THE INTEGRATIVE DETERMINANTS OF ORGANIZATIONAL PERFORMANCE IMPROVEMENT: THE IMPACTS OF DIMENSIONS OF LEARNING ORGANIZATION AND DYNAMIC KNOWLEDGE CREATION

A Dissertation in
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by
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ABSTRACT

The purpose of this study is to identify the structural pathways of the learning organization cultural aspects and knowledge creation process as they relate to determinations of the perceived organizational performance improvement in the Korean context.

Dimensions of the learning organization and knowledge creation process—SECI knowledge conversion theory—have been adapted, and are the independent variables; the levels of organizational financial increase and the intensity of organizational knowledge gain are explored as dependent variables.

Data were collected from five different types of businesses in the Korean conglomerate through the in-house intranet on-line self-response questionnaire. All measures were translated into the Korean language using several validation processes. Collected data were analyzed by using two statistical packages, SPSS 16.0 and LISREL 8.80.

Basically, three analyses were conducted in order to prove the given hypotheses: (a) hypothesized measurement model fit, (b) relational and influential associations among the constructs, and (c) structural equation model analysis. Confirmatory factor analysis (CFA) and item consistency analysis were conducted to assess the measurement model fit to the collected data and construct validity based on several types of model fit indices. Multiple regression and canonical correlation analysis (CCA) were conducted to measure the associations among the variables and variable sets. Structural equation model (SEM) analysis was performed to compare the alternative models with the structural pathways among the constructs. In addition, short answer responses were analyzed.

The results presented that (a) hypothesized measurement models are valid and reliable in the Korean context, (b) the proposed three constructs are statistically correlated with each other, (c) the learning organization culture has significant impact on the organizational knowledge
creation and perceived performance improvement, (d) the knowledge creation process has a positive influence on the perceived performance improvement, (e) both independent variables have greater impacts on perceived organizational knowledge gaining than financial performance in separate regression analyses, (f) in the SEM approach, proximal factors of knowledge creation has the same amount of influence on both types of performance while the distal factors of the learning organization culture were not controlled. In brief, all of hypotheses were positively supported. Further, short answer responses suggest that individuals’ task-related readiness, emotional-related interpersonal trust, and CEO’s supportive mind-set could be considered as important factors for creating learning organization; and for encouraging dynamic knowledge creation practices, easy-access knowledge repository system, and task-related competency and expertises need to be considered.

A conclusive summary is provided along with contributive discussion. Implications and contributions to HRD academic researchers and practitioners are discussed, and recommendations are offered. Also included are conclusive final thoughts accompanied by the limitations of this study.
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CHAPTER ONE
INTRODUCTION

In the current era of fierce economic struggle, human capital is the dominant competitive weapon of organizations. The extent of knowledge of the workforce will be a priority over such external and physical resources formerly relied on, such as cash, capital, or even technology. With a growing awareness of the importance of individuals’ knowledge created in organizations, organizational knowledge plays a key role in many functions (Drucker, 1993, 2000; Thurow, 2003). These functions include developing and creating new products and technology, shortening manufacturing-cycle times, overcoming barriers to entering new markets, and improving service (Nonaka & Nishiguchi, 2001; Nonaka & Toyama, 2007; von Krogh, Ichijo, & Nonaka, 2000). Along with these economic trends, the organizational knowledge of the human workforce seems to be a critical source of sustained organizational competitiveness (Cohen & Prusak, 2001; Drucker, 1993, 1999; Ichijo & Nonaka, 2007; Nonaka, Konno, & Toyama, 2001).

More recently, along with the importance of human knowledge, focus has been given to the importance of the supportive learning organization environment as well (Sessa & London, 206; Senge, 1990; Watkins & Marsick, 1993). Several authors (Calvert, Mobley, & Marshall, 1994; Garvin, 2000; Senge, 1990; Watkins & Marsick, 1993) emphasize the positive relations between organizational capability and the learning process, and present effective and systematic factors of learning organization, which lead to creative organizational performance improvement. Furthermore, the most influential and fundamental component for improving organizational knowledge-based performance could be building an effective learning-related cultural environment (McLagan, 2003; Senge, 1990; Watkins & Marsick, 1993; Yang, Watkins & Marsick, 2004).
From the more practical standpoint, the most significant determinant of organizational performance depends on the level of the knowledge creation process in the organization (Ichijo, 2007; Nonaka & Nishiguchi, 2001; Nonaka & Takeuchi, 1995; von Krogh, Ichijo & Nonaka, 2000). In this unpredictable world, economic competition, organizational shared knowledge, and innovative knowledge creation are the determinants of continuous organizational capabilities. In addition, according to Nonaka and his colleagues, based on the socialized interaction, organizational knowledge creation could play the most innovative role in improving organizational capability and continuous organizational sustainability.

As previously mentioned, two major issues in current management fields are the following: a) learning organization structures, which are primarily environmental factors; and b) integrated organizational knowledge creation, which is the more process-related practical aspect inside the organization. All practices in all organizational entities have inter-relations with any types of systemic environmental factors, which include organizational structure, interactive learning process, empowerment, embedded system, leadership styles, and organizational visionary mission (Senge, 1990; Ichijo & Nonaka, 2007; von Krogh, 1998); there is no exception to the knowledge creation process.

In this regard, in this globalizing and unstable economic status, creating the organizational circumstance for improving the learning process and facilitating organizational knowledge creation is the most urgent and required element. Through this facilitative environment, creative knowledge could be generated; and that is the most prevailing factor for organizational endurance.
**Statement of the Problem**

The purpose of this research, from the broad perspective, is to identify the ways in which the dimensions of the learning organization impact the process of organizational knowledge creation, and their relations to performance improvement within private firms in the Korean context.

Since the 1980s, there have been a considerable number of research studies conducted on learning organization construct factors (Argyris, 1977; Argyris & Schön, 1978, 1996; Carroll, Rudolph, & Hatakenaka, 2005; Garvin, 2000; Senge, 1990; Marsick & Watkins, 2003; Watkins & Marsick, 1993, 1996, 1997), as well as knowledge creation (Nonaka, 1991; Nonaka & Takeuchi, 1995; Nonaka, Takeuchi, Nonaka & Nishiguchi, 2001; Ichijo & Nonaka, 2007; von Krogh, Ichijo & Nonaka, 2000). These studies, however, have been conducted separately without the inter-connections of two variables, learning organization cultural factors and systematic knowledge creation process.

In this current study, the author assumes that those two variables might have common influential factors in terms of supportive environmental features that facilitate the learning-based knowledge creation process. According to this academic assumption, based on the literature review, identification of the influential pathways between learning organization cultural factors and the process of knowledge creation; and verification of their independent and cooperative impacts on organizational performance improvement need to be researched for the more effective applications of organizational strategies.

A lack of empirical evidence of what factors facilitate or impede the organizational knowledge creation and a lack of integrated research with expansion of scope to actual performance improvement in the real workplace are further reasons for this research. A few studies have been done to verify the influential process between learning organization factors and
performance improvement (Ellinger, Ellinger, Yang, & Howton, 2002; Yang, Watkins & Marsick, 2004; Zhang, Zhang & Yang, 2004) and between the knowledge creation process and organizational capability (Peltokorpi, Nonaka, & Kodama, 2007; Kusunoki, Nonaka, & Nagata, 1998) separately in limited regions. More critically, none of those studies have been conducted in the Korean context along with rigorous validation processes of measures.

The aforementioned research will define the significant and systematic inter-relations between two variables, learning organizational factors and the knowledge creation process in the Korean organization context. The results of this research shed light on the organizational strategy for maximizing knowledge-based organizational capability.

**Purpose of the Research**

The primary objective of this research is to verify the connection among affecting learning-based work environmental factors, organizational knowledge creativity, the knowledge creation process, and organizational performance improvement. Some demographic variables, which include gender, types of business, occupational status, years of work experience, and occupational position, have been considered as other research aspects for identifying the variations as well.

The specific objectives of this research are the following:

1. Validate the psychometric prosperities of the proposed measurements, based on the collected data, in the Korean business organization contexts.
2. Identify the overall relationship between learning organization cultural factors and the levels of the organizational knowledge creation process.
3. Explore the overall relations among learning organization factors, the organizational knowledge creation process, and the level of organizational performance improvement.
According to these purposes of the study, ultimately, the systematic influences among the learning organization construct factors, the process of organizational knowledge creation, and the levels of performance improvement were verified along with configurations of the influential relationships among these three variables independently and jointly.

**Research Questions & Hypotheses**

The major framework of this research is the association of learning organization factors, the organizational knowledge creation process, and the levels of organizational performance improvement. In this regard, Watkins & Marsick’s (1993, 1996) Seven Dimensions of the Learning Organization Questionnaires (DLOQ) and Nonaka & Takehich’s (SECI) Knowledge creation theory (1995) were adopted for the primary research instruments.

Along with these two major research concepts, the following research questions guided the entire study:

1. Are the hypothesized measurements valid and reliable in Korean business organization contexts?
2. What are the relationships among the cultural aspects of the learning organization, the practices of the dynamic organizational knowledge creation, and organizational performance improvement?
3. Do cultural aspects of the learning organization and organizational knowledge creation practices jointly contribute to organizational performance improvement?
4. What factors do participants report as most influential and encouraging for effective learning organization culture and active knowledge creation practices?
Hypothesis 1: *Two measurements of learning organization and knowledge creation processes are valid and reliable concepts in the Korean context.*

Hypothesis 2: *Cultural aspects of the learning organization will be positively related to processes of the organizational knowledge creation.*

Hypothesis 3: *Cultural aspects of the learning organization will be positively related to organizational performance improvement.*

Hypothesis 4: *The processes of the organizational knowledge creation will be positively related to organizational performance.*

**Significance of the Study**

A growing interest has developed regarding organizational knowledge creation through the configurative socialization of organizational tacit knowledge, but its impact on organizational performance improvement within the influences of the learning organizational environment has not been matched yet by an equivalent effort to provide empirical evidence supporting the research hypotheses at the basis of this research paradigm. In addition, most of the studies conducted in the past few decades have focused on the conceptualization of those themes including learning organization and knowledge creation; thus, the empirical research regarding the relationship with organizational performance improvement has been out of the range of research.

This study has both practical and theoretical significance. On the one hand, it contributes by providing human resource professionals and organizational strategy developers with an integrated framework that reveals the presence of the knowledge creation process with an influence of positive learning organization-related structure and its impact on organizational performance improvement. The process of this study, on the other hand, contributes to the
literature on the emergent knowledge based view of business organization and knowledge management system by providing the benefits of knowledge-based human capital assets with association of performance improvement. Finally, but not least, the results of this integrated study provide human resource developers and organizational decision makers with empirical data on which learning organization characteristics have the most impact on the organizational knowledge creation process and have positive inter-correlations with organizational performance improvement. These significant findings could be the foundation for creating organizational systems, training strategies, and intervention practices aimed at the optimization of innovative knowledge generations and continuous knowledge retention within organizations.

**Conceptual Framework of the Research**

Human resource development (HRD) scholars and practitioners have recently emphasized the importance of learning about supportive organizational structure and the value of creative knowledge to endorse continuous organizational performance (Herling & Provo, 2000; Ichijo & Nonaka, 2007; Marsick & Watkins, 1994; Nonaka, 2000; Nonaka, von Krogh, & Voelpel, 2006; Yang, Watkins & Marsick, 2004). According to this trend, in this study the following three themes were explored in terms of their inter-influences: a) learning organization-related factors, b) the knowledge creation process within the organization, and c) organizational performance amid the increasing affluence of both knowledge and finances.

