & Sawhney, R. (2012). Orchestrating Design Collaborations: Think Like a Family. *Design Management Review*, 23(1), 46-57.
28. Kang, H. J., Chung, K. W., & Nam, K. Y. (2015). A competence model for design managers: A case study of middle managers in Korea. *International Journal of Design*, 9(2), 109-127.
29. Kanter, R. M. (2004). The middle manager as innovator. *Harvard Business Review*, 82(7-8), 150-161.
30. Katz, R. (1974). Skills of an effective administrator. *Harvard Business Review*, 52(5), 90-102.
31. Khomeiran, R. T., Yekta, Z. P., Kiger, A. M., & Ahmadi, F. (2006). Professional competence: factors described by nurses as influencing their development. *International Nursing Review*, 53(1), 66-72.
32. Lacey, A., & Luff, D. (2007). *Qualitative data analysis*. Sheffield: The NIHR RDS for East Midlands / Yorkshire & the Humber.
33. Lockwood, T. (2004). Integrating design into organizational culture. *Design Management Review*, 15(2), 32-39.
34. Lockwood, T. (2010). Transition: Becoming a Design-Minded Organization. In T. Lockwood (Ed.), *Design Thinking: Integrating Innovation, Customer Experience and Brand Value* (pp. 81-95). New York: Allworth Press.
35. Lockwood, T. (2011). A Study of the Value and Applications of Integrated Design Management. In R. Cooper, S. Junginger., & T. Lockwood (Eds.), *The Handbook of Design Management* (pp. 244-259). Oxford, New York: Berg.
36. McCullagh, K. (2008). *The Many Faces of Design Leadership*. Retrieved Dec 22, 2016 from [http://www.core77.com/blog/featured\\_items/the\\_many\\_faces\\_of\\_design\\_leadership\\_by\\_kevin\\_mccullagh\\_9962.asp](http://www.core77.com/blog/featured_items/the_many_faces_of_design_leadership_by_kevin_mccullagh_9962.asp).
37. Metheny, G. A. (2013). The Value of Leading from the Middle. *Leadership Advance Online*, (23), 1-7. Retrieved Dec 22, 2016, from <http://www.regent.edu/acad/global/publications/lao/>.
38. Miller, K., & Moultrie, J. (2013). Understanding the Skills of Design Leaders. *Design Management Journal*, 8(1), 35-51.
39. Noe, R. A., & Wilk, S. L. (1993). Investigation of the factors that influence employees' participation in development activities. *Journal of Applied Psychology*, 78(2), 291-302.
40. Perks, H., Cooper, R., & Jones, C. (2005). Characterizing the Role of Design in New Product Development: An Empirically Derived Taxonomy. *Journal of Product Innovation Management*, 22(2), 111-127.
41. Peters, J. (2012). Educating Designers to a T. *Design Management Review*, 23(4), 62.
42. Spencer, L. M., & Spencer, S. M. (1993). *Competence at work: Models for superior performance*. New York: Wiley.
43. Stevens, J., & Moultrie, J. (2011). Aligning Strategy and Design Perspectives: A Framework of Design's Strategic Contributions. *The Design Journal*, 14(4), 475-500.
44. Turner, R., & Topalian, A. (2002). Core Responsibilities of Design Leaders in commercially demanding environments. Paper presented at the *Inaugural presentation at the Design Leadership Forum*, London.
45. von Stamm, B. (2004). Innovation-What's Design Got to Do with It? *Design Management Review*, 15(1), 10-19.
46. Wolff, S. B. (2005). *Emotional Competence Inventory (ECI): Technical Manual*. Retrieved Feb 27, 2017, from Hay Group, McClelland Center for Research and Innovation [http://www.eiconsortium.org/pdf/ECI\\_2\\_0\\_Technical\\_Manual\\_v2.pdf](http://www.eiconsortium.org/pdf/ECI_2_0_Technical_Manual_v2.pdf).