The supportive learning organization environment has been regarded as the most significant determinant of organizational performance for the past decades (Argyris & Schön, 1978; Garvin, 2000; Marsick & Watkins, 2003; Sessa & London, 2006; Watkins & Marsick, 1993, 1996; Yang, Watkins & Marsick, 2004). Numerous studies have approached classifying the specific learning organization construct components from the perspectives of the structural
organization system level, individuals’ learning process, and effective organizational level

More recently, along with the growing attention to the importance of the asset of human
knowledge, the knowledge creation process in the organization has been conceptualized and
regarded as another determinant for organizational sustainable performance (Ichijo & Nonaka,
2007; Kim, 2001; Nonaka & Nishiguchi, 2001; Nonaka & Takeuchi, 1995; von Krogh, Ichijo &
Nonaka, 2000). Emphasis is placed on the value of human tacit knowledge. It is believed that the
fundamental concept of knowledge creation is organizational interaction based on the
socialization, externalization, combination, and internalization of tacit and explicit knowledge
within the organization.

In order to design the integrated research based on the determinant themes of this study, a
conceptual framework (Figure 1-1) has been developed to guide the entire study.
Limitations of the Research

This study has four limitations related to conceptualization and sampling issues even though the overall research design has been theoretically and confidently integrated.

First of all, the current study has a theoretical limitation regarding an independent variable. Literature related to the individual learning theory suggests critical consideration of individuals’ generic personalities for examining the knowledge generation process. In reality, individual participants’ personal characteristics could be critical variables that lead to a variety of levels of knowledge creation in an organization. This research, however, does not include those variations regarding individuals’ personality types, but focuses more on the overall process of the
organizational knowledge creation process in general following the major aim and range of the current study.

Second, as with all studies, there are other possible variables that will not be examined that may have exogenous effects on the relationship studies. In particular, both specific organizational culture (Nonaka, 1991, 1994; Nonaka & Nagata, 2000) and social capital (Nahapiet & Choshal, 1998) have been cited as key aspects for promoting the process of knowledge creation in the organization. From the social science research standpoint, all of the potential influences could not be examined; thus, this research mainly focused on the knowledge conversion SECI theory of Nonaka and Tackuchi (1995).

As the third limitation, in order to measure the levels of organizational financial performance improvement, actual hard information of organizational finances should be used. However, due to the sensitivity and confidentiality of that data in terms of indigenous disclosure policies, it is likely that receipt of this information would not be possible. For this reason, participants’ self-reported perspectives regarding financial performance improvement were collected and analyzed. Those perspectives might have some limitations as a measure of the precise intensity of organizational financial revenues.

Finally, regarding the sampling procedure, the target sample was several business units in a large Korean conglomerate chosen for its firm size and financial revenue. The current study employed a purposive, non-random sampling process; therefore, the issue related to generalization of the eventual findings could be compromised. However, it is not the major intention of this study to generalize the results beyond the sample population.
Definitions of Terms

**Explicit knowledge:** Knowledge that is easily codified and can be shared, or it can be embedded in processes or systems (DeLong, 2004, p.83)

**Learning organization:** one that learns continuously and transforms itself…Learning is a continuous, strategically used process-integrated with and running parallel to work…Learning also enhanced organizational capacity for innovation and growth. The learning organization has embedded systems to capture and share learning. (Watkins & Marsick, 1993, p. 8)

**Organizational learning:** The learning process from direct experience, and how organizations learn from the experience of others, and how organizations develop conceptual frameworks or paradigms for interpreting that experience (Levitt & March, 1988, p.319).

**Organizational capability:** Collective and sustainable capacity of organization, which could be developed and maintained through the leadership or/and human resource strategies; thus, human resources are regarded as the most valuable asset for the consistent growth of business performance in many ways (Heskett & Schlesinger, 1997; Hiltrop, 2005; Ulich, 1987; Ulich & Lake, 1991).

**Organizational performance:** Strategic and competency-based outcomes or accomplishments of organization, which lead the improvement of its’ value in the both levels of financial-oriented market sharing and learning-based knowledge creation (Gilley & Maycunich, 2000; Nonaka & Takeuchi, 1995; Rothwell, 1996; Yang, Watkins & Marsick, 2004).

**Knowledge:** A shared set of justified true beliefs based on the human socialized interaction (Nonaka & Takeuchi, 1995, p.3; Nonaka, Toyama, & Konno, 2000, p. 7)
Knowledge creation: The process of making available and amplifying knowledge created by individuals as well as crystallizing and connecting it to an organization’s knowledge system (Nonaka, von Krogh, & Voelpel, 2006, p. 1179)

Tacit knowledge: The tacit knowledge is highly personal and hard to formalize, making it difficult to communicate to others or share with others (Nonaka, Tackeuchi, & Umemoto, 1996, P. 534)

Knowledge conversion: The assumption that knowledge created through conversion between tacit and explicit knowledge allows us to postulate four “modes” of knowledge creation process (Nonaka, 1991, 1994; Nonaka & Takeuchi, 1995, p.62)

SECI theory: The systematic process of knowledge conversion, which includes Socialization, Externalization, Combination, and Externalization between tacit and explicit knowledge (Nonaka & Takeuchi, 1995, Nonaka, Toyama, & Konno, 2000, p. 8)

Chapter Summary

In this first chapter, the general framework of the current study has been introduced along with the significance of the study, research questions, conceptual framework, limitations, and general definitions of terms. The primary purpose of this study is the identification of the influential relationships between two independent variables -- learning organization construct factors and the process of dynamic knowledge creation -- and a dependent variable -- organizational performance improvement in both perspectives of finance and knowledge. The results of the current research will shed light on the effective management strategies for sustaining knowledge-based organizational market advantages. Based on the developed conceptual framework for this study, Chapter Two (the relevant literature review section) discussed themes closely related to this study, including learning organization-related cultural
issues, the organizational knowledge creation process, and the improvement of organizational capability.
The purpose of this study is to measure the relations among the learning organization factors, organizational knowledge creation process, and their impacts on the organizational performance improvement in the Korean context. In order to understand each of the research components, the following relevant literatures have been reviewed in integrated perspectives: (a) learning organization construct factors, especially for dimensions of the learning organization (Watkins & Marsick, 1993, 1996, 1999); (b) organizational knowledge creation based on the review of the knowledge conversion SECI theory (Nonaka, 1994; Nonaka & Takecuich, 1995); and (c) learning-based sustainable organizational capability (Marsick & Watkins, 1999, 2003; Pedler, Burgoyne, & Boydell, 1991; Watkins & Marsick, 1996) in the view of the financially successful and increasingly knowledgeable generation in the organization.

Learning Organization

Perhaps it is true that the concept of learning organization is not a newly developed concept, but numerous studies (Egan, Yang, & Bartlett, 2004; Ellinger, Ellinger, Yang, & Howton, 2002; Joo, 2007; Lim, 2003) have been conducted on the conceptualization of the learning organization and practical applications of those concepts in the workplace. This review of relevant literature on the concept and construct of the learning organization reveals that there are as many definitions as there are different approaches and perspectives for defining and conceptualizing the learning organizational construct. In this section, three components are reviewed: (a) general concepts of the learning organization in the environmental perspectives, (b) construct factors of the learning organization from the practical standpoint, and (c) the linkage
between learning organization-related work environment and organizational performance improvement.

*Concepts of Learning Organization*

Much attention has been given to the concept of the learning organization since the late 1970s (Argyris, 1977; Argyris & Schön, 1978), with increasing attention in the 1990s. Along with this attention, the notion of the learning organization has received considerable concentration in the scholarly literature because advanced organizational learning processes have been heralded as a foundation of competitive advantage (Ellinger, Ellinger, Yang, & Howton, 2002; Lyles & Easterby-Smith, 2005; Swieringa & Wierdsma, 1992; Yang, Watkins, & Marsick, 2004). There have been various efforts to define the learning organization, and among the various studies, there are two remarkable efforts: *The Fifth Discipline* by Peter Senge (1990) and *Sculpting the Learning Organization* by Watkins and Marsick (1993). The term *learning organization* was defined in these publications as follows:

The learning organization is an organization that possesses not only an adaptive capacity but also “generative” – that is, the ability to create its alternative future. (Senge, 1990, p.14)

The learning organization is one that learns continuously and transforms itself…Learning is a continuous, strategically used process-integrated with and running parallel to work…Learning also enhanced organizational capacity for innovation and growth. The learning organization has embedded systems to capture and share learning. (Watkins & Marsick, 1993, p. 8)
From a more practical perspective, Slater and Narver (1994) defined a learning organization as one that continuously acquires, processes, and disseminates knowledge about market, products, technologies, and business processes, and this knowledge is often based on experience, experimentation, and information provided by customers, suppliers, competitors, and other sources (Elliger, Watkins & Bostrom, 2000). Other researchers claim that learning organizations are generally market-oriented and have an entrepreneurial mission, a systematic structure, a flexible process, and transformational facilitative leadership (Lundberg, 1991; Slater & Narver, 1995; Watkins & Marsick, 1993, 1996).

More recently, the term learning organization was defined in the broader perspective by Jensen (2005) as “an organization that is organized to scan for information in its environment, by itself creating information and promoting individuals to transform information into knowledge and coordinate this knowledge between the individuals so that new insight is obtained” (p.61).

From a more integrated environmental perspective, Song, Kim & Kim (2007) described the learning organization as “…structure-based learning environment factors which trigger individuals’ learning and knowledge transformation autogenously for the promotion of continuous and spontaneous organizational learning process within organization itself. The learning organization is the fundamental culture and structure for taking the market advantages through the performance improvement.” (p. 1162).

The following commonalities (see Figure 2-1), focusing on the definition and basic assumptions of learning organization, were drawn from the various reviews of literature: (a) learning environment-related factors, (b) continuous learning process within organization; (c) system-oriented learning structure, (d) autogenously learned and knowledge creation environment, and (e) performance and goal-oriented learning systems. Along these lines, the collaborative learning-oriented organizational culture or environments are seriously associated with all of the last learning processes, which include the individuals’ learning, learning and
knowledge transfer, knowledge management system, and collaborative organizational learning culture (Kofman & Senge, 1993; Nonaka, 1991; Pawlowsky, 2001; Senge, 1990; Senge, Schamer, Jaworskiv & Flowers, 2005; Tsang, 1997). To take advantage of learning-based performance improvement in organizations, the establishment of the learning organization culture or environment should be the priority concern of organizational learning processes.

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**Figure 2-1.** Learning organization system and its basic components

For the purpose of this study, a learning organization was defined as one characterized by continuous learning for continuous organizational improvement, and by the capacity to transform itself. It is a learning organization in which people are aligned based on a common vision through the continuous dialogue process, generating new knowledge used to create innovative products and services for organizational performance improvement (Watkins & Marsick, 1999).
Learning Organization Construct Factors

Numerous studies have been conducted in order to verify the critical factors for construct positive learning organization system in terms of organizational structure, collaborative learning process, organizational systematic connection, supportive culture, and individuals’ perception (Argyris & Schön, 1978; Marsick & Watkins, 1999, 2003; Senge, 1990; Watkins & Marsick, 1993, 1996; Yang, Watkins & Marsick, 2004). In this study, as one of the affecting variables, seven Dimensions of the Learning Organization Questionnaires - DLOQ (see Figure 2-2) were adapted, which has been developed (Watkins & Marsick, 1993, 1996) and validated in several regions across the world (Ellinger, Ellinger, Yang & Howton, 2002; Lien, Hung, Yang & Li, 2006; Yang, Watkins & Marsick, 2004; Zhang, Zhang & Yang, 2004).

According to Yang, Watkins, and Marsick (2004), many learning environment-related aspects have emerged and have been considered in order to define the appropriate learning organization constructs through the integrations of (a) the System Perspective of Senge (1990); (b) the Organizational Learning Perspective of Pedler, Burgoyne, and Boydell (1991); (c) the Organizational Structure Perspective of Garvin (1993) and Goh (1998); and (d) the Integrative Perspective of Watkins and Marsick (1993, 1996).

The System Perspective. Senge (1990) defined the essential five disciplines that a functional learning organization should possess: (a) team learning: focus on the learning practices of team-levels rather than on improvement of team process; (b) shared vision: ability to unearth the shared “vision of entire organization” that promotes continuous effort rather than compliance; (c) mental models: embedded internal self-guidance of how the organization works; (d) personal mastery: continually developing and deepening personal competencies following the career pathway; and (e) system thinking: ability to organize all aspects of the entire organization based on the view of interrelationship rather than on the view of a linear cause-effect chain. These five
Disciplines provide valuable principles that guide the entire strategic planning for building a learning organization in terms of broad perspectives of the basic assumption. Even though these basic principles are valuable in working toward learning organization status; the observable characteristics of such organizations have not been represented (Yang, Watkins, & Marsick, 2004).

**Organizational Learning Perspective.** One of the other approaches is the supportive learning-based environment, which has been represented by Pedler, Burgoyne, and Boydell (1991). They stressed the importance of facilitative and supportive factors of learning activities for the continuous learning process and transformation of itself to meet the organization’s strategic goals. This learning perspective provides interactive and comprehensive aspects of organizational learning at all entities of the organization along with the eleven identified applied areas: learning approach to organizational strategy, participative policy-making process, interactive informing, formative accounting and control, internal exchange, flexible reward system, enabling structure, boundary workers as environmental scanners, collaborative inter-company learning, appropriative learning climate, and self-directed individual development. These eleven aspects have the merit of a comprehensive approach; however, it might not be enough to cover all the factors to develop the optimal construct of the learning organization in terms of lacking a parsimonious framework of construct (Yang, Watkins, & Marsick, 2004).

**Organizational Structure Perspective.** According to the literature on the organizational structure approach for building learning organizations, one of the essential notions of the learning organization environment is that of internal drivers for building organizational learning capacity (Garvin, 1993, 2000). Based on Garvin’s definition, a learning organization is required to create, transfer, and modify organizational knowledge; and lead to reflective behavioral change to apply the knowledge to the workplace. Goh (1998), furthermore, represents the five enablers for building the learning organization: clarity and support for organizational mission and vision,
shared leadership and positive involvement, supportive organizational culture for experimentation, organizational level knowledge sharing and transfer, and collaborative teamwork based on the alliance with appropriate organizational structure and employees’ roles and task competencies. Those two approaches, in the macro perspective, are providing the guidance, as prerequisites, for managerial practices or strategic planning for building a foundation for the learning organization. These approaches, however, neglect some of the essential components of the learning organization, such as the individuals’ learning process and continuous learning. Furthermore, from the theoretical standpoint, some of the proposed components might not be conceptually parallel (organizational capacity versus organizational culture); and those perspectives might be the measurement of the overall structure of the organization rather than the set of measures of a particular aspect -- the construct of the learning organization (Yang, Watkins, & Marsick, 2004).

**Integrative Perspective.** Watkins and Marsick (1993, 1996) proposed an integrative model of a learning organization along with the seven dimensions of the learning organization: (a) continuous learning, (b) inquiry and dialogue, (c) team-based learning, (d) empowerment, (e) embedded system, (f) system connection, and (g) strategic leadership. Their proposed learning organization has been drawn from the basic matrix of people in organization and organizational structures. The initial approach was based on the interactive components of organizational change and development at the all entities of individual, team, and organization (Yang, Watkins, and Marsick, 2004). The integrative approach to an effective learning organization is considered as one that has the capability to integrate people and organizational structures in order to facilitate continuous learning and encourage organizational changes (Yang, Watkins, and Marsick, 2004, p. 34). Through the integration of the aforementioned various perspectives of the learning organization, Watkins & Marsick (1996) proposed the integrated model for a learning
organization. The specific descriptions of each of the seven dimensions of a learning organization – the independent variables of this study – are as follows:

- Continuous Learning - Creating and supporting continuous learning opportunities
- Inquiry and Dialogue - Promoting interactive inquiry and dialogue
- Team-based Learning - Encouraging collaborative team-based learning activities
- Empowerment - Empowering people toward a collective vision
- Embedded System - Establishing systems to capture and share learning
- System Connection - Connecting an organization to its environment
- Strategic Leadership - Providing strategic leadership for learning practices

Figure 2-2. Integrated Network of the Dimensions of Learning Organization, and its Outcome

Watkins and Marsick (1993, 1996) indicated that learning organization design depends on those seven complementary imperative activities based on the interaction between people and systematic structure in the organization. The integrated concept of the learning organization is described in Figure 2-2.

**Learning Organization and Organizational Performance**

According to the literature on learning organizations, many perspectives suggest that adopting learning organization strategies should promote all learning practices at all entities of individual, team, and organization levels and that the results of those learning processes should yield organizational performance improvement (Baker & Sinkula, 1999; Day, 1994; Dickson, 1996; Edmondson & Woolley, 2005; Ellinger, Ellinger, Haskell, 2001; Yang, & Howton, 2002; Hunt & Morgan, 1996). Based on the relevant review of learning-based organizational performance improvement, the following assumptions for performance improvement were reviewed: (a) leveraging individual learning for organizational performance improvement and (b) learning supportive organizational structure.

*Linkage between individual learning and organizational performance.* According to Argyris and Schön (1978), Elkjaer (2005), and Nonaka and Takeuchi (1995), organization itself cannot be learned but all of the individuals’ learning processes in the organization might be the agent for promoting organizational learning in the learning organization environment. At the individual level, people make meaning of their experience and apply their existing knowledge in the workplace; and during all those processes, they learn new perceptions and acquire new knowledge (Friedman, 2001). Based on the individuals’ knowledge gain and learning process, organizational learning processes occur through combinations of individual learning practices that
people recreate and “extend our capacity to create, to be part of the generative process of life” (Senge, 1990, p.14).

According to Swierings and Wierdsma (1992), individuals’ learning processes are linked to task-related work processes, and the ultimate goal of individuals’ learning practices in the organization is creating organizational knowledge (p.73). Individuals’ learned knowledge needs to be applied in the workplace based on the collaborative hands-on experiences for creating organizational knowledge (Nonaka & Takeuchi, 1995). Regarding the organizational knowledge creation process, Nonaka and Takeuchi (1995) insist “organizational knowledge creation should be understood as a process that organizationally amplifies that knowledge created by individuals and crystallizes it as a part of the knowledge network of all organizational entities” (p.59). From a more integrated perspective, individuals’ learning could be the foundation of the organizational learning process (Argyris & Schön, 1978; Senge, 1990; Starbuck & Hedberg, 2001); and through the organizational learning practices, organizational knowledge might be created (Nonaka & Takeuchi, 1995; Swierings & Wierdsma, 1992), which could be the catalyst of organizational performance improvement.

As a critical factor of linkage between individuals’ learning activities and the organizational knowledge creation process, Watkins and Marsick (1993, 1996) suggest that becoming a learning organization which nurtures creative questioning, innovative feedback, and practical experimentation is based on continuous dialogue and an inquiry system. Senge (1990), furthermore, claims that thorough the interpersonal dialogue system, individuals gain insights and acquire new knowledge that simply could not be achieved individually (p.241). From a practical standpoint, interpersonal knowledge transfer practices should be encouraged within the learning organization environment, and those practices could occur through the knowledge conversion based on the social interaction between tacit knowledge, which is transmittable in a formal systemic language (Kline & Saunders, 1993; Nonaka & Takeuchi, 1995, p. 60).
According to Watkins and Marsick (1996), the integrative individual learning activities lead to team-based collaborative learning practices, and it is “the mutual construction of new knowledge and the capacity for concerted, collaborative action” (p.6). In accordance with knowledge creation theory (Nonaka & Takeuchi, 1995), the sharing of tacit knowledge among multiple individuals with diversities, which include background, perspectives, and motivation, becomes the critical stage for collaborative organizational knowledge creation (p.85).

Finally, individual learning practices along with systematic inquiry and daily-based dialogue could be the fundamental foundation of collaborative organizational learning, and could promote continuous learning practices and contribute to increased organizational knowledge creation, which could lead to organizational performance improvement, and those sequences are critically related to the learning organization environmental factors and knowledge creation process (Hernandez, 1995).

From the practical standpoint, even though theoretically well-defined learning organization construct factors have been identified (Watkins & Marsick, 1993, 1996), contributions in the learning organization literature remain largely descriptive or prescriptive without empirical evidence in terms of linking learning-based environmental factors and organizational performance achievement (Jacobs, 1995; Kaiser & Holton, 1998; Smith & Tosey, 1999). Few studies have presented the measurable association between learning organizational factors and organizational performance improvement (Ellinger, Ellinger, Yang, & Howton, 2002).

Through the problematic perspective, Watkins & Marsick (1999) proposed an instrument for measuring the levels of organizational performance improvement, in both organizational financial achievement and individuals’ knowledge gaining, based on the alliances with the DLOQ. Based on this expanded instrument, Ellinger, Ellinger, Yang, and Howton (2002) and Zhang, Zhang, and Yang (2004), conducted research in order to measure the empirical association between the learning organization components (seven dimensions) and organizational performance improvement (finance and knowledge). Based on the results of those studies, more than ten percent of the variability in the organizational performance could be accounted for by the seven dimensions of the learning organization (Zhang, Zhang, & Yang, 2004) with the canonical correlation ranging from .11 to .12 (p < .001); and Ellinger, Ellinger, Yang, and Howton (2000) suggested a positive association between learning organization structure and the organization’s financial performance improvement, providing the results that more than a quarter of the variance of the organization performance could be accounted for by the learning organization environment with an effect size of the canonical correlation ranging from .247 to .312 (p < .001).

Perhaps it is true that a limited number of studies might not be representative enough to validate the accurate association between learning organizational structures and performance improvement. In that regard, based on the results of the previous studies that show a certain
amount of reliable relationship between two factors – *structural factors of learning organization and organizational performance improvement* –, in this research, the seven dimensions of learning organization and the process of knowledge creation will be used as independent variables to measure the more truthful association among the research components. From the holistic perspective, through the various literature reviews on learning transfer, knowledge creation, and learning organization, the conceptual framework has been developed.

![Figure 2-3. Integrated concept of learning organization and organizational performance improvement](image)

**Organizational Knowledge Creation**

Individual learning theory, including individuals’ adaptive learning process and individuals’ knowledge acquisition, has been studied since the early 1900s along with the
maturity of learning psychological literacy (DeFillippi & Ornstein, 2005). From the practical standpoint, research has focused on knowledge creation since the early 1990s with the introduction of the book entitled Knowledge creating company: How the Japanese company is working (Nonaka & Takeuchi, 1995). More recently, much of the literature has focused on the practical and applicable approach to link the knowledge creation process and improvement of organizational capability (Ichijo & Nonaka, 2007; Nonaka & Nishiguchi, 2001; Nonaka, von Krogh, & Voelpel, 2006; Tsoukas, 1996; von Krogh, Ichijo, & Nonaka, 2000; Ulrich, 1987; Ulrich & Lake, 1991; Vicari & Troilo, 2000). In this section, the following three key themes were reviewed: a) general process of organizational knowledge creation process based on the knowledge conversion theory, b) supportive factors encouraging knowledge process from the perspective of knowledge creating enablers, and c) impact of continuous knowledge creation on the organizational performance improvement.

**Concept and Theory of Knowledge Creation**

The definitions of knowledge and organizational knowledge creation vary, depending on the different perspectives of economics, psychology, and management views. Knowledge is defined as “a set of justified true beliefs” (Nonaka & Takeuchi, 1995, p.3); and organizational knowledge creation is defined as “the capability of a company as a whole to create new knowledge, disseminate it throughout the organization, and embody it in products, services, and systems” (p.58).

The foundation of the organizational knowledge creation process has been researched by many scholars and practitioners (Dixon, 2000; Nonaka, 1991, 1994; Tsoukas, & Mylonopoulos, 2004; von Krogh, 1998; von Krogh, Ichijo, & Nonaka, 2000) including a review of the four modes of knowledge conversion and a five-phase model of the organizational knowledge creation
process developed by Nonaka and Takeuchi (1995). The basic concept of knowledge conversion is based on how two types of knowledge (tacit and explicit knowledge) interact to create new organizational knowledge; and the knowledge creation process model refers to whether there are particular stages and actions that facilitate some firms to continuously create knowledge (Oh, 2001, p.33). On the first hand, Nonaka and Takeuchi (1995) conceptualized the concept of knowledge conversion -- that knowledge is created through social interaction between tacit and explicit knowledge (p.61). The following are the general modes of knowledge conversion: (1) tacit to tacit (socialization), (2) tacit to explicit (externalization), (3) explicit to explicit (combination), and (4) explicit to tacit (internalization) (Nonaka and Takeuchi, 1995; Nonaka, Toyama, & Konno, 2000).

Knowledge creation SECI theory. The aforementioned basic assumption of the knowledge creation theory of Nonaka and Takeuchi (1995) is the conversion process between individuals’ tacit knowledge and explicit knowledge within a supportive organizational context. In more detail, specific descriptions of knowledge conversation modes will follow.

As the first mode of knowledge conversion process, according to Nonaka and Takeuchi (1995), socialization (S) is a process of sharing and converting tacit knowledge, thereby creating new tacit knowledge such as shared mental models and task-related technical skills. Individuals’ tacit knowledge could be acquired and transferred better through observation, imitation, and experience-based practice than formal language-based conversation (p. 62). Like the on-the-job training process in the work setting, sharing and acquiring tacit knowledge could be possible only based shared experience, and creative dialogue and enhancing mutual trust among group members are required components for effective knowledge sharing beyond simple information sharing (p.63).

The second mode is externalization (E), which is the process of articulating tacit knowledge into explicit concepts for application to the workplace. This mode is significant for
figuration of tacit knowledge into the applicable explicit knowledge among group members. During this mode, scattered individuals’ tacit knowledge could be articulated and conceptualized by facilitating creative and essential dialogue, using inductive and deductive thinking and metaphors in dialogue (Nonaka, 1991, 1994; Nonaka & Takeuchi, 1995; Nonaka, Toyama, & Konno, 2000). Individuals’ tacit knowledge could be conceptualized mostly by the expression of its language, and the central process in creating a new concept is coming up with language both to communicate new insights and to guide new perceptions, which lead to fostering reflection and interaction between individuals (Nonaka & Takeuchi, 1995; von Krogh, 1998; von Krogh, Nonaka, Nishiguchi, 2000). When tacit knowledge is made explicit, knowledge is crystallized, thus allowing it to be shared by others, and it becomes the basis of new knowledge (Nonaka, Toyama, & Konno, 2000, p.9).

According to Nonaka and Takeuchi (1995), based on the shared tacit knowledge and through the figurative language with metaphor and analogy, an explicit concept could be created followed by the logical model. In order to ensure systematic knowledge externalization, all concepts and propositions must be expressed in systematic language and coherent logic based on the commonness of individuals’ perceptions (Nonaka, 1990; Nonaka & Takeuchi, 1995).

Combination (C) is the third phase of the knowledge conversion process. Through this process, explicit knowledge could be converted into more complex and systematic sets of explicit knowledge (Nonaka, Toyama, & Konno, 2000). It is a process of systemizing concepts into a combined knowledge system through the connecting and combining of different bodies of conceptualized explicit knowledge. The key practices of this mode include acquiring, integrating, synthesizing, processing, and disseminating internal and external existing information (Nonaka, 1994; Nonaka & Takeuchi, 1995; Nonaka, Toyama, & Konno, 2000). Another concern of this mode is the importance of middle managers’ roles, which “break down and operationalize corporate visions, business concepts, or product concepts” (Nonaka & Takeuchi, 1995, p.68;
Nonaka, Toyama, & Konno, 2000). This mode could be facilitated by networking of concepts and codified information in a computerized large-scale information database in the organization.

The last process of knowledge conversion is *internalization* (I), which is the process of embodying explicit knowledge back into organizational tacit knowledge (Nonaka & Takeuchi, 1995; Nonaka, Toyama, & Konno, 2000). In this mode individuals’ experimental experience plays a key role, which is related to the concept of “learning by doing,” and “when experiences through socialization, externalization, and combination are internalized into individuals’ tacit knowledge bases in the form of shared mental models or technical know-how, they become valuable assets in organizational levels” (Nonaka & Takeuchi, 1995, p.69). In order to promote the effective internalization of tacit knowledge, verbalized and diagrammed knowledge needs to be transferred into documents, manuals, or oral stories for enriching individuals’ tacit knowledge.
and helping individuals experience the experiences of others indirectly (Nonaka & Takeuchi, 1995). This tacit knowledge accumulated at the individual level can then set off a new spiral of knowledge creation when it is shared with other group members through socialization again (Nonaka, Toyama, & Konno, 2000, p.10).

On the other hand, Nonaka and Takeuchi (1995) developed a five-phase model of the knowledge creation process based on the proposed four different ways of knowledge conversion as internal dynamics of knowledge creation: (1) sharing tacit knowledge, (2) creating concepts, (3) justifying concepts, (4) building an archetype, and (5) cross-leveling knowledge. More specific descriptions and outcomes of each phase of knowledge creation follow:

The first phase of the knowledge creation process is *sharing tacit knowledge*. The initial knowledge creation is based on the individuals’ tacit knowledge, and “it seems natural to start the process by focusing on tacit knowledge, which is the rich, untapped source of new knowledge” (Nonaka & Takeuchi, 1995, p.85). Sharing of individuals’ tacit knowledge solidly relies on continuous and interactive dialogue among group members. Based on the continuous dialogue and inquiry system; the individuals’ tacit knowledge could be shared and synchronized. This process, as well, could be facilitated by secure observation and imitated experimentations. In order to ensure this process, a high degree of autonomy, a requisite variety of group members, and a systematic redundancy of information are required components.

Second, the most concentrated interaction between tacit and explicit knowledge takes place in this second *creating concepts* phase (Nonaka & Takeuchi, 1995, p.85). In this phase, a shared individuals’ tacit mental model could be verbalized into understandable words and revised, and finally crystallized into organizational explicit concepts, and this process corresponds to externalization mode of knowledge conversion theory (Nonaka, 1991; Nonaka & Takeuchi, 1995). Explicit concepts are created cooperatively through the dialogue and the iterative and spiral process along with facilitations of multiple reasoning methods such as
deduction, induction, and abduction. In order to create figurative concepts, group members have to rethink their existing premises fundamentally.

From more integrative perspectives, the organization’s requisite variety provides different angles or perspectives for looking at a problem; the fluctuation and intended chaos, either inside or outside, also encourages group members to modify their basic way of thinking; and the systematic redundancy of information allows group members to comprehend figurative language as well as lets their shared mental model take shape (Nonaka & Takeuchi, 1995, p.86).

The third phrase, justifying concepts, engages the process of determining whether the newly articulated concepts are truly worthwhile for the organization and society. The explicit concepts need to be communicated and verified to other group members who have not been involved in concrete experiences and intuitions. Through this verification process based on the interactive dialogue, newly developed concepts are transformed into justified beliefs -- the basic meaning of organizational knowledge -- at the organizational level.

This phase is solidly related to more managerial decision-making based on the criteria of cost, profit margin, and the degree to which a product can contribute to the firm’s growth in both qualitative and quantitative perspectives (Nonaka & Takeuchi, 1995). The roles of management, furthermore, in this phase need to be significantly considered to formulate the justification criteria in the form of organization intention, which is expressed in terms of strategy or vision (Nonaka, 1998; Nonaka, Toyama, & Byoière, 2001; Mitsuru, 2006).

Fourth, in the building an archetype phase, justified concepts are converted into a more tangible or concrete, namely, actionable archetype (Nonaka & Takeuchi, 1995; von Krogh, 1998; von Krogh, Ichijo & Nonaka, 2000). According to Nonaka and Takeuchi (1995), “an archetype could be thought of as a model operating mechanism, and it is built by combining newly articulated explicit concepts with existing explicit knowledge; and this phase is akin to the combination process of knowledge conversion” (p.87). During this process, group members
develop specifications of the real products or a model of the practical system; and for ensuring the
dynamic prototyping process, the collaborative involvement of multiple functions, such as
marketing, manufacturing, strategic planning, and research and development is indispensable.
Additionally, although requisite variety and effective redundancy of information facilitate this
process, autonomy and intended fluctuation are generally not that relevant at this stage.

In the final phase of the knowledge creation process, from the basic assumption that
organizational knowledge creation is a never-ending process that upgrades itself continuously,
*cross-leveling knowledge* is essential. In this phase, newly articulated concepts, which have been
created, justified, and prototyped, spread to a new cycle of knowledge creation at a different
ontological level (Nonaka and Takeuchi, 1995; Nonaka, Toyama, & Konno, 2000; von Krogh,
2005; von Krogh, Nonaka, & Nishiguchi, 2000); and according to Nonaka and Takeuchi (1995)
this interactive and spiral process, “which is called *cross-leveling of knowledge*, occurs both intra-
organizationally and inter-organizationally” (p.88). In order for this phase to function effectively,
each unit of organization has the autonomy to apply created knowledge freely across different
levels and boundaries; and knowledge transfer through task rotations needs to be facilitated based
on the systematic support of redundancy of information and requisite variety (Nonaka &
intention will act as a control mechanism on whether or not knowledge should be cross-fertilized
within the organization” (Nonaka & Takeuchi, 1995, p.89).

Organizational knowledge creation based on the individuals’ knowledge formation is a
synthesized dialectical process, in which various feats are integrated and amalgamated through
dynamic interrelationship among individuals, groups, the entire organization, and the
organizational environmental factors (Nonaka, Takeuchi & Umemoto, 1996; Nonaka, Toyama &
Nagata, 2000; Nonaka & Toyama, 2003; von Krogh, Ichijo, & Nonaka, 2000). Nonaka and
Toyama (2003) assert that organizational knowledge is created through dialectic thinking and
acting based on the individuals’ continuous communication generated by their own experiences or tacit knowledge rather than by the existing theorized knowledge in the organization.

**Figure 2.5.** Organizational knowledge creation process and its actions

In accordance with organizational knowledge theory, each entity (individuals, groups, and organizations) coexists with a related environment because they are subject to environmental influence as much as the environmental factors are influenced by the entities, thus positive organizational environmental factors promote knowledge creation for both the individual and organization, and those environmental factors need to be regarded as one of the critical components for the continuous and systemic ecosystem of organization knowledge creation (Nonaka & Toyama, 2003; Nonaka, Toyama & Nagata, 2000). The integrated concept of the four steps of knowledge conversion and the five phases of knowledge creation is shown in Figure 2.6 below:
Figure 2-6. Systematic process and concept of organizational knowledge creation

**Knowledge Creation Enabling Factors**

The key concept of the organizational knowledge creation process is how to promote and sustain the knowledge conversion between individuals’ tacit and actionable explicit knowledge within an organization (Davenport & Prusak, 2000; von Krogh, Ichijo & Nonaka, 2000). In order to encourage interactive knowledge creation, mutual relations with organizational functions, which include the organization’s knowledge vision, collaborative interaction, contextual cares, and trust-based strategies, need to be considered (von Krogh, Ichijo & Nonaka, 2000).

Supportive conditions for knowledge creation. Knowledge creation-enabling conditions have a theoretical and practical relationship with learning organizational climate (Oh, 2001), for the reason that the organizational knowledge conversion process could occur based on the
individuals’ learning process within supportive organizational contexts (Nonaka & Takeuchi, 1995; von Krogh, 1998). The organizational knowledge theorists use the term *enabling conditions* in a slightly different way from that used by the organizational theory researchers in that it is used to explain the conditional organizational climate, which is influential on the organizational knowledge creation process within broader organizational context (Oh, 2001; von Krogh, & Grand, 2000; von Krogh, Ichijo & Nonaka, 2000). These organizational knowledge theorists insist that identification of enabling conditions of organizational knowledge creation is necessary for the purpose of maximizing their impact on the process. They provide, furthermore, several business cases to prove how the enabling conditions affect the rate and quality of the organizational knowledge creation, which in turn influences organizational performance improvement as well. Based on their professional experiences and scholarly insights, Nonaka and Takeuchi (1995), who explored the organizational conditions that appear to be necessary to promote the continuous knowledge creation process, identified the five primary knowledge creation-enabling conditions as the following:

- Organizational aspiration / intention with clear vision and mission,
- Sufficient levels of autonomy of employees for examining intended as-yet-unexplored opportunities,
- The premeditated managerial deployment of fluctuation and creative chaos to break down rigid routines and cognitive framework,
- Creative redundancy as intentional overlapping of information about business practices, management responsibilities, and the company as a whole in order to promote the sharing and socialization of tacit knowledge, and
• Requisite diversity, which is ensuring the accessibility to required information and spreading, thought the entire organization, in order to cope with environmental complexity and economic changes.

_Five enablers for knowledge creation._ More recently, von Krogh, Ichijo and Nonaka (2000) proposed five more expanded knowledge-enabling factors (see Figure 2-7) based on the problematic concerns about limitations of the current knowledge management system from a more strategic standpoint. They pointed out the importance of organizational, actionable, explicit knowledge, and the difficulty of sharing individuals’ tacit knowledge thorough the existed knowledge management system. According to them, easily detectable knowledge and quantity of information within the organization could not ensure organizational knowledge-related performance, and they criticized that most of the knowledge management system heavily depends on the single division or a knowledge officer within the organization. Through those issues, they contended that knowledge creation should be without boundaries, involving multiple disciplines, multiple functions and organizational members with different experiences in order to promote and ensure effective knowledge creation with socialization and externalization of individuals’ valuable tacit knowledge (von Krogh, Ichijo, & Nonaka 2000, p. 30).

The basic assumptions of five knowledge creation enablers were drawn from the general concepts of knowledge, which means that knowledge is context-reliable justified true beliefs (Nonaka & Takeuchi, 1995; Nonaka & Toyama, 2003), and knowledge could be created through the socialization of individuals’ tacit knowledge and conversion process to organizational explicit knowledge (Nonaka & Takeuchi, 1995; Nonaka, Takeuchi & Umemoto, 1996; Nonaka, Toyama & Nagata, 2000). In more strategic perspectives, they (von Krogh, Ichijo, & Nonaka 2000) focused on the organizational support, named _organizational cares_, which includes trust-based organizational activities based on the abundance of accessible information and collaborative
involvement. Accordance with all those foundations, for ensuring the continuous organizational knowledge creation process, the following five strategic enabling factors are proposed:

- **Instilling a knowledge vision** is firmly connected to an advancement strategy, one that emphasizes a company’s future performance and success.

- **Managing conversations** is affecting not only tacit-knowledge sharing but also all the other phases of the organizational knowledge creation process.

- **Mobilizing knowledge activities** help establish the right enabling context - the essential space and relationship that allow tacit knowledge to be unleashed.

- **Creating the right context** has the most impact on how concepts are justified organizationally -- that is, whether a broad range of perspectives is used to match new concepts with a company’s strategic objectives -- and how new knowledge is cross-leveled throughout.

- **Globalizing local knowledge** is to spread knowledge organizationally, and emphasizes breaking down the physical, cultural, organizational, and managerial barriers that often prevent effective knowledge transfer across the organization.
Those two concepts, *supportive conditions for knowledge creation* and *knowledge creation enablers*, are strategies for building a knowledge creation climate in the organization context based on the assumptions that organization must continue creating new knowledge to fuel an advancement strategy at the same time that it uses existing knowledge for survival (von Krogh, Ichijo, & Nonaka, 2000, p.257). Finally, all the processes of knowledge creation within the knowledge-creating enabling context do indeed require a substantial managerial commitment to analyzing processes, ways of working, organizational culture, and additional knowledge enablers as well (von Krogh, Ichijo, & Nonaka, 2000, p.263; von Krogh, Nonaka, & Ichijo, 1997).
Knowledge Creation and Organizational Capability

Organizational capabilities are not easily obtainable in this economic marketplace for the following reasons: (a) organizational knowledge-based competencies are difficult to copy; and (b) organizational capabilities could be accumulated through the long-term and continuous learning process (Kusunoki, Nonaka, & Nagata, 1998; Peltokorpi, Nonaka, & Kodama, 2007). In order to sustain, furthermore, the organizational capabilities, typically, knowledge plays a vital role as a source of competitive advantage in current world marketplace in ways of knowledge-based approach, collaborative knowledge architecture, and continuous and dynamic knowledge creation (Kusunoki, Nonaka, & Nagata, 1998; Nonaka, 1994; Nonaka & Takeuchi, 1995).

In order to examine the empirical influences of the dynamic knowledge creation process on the organizational capabilities, some studies have been conducted (Johansson, Douglas, & Nonaka, 1985; Johansson & Nonaka, 1987; Kusunoki, Nonaka, & Nagata, 1998; Peltokorpi, Nonaka, & Kodama, 2007). For example, one such study verified (a) the positive relationships between two variables (correlation coefficient 0.83; \( p < .001 \)): the dynamic knowledge creation process and organization product development performance in terms of productivity, product quality, and organizational innovativeness; and (b) the significant effect size of the aforementioned three independent variables and the dependent variable: financial return (35% of explanation abilities of independent variables \( F = 47.11; p < .001 \)).

According to their empirical findings, Kusunoki, Nonaka, and Nagata, (1998) insisted that (a) the process of dynamic knowledge creation has significant impacts on the organizational performance improvement; (b) the dynamic process of knowledge interaction rather than richness of individual knowledge is decisively important for enhancing performance improvement; and (c) the process of knowledge dynamic has relationships to several factors in the organizational environment.
Based on the integrative concerns of the relationships between the knowledge creation process and improvement organizational capabilities, the following diagram has been developed (see Figure 2-8).

Figure 2-8. Knowledge creation and its impact on organizational capabilities

Several aspects of the organizational environment could be determinant factors for promotion and facilitation of the levels of the dynamic process of the knowledge creation process (Nonaka, 1994; Nonaka & Takeuchi, 1995; Nonaka, Peltokorpi, & Tomae, 2005; von Grogh, Nonaka, & Ichijo, 1997), and the continuous process of organizational knowledge creation plays one of the primary roles for ensuring the organizational performance improvement (Johansson, Douglas, & Nonaka, 1985; Kusunoki, Nonaka, & Nagata, 2007; Nonaka, Peltokorpi, & Tomae, 2005; Nonaka, Toyama, & Nagata, 2000). Based on all of the environmental aspects and through
the dynamic process of organizational knowledge creation, knowledge-based organizational capabilities could be improved, including dynamic knowledge-based collaboration, integrative problem-solving process, product-based market share, and continuous knowledge creation.

**Learning Organization and Organizational Knowledge Creation**

According to the relevant literature, the primary purpose of both learning organization and organization knowledge creation is improvement of organizational performance; the critical media is continuous collaborative learning and dynamic interpersonal interaction; and the most influential factor is the supportive learning environment and systematic connection with organizational structures (Garvin, 1993, 2000; Nonaka & Nishiguchi, 2001; Nonaka & Takeuchi, 1995; Senge, 1990; von Krogh, 2005; von Krogh, Ichijo, & Nonaka, 2000; Watkins & Marsick, 1993, 1996, 1999).

In this section, in order to conceptualize this study, the following were discussed in a more integrative perspective: (a) the relationship between the learning organization work environment and organizational knowledge creation, and (b) their mutual impact on organizational performance improvement. This section also proposes the holistic conceptual framework of this study.

**Learning Organization and Knowledge Creation**

According to Nonaka and Takeuchi (1995), Nonaka, Toyama, & Byoière, (2001); Nonaka, Toyama, and Konno (2000), and Nonaka, von Krogh, and Voelpel (2006), the organizational knowledge creation process could be facilitated and promoted in the supportive environment, ‘*ba*’, which could be translated into the English “space” and “workplace context”. It
can be a physical, virtual, and mental space in the workplace, in which organizational knowledge creation could be encouraged.

The concept of this ‘ba’ has corresponding assumptions with the dimensions of learning organization in terms of (a) continuous individuals learning, (b) dynamic interpersonal interaction, (c) shared mental model and vision, (d) systematic inquiry and dialogue, (e) supportive managerial structure, (f) leveraging organizational knowledge, and (g) systematic connection with the environment. Furthermore, the aforementioned enablers of the knowledge creation process have mutual commonalities with those environmental factors.

In order to understand the relationship between the dynamic process of organizational knowledge creation and organizational performance improvement, this study will examine, first, the relationship between the seven dimensions of the learning organization (Watkins & Marsick, 1999; Marsick & Watkins, 1999) and the process of knowledge creation (Nonaka & Takeuchi, 1995). Secondly, as previously mentioned, based on the mutual commonalities of supportive environmental factors and the similarities of the primary objective of two variables (learning organization and knowledge creation process), this study will measure their mutual influences for organizational performance improvement. From the more systematic perspective, the following diagram has been developed (see Figure 2-9).

*Linkage between Knowledge Creation with the Learning Organization and Organizational Performance Improvement*

Along with the suggestions of a seemingly infinite number of relevant literature, the learning organization-related work environment plays a critical role for organizational performance improvement (Ellinger, Ellinger, Yang, & Howton, 2000; Watkins & Marsick, 1993, 1996; Watkins, Marsick, & Yang, 2004; Zhang, Zhang, & Yang, 2004); moreover,

In this study, first, the relationship between the learning-related work environment and organizational performance and the relationship between the knowledge creation process and organizational performance will be measured independently, and secondly, the combined knowledge creation process within the learning organization and organizational performance improvement will be examined jointly. Regarding these research concepts, a mutually combined framework has been developed (see Figure 2-9). More specific methodological procedures have been described in detail in Chapter three.

Figure 2-9. Integrated framework for knowledge creation within the learning organization environment and organizational performance improvement
Chapter Summary

In this chapter, various relevant literatures have been reviewed for the conceptualization of the research framework. Along with the intended research objectives, two major areas have been considered: the learning organization and the knowledge creation process. Regarding the learning organization-related literature, the following topics have been reviewed: (a) general concepts and definitions of learning organization; (b) learning organization construct factors, focusing on the seven dimensions of the learning organization; and (c) integrative perspectives of learning organization and organizational performance. Topics reviewed for discussion of the knowledge creation process included the following: (a) general concepts of the organizational knowledge creation process, focusing on the knowledge conversion SECI theory and five phases of the knowledge creation process; (b) knowledge enabling factors; and (c) knowledge creation process organizational capabilities as its outcomes. Finally, in the integrative perspective, to describe the entire research framework, the flow-map of the knowledge creation process within the learning organization environment and its impact on organizational performance improvement has been proposed. In the following chapter, more specific methodological procedures are discussed.
CHAPTER THREE
METHODOLOGY

The purpose of this study is to identify the ways in which the learning-related environmental factors, the seven dimensions of the learning organization impact the process of organizational knowledge creation and organizational performance in Korean private organization context.

This chapter describes the research method and research procedures employed for examining the relationship between the knowledge creation process, within the learning organization environment, and organizational performance improvement. In this chapter, the following components addressed in detail: (a) research questions, and hypothesized models, (b) research instruments, (c) target population and research sample; (d) research variables; (e) data collection procedures; and (5) data analysis methods.

Research Questions and Hypothesized Models

As described in Chapter 2, this research is based on the integrative view of the organizational performance improvement that emphasizes both cultural and process-oriented factors. Based on the primary purpose of this research, following three areas of research were covered: (a) model assessment of proposed instruments, (b) the relationships among learning environment, knowledge creation, and performance, and (c) the impacts of environment and process-related factors on the organizational performance improvement in the Korean private organization context. The following questions were identified:

1. Are the hypothesized measurements valid and reliable in Korean business organization contexts?
2. What are the relationships among the cultural aspects of the learning organization, the
practices of the dynamic organizational knowledge creation, and organizational
performance improvement?

3. Do cultural aspects of the learning organization and organizational knowledge creation
practices jointly contribute to organizational performance improvement?

4. What factors do participants report as most influential and encouraging for effective
learning organization culture and active knowledge creation practices?

In order to address these research questions, a concise hypothesized research model has
been proposed based on the proposed Figure 1-1 (in Chapter one). This hypothesized research
model was derived from the integrative literature review on the successful influences of learning
organization, organizational culture, knowledge creation, and on organizational performance
(Nonaka & Takeuchi, 1995; Watkins & Warsick, 1993, 1996; von Krogh, Ichijo, & Nonaka,

Figure 3-1. Hypothesized research model
Research Instruments

All of the constructs were measured by multi-item scales based on a 5-scale Likert method and all of the measures were perception-based self-reporting survey type of instruments. Three instruments in this research have been previously developed and researched in related literature in the United States and several Eastern contexts (Ellinger, Ellinger, Yang, & Howton, 2000; Joo, 2007; Lien, Hung, Yang & Li, 2006; Oh, 2001; Yang, Watkins & Marsick, 2004; Zhang, Zhang, & Yang, 2004). All of the measurements were translated into Korean versions of instrument, and the translation procedures and assessment criteria were described below.

Development and Application of Instruments

Through the integrative review of relevant literatures, the researcher decided to use an existing instrument for answering the stated research questions. The extended version of the Dimensions of the Learning Organization Questionnaires (DLOQ) has been adapted as a primary instrument for this study (Watkins & Marsick, 1993, 1996). In order to measure the process of organizational knowledge creation, four phases of knowledge process questionnaires was adapted from the previous literature in the Korean context (Oh, 2001). This instrument has been developed based on the analysis and integration of the knowledge creation theory of Nonaka and Takeuchi (1995) and was applied to the Korean context in 2001 by Oh.

In general, although Watkins & Marsick acknowledged that constructing a valid instrument is an ongoing process, several studies have assessed the psychometric prosperities of the DLOQ in different contexts (Ellinger, Ellinger, Yang, & Howton, 2002; Lien, Yang, & Li, 2002; Yang, Watkins, & Marsick, 2004; Zhang, Zhang, & Yang, 2004). These studies present the empirical results of acceptable reliability estimates providing coefficient alpha ranges from .75 to. 85.
The extended version of the DLOQ was developed to measure the relationship between the learning organization construct of the seven dimensions and organizational performance improvement (Watkins & Marsick, 1999). Among the DLOQ, regarding the seven dimensions of environmental factors, there are 43 items; however, in this research an abbreviated version with 21 items will be used based on the empirical evidence of the validation literatures (Ellinger, Ellinger, Yang, & Howton, 2002; Lien, Yang, & Li, 2002; Yang, Watkins, & Marsick, 2004; Zhang, Zhang, & Yang, 2004). These studies present that although the seven-dimension factor structure with 43 items fit the data moderately well, the abbreviated 21 items of the same factor structure fit the data reasonably well based on the results (GFI = .89 and .87) of confirmatory factor analysis (CFA).

Regarding the measuring of organizational performance improvement, several research studies have been conducted to examine the relationship between the DLOQ and the level of organizational performance (Ellinger, Ellinger, Yang, & Howton, 2002; Zhang, Zhang, & Yang, 2004). These studies proposed the reliable relationship, in terms of statistical significance, with the overall effects of the canonical correlation analysis results. The multivariate tests suggest that there are significant relationships between the seven dimensions of learning organization and the two perceptional outcome variables, financial performance and knowledge performance \(p < .001\). The effect size of the canonical correlation analysis ranged from .25 to .31 (Ellinger, Ellinger, Yang, & Howton, 2002) and from .11 to .12 (Zhang, Zhang, & Yang, 2004).

In order to measure the process of organizational knowledge creation, the existing instrument was adapted from the doctoral dissertation of Oh (2001). Oh (2001) examined the relationship between the work environment and the knowledge creation process in the Korean context, and he used the same approach to assess the organizational knowledge creation process with his study. Oh validated and modified the instruments to finalize a reliable research instrument to measure the process of knowledge creation. In this regard, Oh’s existing instrument
of the knowledge creation process (2001) was adapted for this study. Specific descriptions of each research instrument are as follows.

**The Dimensions of the Learning Organization Questionnaires (DLOQ)**

The DLOQ, which is an instrument for measuring the integrative factors of the learning organization environment, has seven dimensions.

Table 3-1

*Learning organization construct dimensions and sub-questionnaires (DLOQ)*

<table>
<thead>
<tr>
<th>Seven Dimensions</th>
<th>Sub-Questionnaires</th>
</tr>
</thead>
</table>
| Continuous Learning    | • People help each other learn  
                            • People take time to support learning  
                            • People are rewarded for learning |
| Inquiry & Dialogue     | • People give open & honest feedback to each other  
                            • People state their views; they also ask what others think  
                            • People spend time building trust with each other |
| Team based Learning    | • People have the freedom to adapt their goals as needed  
                            • People revise thinking as a result of organization discussions or information collected  
                            • People are confident that the organization will act on their recommendations |
| Embedded System        | • Creates systems to measure gaps between current and expected performance  
                            • Makes its lessons learned available to all employees  
                            • Measures the results of the time and resources spent on learning |
| Empowerment            | • Recognizes people for taking initiative  
                            • Gives people control over the resources they need to accomplish their work  
                            • Supports members who take calculated risks |
| System Connection      | • Encourages people to think from a global perspective  
                            • Works together with the outside community or other outside resources to meet mutual needs  
                            • Encourages people to get answers from multiple locations and perspectives when solving problems |
| Strategic Leadership   | • Leaders mentor and coach those they lead  
                            • Leaders continually look for opportunities to learn  
                            • Leaders ensure that the organization’s actions are consistent with values |
As shown in the Table 3-1, in the abbreviated version with 21 items, each of the dimensions has three questions to measure each of the seven dimensions of the learning organization environment. (see Appendix A for entire questionnaires).

**Process of Organizational Knowledge Creation**

The researcher adapted and modified an instrument for one of independent measures from the previous literature of Oh (2001). This instrument was developed based on the concepts of Nonaka and Takeuchi’s (1995) organizational knowledge creation theory and additional extended research with their several colleagues (Nonaka, et al., 1994; von Krogh, 2000).

Table 3-2

*The Descriptions of the Knowledge Creation Process and Its Sub-constructs*

<table>
<thead>
<tr>
<th>Process of Organization Knowledge Creation</th>
<th>Sub-Constructs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharing tacit knowledge</td>
<td>• Knowledge Accumulation</td>
</tr>
<tr>
<td></td>
<td>• Social Information Collection</td>
</tr>
<tr>
<td></td>
<td>• Transfer of Knowledge</td>
</tr>
<tr>
<td>Creating concept</td>
<td>• Inductive thinking</td>
</tr>
<tr>
<td></td>
<td>• Deductive thinking</td>
</tr>
<tr>
<td></td>
<td>• Constructive dialogue</td>
</tr>
<tr>
<td>Justifying concept</td>
<td>• Formulation of criteria</td>
</tr>
<tr>
<td></td>
<td>• Application of criteria to evaluation</td>
</tr>
<tr>
<td></td>
<td>• Inter-departmental sharing</td>
</tr>
<tr>
<td>Building prototypes</td>
<td>• Combining existing ideas and new knowledge</td>
</tr>
<tr>
<td></td>
<td>• Developing specifications of ideas</td>
</tr>
<tr>
<td></td>
<td>• Collaborative modeling process</td>
</tr>
</tbody>
</table>

As noted in the literature review section, there are four modes for conversion process of organizational knowledge, which include socialization, externalization, internalization, and externalization. Based on those four modes of organizational knowledge creation theory are the
following five phases of knowledge creation: sharing knowledge, creating the concept, justifying the concept, building a prototype, and knowledge leveraging. Table 3-2 shows the descriptions of all the phases, which are the fundamental concepts for the instrument. Appendix B presents the specific descriptions and resources of each item of the sub-questionnaires for knowledge creation measures. The measures of the four phases of the dynamic process of knowledge creation have been developed and articulated in more integrative perspectives based on the literature review.

Organizational Performance Improvement

As previously mentioned, from a practical standpoint, the DLOQ has been applied for measuring the organizational performance improvement in both financial increasing and knowledge gaining in several research studies (Ellinger, Ellinger, Yang, & Howton, 2002; Lien, Yang, & Li, 2002; Yang, Watkins, & Marsick, 2004; Zhang, Zhang, & Yang, 2004). According to the level of reliability and validity of those studies, the additional 12 DLOQ items, which have been developed to examine the performance level, have been adapted in this research for measuring the independent variables, the levels of organizational performance improvement. Table 3-3 describes the instrument items for organizational performance improvement (see Appendix A for entire questionnaires).

In more strategic management perspective, in the early 1990’s, Kaplan and Norton developed strategic measurement of management system, which is entitled as Balanced Score Card (BSC) focusing on the strategic approach to the organizational performance improvement (Kaplan & Norton, 1992). This management system has four major factors, which include financial, customer, learning, and business process, to measure the level of organizational performance (Kaplan & Norton, 1996).
In this study, in order to more focus on the organizational learning-based environment and knowledge creation process, adapted 12 item measurement could be considered as the equivalent instrument with BSC systems. Two levels of organizational performance improvement will measure both organizational financial perspective - *financial increasing and customer satisfaction*; and process-based knowledge perspective - *business process and learning-based growth*.

Table 3-3.

*The Measures of organizational performance improvement*

<table>
<thead>
<tr>
<th>Organization Performance Improvement</th>
<th>Sub-Questionnaires</th>
</tr>
</thead>
</table>
| **Organizational Financial Improvement** | • Return on investment is greater than last year’s  
• Average productivity per employee is greater than last year’s  
• Time to market for product and service is less than last year’s  
• Response time for customer complaints is better than last year’s  
• Market share is greater than last year’s  
• The cost per business transaction is less than last year’s |

| **Organizational Knowledge Leveraging** | • Customer satisfaction is greater than last year’s  
• The number of suggestions implemented is greater than last year’s  
• The number of new products or services is greater than last year’s  
• The percentage of skilled workers compared to the total workforce is greater than last year’s  
• The percentage of total spending devoted to technology and information processing is greater than last year’s  
• The number of individuals learning new skills is greater than last year’s |

*Translations of Instrument*

The final version of measures have been translated, modified, and validated so it can be used with Korean-speaking target samples. Regarding the reliability of cross-cultural research
perspectives, Brislin, Lonner and Thorndike (1973) proposed, “Unless researchers present empirical evidence to support their claim that different language versions of the same instrument are equivalent, translation problems will always be plausible rival hypotheses for any obtained results” (p.32). In this regard, the equivalence of measurements is therefore one of the critical issues of cross-cultural research (Harkness, van de Vijver, & Mohler, 2003; Presser, Rothgeb, Couper, Lessler, Martin, & Singer, 2004). Hernandez (2000), furthermore, proposed in his cross-cultural dissertation, “if equivalence of translation can not be demonstrated between translations, it remains uncertain whether any differences noted between subjects could be attributed to differences in item translation, whether the translated scales are comparable to the original scale, and whether differing translations are equivalent in constructs addressed” (p.65).

In those regards, four translation procedures, based on the literature on several cross-cultural research method (Brislin, 1976; Harkness, van de Vijver, & Mohler, 2003; Presser, Rothgeb, Couper, Lessler, Martin, & Singer, 2004), have been used for the translation of the current instruments: (1) forward translation, (2) assessment of forward translation for clarity, common language and cultural adequacy, (3) back translation, and (4) assessment of back translation for conceptual equivalence. Specific procedures of each process are as follows:

*Forward translation.* The initial translation of the measures, DLOQ, knowledge creation, and organizational performance, from English to Korean was performed by two professors who hold doctoral degrees in the United States and whose mother tongue is the target language. Based on their degrees and their experience, these two professors could also serve as subject matter experts on the learning organization concepts. Prior to beginning the translation procedures, explicit information regarding the objectives of this research and intent of those instruments was given to the two translators. The initial information included a request to avoid focusing or centering on the use of Korean terminology when completing the initial translation, to use
common Korean equivalents for all words and phrases, and to translate the original text as closely as possible.

*Assessment of forward translation.* In order to assess the credibility of the initially translated versions of the instruments, a panel of four additional Korean doctoral candidates in the United States has reviewed the translated versions. These individuals were asked to independently review each item of both translations based on the comparisons between original English versions and Korean versions. The panel group decided which one is the best by providing their comments and suggestions according to the following criteria:

<table>
<thead>
<tr>
<th>Reviewing Areas</th>
<th>Specific Criteria</th>
</tr>
</thead>
</table>
| **Clarity**             | • The item must express a single idea  
                           • The item should not contain ambiguous terms & ideas  
                           • The item should be easy to read & understand |
| **Common language**     | • The item is expressed with language used by the general population  
                           • The item should be expressed with context-related language |
| **Cultural adequacy**   | • The item is appropriately expressed by the culturally accepted terms  
                           • The item is relevant for the culture for which it is being adapted |

*Backward translation.* The consensus Korean translations of instruments were back translated into English by two Korean high school teachers of English who have respective backgrounds in English education and English literacy; in addition, they hold the Master’s degrees in the fields of English linguistics and TESOL (Teaching English as a Second Language), respectively. These two individuals have been requested to back translate the Korean versions
into English. As with the forward translation process, the initial information regarding the intent of translation and the objectives of the research were provided in advance.

Assessment of backward translation. The back-translated versions have been reviewed, based on the comparisons between the original versions and the back translated versions, by a panel consisting of the researcher’s committee chair and researcher. The review process focused on the conceptual equivalence with the original versions of instruments. One of each item has been reviewed and the equivalence decision process proceeded based on the following options:

1. The terms have nothing to do with each other in terms of both the wording itself and the intended meaning.
2. The wording itself could be equivalent in some aspects but the item does not capture the intended meaning of the original versions.
3. The wording itself is not equivalent but the item could capture the intended meaning of the original versions.
4. The wording itself is equivalent and captures the intended meaning of the original versions.

According to the results of this review, an appropriate translated Korean version of measurements has been confirmed.

Target Population and Research Sample

The population of this research was the employees who are working for private corporate organizations in Korea. As a research sample, five subsidiary companies of the largest Korean conglomerate, which is also one of the Fortune Global 500 companies, were recruited. In general, larger organizations have more dynamic knowledge creation processes in terms of diversity, and these organizations have better reputations than any other Korean organizations in terms of
supportive workplace learning environments. The research sample consisted of the employees who are working for various business divisions -- manufacturing, research and development, marketing and sales, human resources, and customer care -- and different areas of industry, which include insurance, electronics, construction, IT service, and heavy industrial areas.

In this research, the criterion-based method was used for selecting large organizations in terms of the number of their employees, the various types of task functions, and the multiple types of industries, including managerial employees. In order to examine the research objectives regarding the collaborative learning organization and dynamic knowledge creation, these sample-selecting criteria were required. One of the assumptions for a supportive learning organization is collaboration based on team-based work process; and one of the required factors for dynamic knowledge creation process is diversity in terms of individuals’ personalities, various job tasks, and different job functions. In order to meet these basic assumptions of the proposed research constructs, using selected target groups would be acceptable. Finally, perceptual responses for performance level were used for performance variables, thus the researcher assumes that managerial level employees have accurate perceptions on performance improvement.

The reason for selecting large organizations was that they have a more strategic learning support system, in terms of learning organization, and they are more aware of the concept of the learning organization. Regarding the knowledge creation process, the majority of the selected sample organizations have more structured research and development institutions and strategic customer care functions, which are required for the creative knowledge process based on the continuous creation process and interconnection with inter-organizations (Nonaka, 1991, 1996; Nonaka & Takeuchi, 1995; von Krogh, Ichijo, & Nonaka, 2000).

Verification of the consistency of research results with a variety of contexts is a key consideration of research in terms of reliability of results and convenience of generalization.
Thus, different types of industries were considered in order to collect various perspectives from task positions as diverse as possible in the five subsidiaries of the Korean conglomerate.

Furthermore, managerial employees were intentionally included for the reasons that managers play critical roles in bridging organizational information from the top management to field-line employees and funnel the data and information gathered from the market or customers to the top decision-makers. These roles are key criteria for facilitating the dynamic organizational knowledge creation process (Nonka & Takeuchi, 1995). Regarding one of the seven dimensions of the learning organization, managers’ strategic leadership needs to be focused to provide positive influences on the group members’ continuous learning process (Watkins & Marsick, 1993, 1996).

Approximately 2,000 employees were selected as a potential sample group from the five subsidiary companies of the Korean private conglomerate by the random email-list selection function of the sample conglomerate’s Intra-Net server system. The demographic information, response rate, and data collection procedures are discussed in the section of data collection.

**Data Collection**

As previously mentioned, the target sample group of this research was composed of five subsidiary companies, which include insurance, electronics, construction, service, and heavy industrial areas of the Korean private conglomerate.

With regard to ethics in the research procedure, first, informed consent should be considered based upon the approval of the Institutional Review Board (IRB). The research was approved by the Office for Research Protections of the Pennsylvania State University, and the informed consent form and recruitment letter (see Appendix A and C) were distributed through the Intra-Net server system of the sample conglomerate on behalf of its senior manager of the
Center for Human Resource Development. Among the potential samples for this research, as noted, 2,000 employees were randomly selected for this research.

**Instruments.** In the survey questionnaire, for the measures of the dimensions of the learning organization, the process of knowledge creation, and the levels of organizational performance, multiple scale (five-point Likert-type scale) measurements were used, ranging from 1 (strongly disagree) to 5 (strongly agree). At the final stage of this survey, some of the individuals’ demographic-related items (gender, types of industry, years of work experience, task-related positions, and/or specific types of task) and three short-answer questions were included.

**Procedures.** In order to collect data, the measures were distributed through the conglomerate’s Intra-Net server system on behalf of the senior manager of the Center for Human Resource Development (HRD). The Center for Human Resource Development of the conglomerate has an employee data-bank system, which contains all of the contact information for individual employees of all the subsidiary units. The senior manager of the HRD center of the conglomerate granted approval for the researcher to access the Intra-Net server to obtain the completed questionnaires upon the respondents’ agreement of participation. All details regarding the sample ratio and response rate are presented in Table 3-5.

### Table 3-5

**Sample and response rate**

<table>
<thead>
<tr>
<th>Organization</th>
<th>Industry</th>
<th>Sample (n = 2,000)</th>
<th>Response (Number)</th>
<th>Response (Rate, %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Electronics</td>
<td>600</td>
<td>264</td>
<td>44.0</td>
</tr>
<tr>
<td>B.</td>
<td>Finance</td>
<td>500</td>
<td>104</td>
<td>20.8</td>
</tr>
<tr>
<td>C.</td>
<td>Service</td>
<td>400</td>
<td>113</td>
<td>28.2</td>
</tr>
<tr>
<td>D.</td>
<td>Heavy Industry</td>
<td>200</td>
<td>67</td>
<td>33.5</td>
</tr>
<tr>
<td>E.</td>
<td>IT</td>
<td>200</td>
<td>85</td>
<td>42.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>1,900</strong></td>
<td><strong>633</strong></td>
<td><strong>33.3</strong></td>
</tr>
</tbody>
</table>
Approximately 2,000 employees were contacted through the Intra-Net email via the senior manager of HRD center. As illustrated in Table 3-1, above, 633 responded for a response rate of approximately 33%, which was reasonably acceptable, considering the decreasing response rates in research using the emailing (on-line) survey method (Bartlett, 2005). It might be safe to assume that all five participating subsidiary companies of the Korean private conglomerate may share a similar organizational culture under the same mission or vision of the conglomerate. In terms of the industry representation, those five participating companies could cover the majority of major Korean industries, which include electronics, financial industry, customer care and service, and IT solutions.

Table 3-6 presents the distribution of the sample of employees by demographic variables. Among the total respondents (n = 633), almost 67% were male; and in terms of the job task types of the respondents, almost 40% were involved in research and development, 17.5% in sales and marketing, and 12% in production.

With regards to the work position, the majority, more than 62%, were senior manager level employees, and the rest of the respondents were in the levels of assistant manager (14%) and general management (23%). In addition, regarding the size of the organization, which could be respectively related to the organizational learning culture and process of knowledge creation process, more than 45% of the employees were working for the firm, which has more than 10,000 employees.

Finally, regarding the response rates of each different type of organization, a 44% response rate was achieved from the electronic-related organization; and an IT-type of organization shows a 43% response rate. However, more customer- and field-related types of organizations, which include financial and service organizations, show lower response rates, 20.8% and 28.2%, respectively. Thus, response rates to the online survey in this research were higher for employees working in technology-related fields.
Table 3-6

Demographic information

<table>
<thead>
<tr>
<th>Variables</th>
<th>Values</th>
<th>Frequency</th>
<th>%</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>423</td>
<td>66.8</td>
<td>66.8</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>210</td>
<td>33.2</td>
<td>100</td>
</tr>
<tr>
<td>Job Task</td>
<td>HR(D)</td>
<td>20</td>
<td>3.2</td>
<td>3.2</td>
</tr>
<tr>
<td></td>
<td>Sales/Marketing</td>
<td>111</td>
<td>17.5</td>
<td>20.7</td>
</tr>
<tr>
<td></td>
<td>Production</td>
<td>78</td>
<td>12.3</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>R / D</td>
<td>252</td>
<td>39.8</td>
<td>72.8</td>
</tr>
<tr>
<td></td>
<td>IT/Computer</td>
<td>59</td>
<td>9.3</td>
<td>82.1</td>
</tr>
<tr>
<td></td>
<td>General Mag.</td>
<td>73</td>
<td>11.5</td>
<td>93.7</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>40</td>
<td>6.3</td>
<td>100</td>
</tr>
<tr>
<td>Work</td>
<td>Asst. Manager</td>
<td>89</td>
<td>14.1</td>
<td>14.1</td>
</tr>
<tr>
<td></td>
<td>General Manager</td>
<td>148</td>
<td>23.4</td>
<td>37.4</td>
</tr>
<tr>
<td></td>
<td>Senior Manager</td>
<td>369</td>
<td>62.6</td>
<td>100</td>
</tr>
<tr>
<td>Year of Work</td>
<td>Less than 3 Yrs.</td>
<td>26</td>
<td>4.1</td>
<td>4.1</td>
</tr>
<tr>
<td></td>
<td>3 - 5 Yrs.</td>
<td>35</td>
<td>5.5</td>
<td>9.6</td>
</tr>
<tr>
<td></td>
<td>5 - 7 Yrs.</td>
<td>24</td>
<td>3.8</td>
<td>13.4</td>
</tr>
<tr>
<td></td>
<td>7 - 9 Yrs.</td>
<td>77</td>
<td>12.2</td>
<td>25.6</td>
</tr>
<tr>
<td></td>
<td>Over 9 Yrs.</td>
<td>471</td>
<td>74.4</td>
<td>100</td>
</tr>
<tr>
<td>Number of Employee</td>
<td>Less than 500</td>
<td>8</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>500 - 1000</td>
<td>51</td>
<td>8.1</td>
<td>9.3</td>
</tr>
<tr>
<td></td>
<td>1001 - 5000</td>
<td>147</td>
<td>23.2</td>
<td>32.5</td>
</tr>
<tr>
<td></td>
<td>5001 - 10000</td>
<td>138</td>
<td>21.8</td>
<td>54.3</td>
</tr>
<tr>
<td></td>
<td>Over 10001</td>
<td>289</td>
<td>45.7</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>633</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Research Variables

From the methodological standpoint, generally, this study contains three parts of analysis. The first part of this study assesses the model-fit of the proposed measurements from the perspective of the construct reliability and validity. The second part examines the relationship between the seven dimensions of learning organization environmental factors and the dynamic organizational knowledge creation process. The third objective, the primary concern of this research, is to examine the impact of the seven dimensions of learning organization environmental factors and the organizational knowledge creation process on the level of organizational performance improvement in both financial improvement and knowledge leveraging based on the structural equation modeling analysis. For analytical simplicity and on the basis of the assumption that the seven dimensions of the learning organization do not necessarily, at least in a comprehensive manner, account for the impact of the dynamic knowledge creation process on organizational performance improvement, it is significant to distinguish between two different analyses for this research (see Figure 3-1): The first is related to the seven dimensions of the learning organization as determinants of the process of organizational knowledge creation, and the second is the impact of the organizational knowledge creation process on the organizational performance improvement.

Dependent Variables

One of the dependent variables of this research is the learning organization environmental factors, the seven dimensions of the learning organization (Watkins & Marsick, 1993, 1996). These seven dimensions of the learning organization construct factors include various aspects of the work environment for ensuring organizational performance improvement through the continuous and collaborative learning process in the organization (Ellinger, Ellinger, Yang, &
Howton, 2002; Yang, Watkins, & Marsick, 2004). These learning organization construct factors have been validated and modified through sustained efforts in a variety of different contexts, and according to the results of positive reliability of applications, they have been adapted for this study in the Korean context.

Another dependent variable of this research is the process of organizational knowledge creation, developed by Nonaka and Tackeuchi (1995) and revisited by several scholars (Nonaka & Nishiguchi, 2001; von Krogh, 2000; von Krogh, Ichijo, & Nonaka, 2000; von Krogh, Nonaka, & Nishiguchi, 2000). The knowledge creation process has four major phases for leveraging organizational knowledge: (1) sharing tacit knowledge, (2) creation of concepts, (3) concept justification, and (4) prototyping models. This dynamic process of organizational knowledge creation could be the critical determinant for improvement of organizational performance in both financial improvement and organizational knowledge gain (Nonaka & Tackeuchi, 1995; Nonaka, Toyama, & Nagata, 2000).

It is important to note that this dependent variable, knowledge creation process, will be used as an independent variable for exploring one of the research questions that examines the impact of the seven dimensions of the learning organization on organizational knowledge creation as well.

**Independent Variable**

The aforementioned primary purpose of this research is to examine the influences of learning organization environment and organizational knowledge creation on organizational performance improvement. According to this research objective, the independent variable of this study is the level of organizational performance improvement. According to Marsick and Watkins (2003) and Watkins and Marsick (1996, 1999), organizational performance can be categorized
into two components: one is organizational practical performance (financial improvement) and the second is learning-related organizational performance (knowledge gain). The dependent variable of this research, the level of organizational performance improvement, will be explored by the (1) influences of each independent variable, the seven dimensions of the learning organization, and the process of organizational knowledge creation in parallel; and (2) the impact of the independent variables mutually.

**Data Analysis Strategies**

In order to answer the proposed research questions, first of all, basic descriptive, scale reliability, correlation, and regression analyses were employed. In addition to those basic statistical analyses, structural equation modeling (SEM) was employed to assess empirically the hypothesized models based on the collected data sets. More specifically, in order to measure the goodness-of-model fit of the hypothesized measurements, confirmatory factor analysis (CFA) was conducted, and CFA could be considered the first step of the general structural equation modeling analysis. Table 3-6 summarizes the types of statistical analysis used for each research question.

Table 3-7

*Types of statistical techniques associated with the research questions*

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Types of Statistical Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Measurement Model Fit Assessment Research Questions 1 &amp; H1</td>
<td>Confirmatory Factor Analysis (CFA)</td>
</tr>
<tr>
<td>B Relationship Analysis Research Questions 2 &amp; H2, H3, H4</td>
<td>Correlation, Multiple Regression &amp; Canonical Correlation Analysis (CCA)</td>
</tr>
<tr>
<td>C Structural Equation Model Assessment Research Question 3</td>
<td>Structural Equation Modeling (SEM)</td>
</tr>
<tr>
<td>D Short Answer Questions</td>
<td>Thematic Analysis</td>
</tr>
</tbody>
</table>
Basic Analysis Methods

In order to answer the research questions of relationship among the variables, basic correlation, canonical correlation, and regression analyses were conducted.

Correlation analysis is appropriate for the assessment of the relationships between variables both in the single measurement model and across factors. According to this analysis, the existence of statistical inter-relationships among the variables could be defined, and depending on the value of correlation coefficient; the magnitude (i.e., power of relationship) and direction (i.e., positive and negative) of correlations could be assessed (Cohen, 1998; Urdan, 2005). According to McMillan and Schumacher (2000), an item-correlation coefficient level between .10 and .30 is a weak positive relationship; between .31 and 70 is a moderate range; and .71 and above shows a high positive relationship.

In order to measure the relationship between two sets of factors (a set of the learning organization environmental factors and a set of the knowledge creation process), canonical correlation analysis (CCA) was conducted. According to Hair, Black, Babin, Anderson, & Tatham (2006), whereas multiple regression involves a single dependent variable, CCA involves multiple dependent variables, and the underlying principle is to develop a linear combination of each set of variables. The results of CCA could obtain a set of weight for the dependent and independent variables that provides the maximum simple correlation between the set of dependent variables and the set of independent variables (Hair, Black, Babin, Anderson, & Tatham, 2006, p.19).

In order to estimate the size of influences of the independent variables to the set of the factors (i.e., the seven dimensions of the learning organization and organizational performance, and four modes of knowledge creation process and organizational performance), multiple regression analysis was employed. Multiple regression is the appropriate method of analysis
when the problem involves a single metric dependent variable presumed to be related to two or more metric independent variables, and the primary objective of multiple regression analysis is to predict the changes in the dependent variable in response to change in the independent variables (Kline, 2005; Hair, Black, Babin, Anderson, & Tatham, 2006, p.18). The results of multiple regression analysis could show the weight of the estimated effects of independent variables on the dependent variable based on the regression coefficient (R) value (James, Robert, & Choi, 1990). Furthermore, according to Urdan (2005), this statistic provides a measure of the strength of the association between two variables in terms of percentage of variance explained (p. 145). Along with those analysis techniques, general descriptive analysis and scale reliability analysis were conducted.

**Structural Equation Modeling (SEM) and Confirmatory Factor Analysis (CFA)**

The primary research objective is to assess the hypothesized structural models based on the identification of the relationships among the variables. According to this purpose of the research, structural equation modeling (SEM) was adapted as the primary statistical technique. The main advantage of SEM is the ability to assess a series of dependence relationships simultaneously -- *a hypothesized dependent variable becomes an independent variable in a subsequent dependence relationship* -- differently from the regression methods (Hair, Black, Babin, Anderson, & Tatham, 2006, p. 706).

SEM could be categorized into two conceptualized analyses: the measurement model and structural model (Burnette & Williams, 2005). The measurement model is a confirmatory factor analysis (CFA) model that assesses the relation of the observed variables to the hypothesized underlying constructs from the construct validation process perspectives (Anderson & Gerbing, 1998; Thompson, 2004). The structural model could be considered as the CFA in nature and is
used to specify the casual relations of the constructs to one another based on a priori theory and hypothesized model structure (Anderson & Gerbing, 1998, Byrne, 1998; Kline, 2005). According to Byrne (1998), another distinguished aspect of SEM could be that whereas several non-structural equation methods are based on observed measurements only, SEM procedures can incorporate both unobserved (i.e., latent or factor) and observed variables (i.e., indicators).

In this research, the two-step method in SEM was used: (a) assessing measurement model validity and (b) evaluation of the hypothesized models’ causal relations. First, in order to assess and validate the hypothesized models of measurement, confirmatory factor analysis (CFA), one of the sub-techniques of structural equation modeling (SEM), was employed. CFA is the way of testing how well measured variables represent a small number of constructs (Kline, 2005; Thomson, 2004). The biggest advantages of CFA is its ability to assess the construct validity of a proposed measurement theory; in more detail, the construct validity is the extent to which a set of measured items actually reflects the theoretical latent construct those items are designed to measure (Byrne, 1998; Hair, Black, Babin, Anderson, & Tatham, 2006, p. 774; Kline, 2005).

Secondly, in order to determine the adequacy of the overall structural model fit of the hypothesized equations; several indices were assessed, including chi-square ($\chi^2$), root mean square error of approximation (RMSEA), root mean square residual (RMR), non-normed fit index (NNFI), comparative fit index (CFI), standardized root mean residual (SRMR), goodness-of-fit index (GFI), and adjusted goodness-of-fit index (AGFI). The significance of the individual causal paths in the best fitting nested model was assessed to answer research question 6 and to determine the strength of the hypothesized causal relations among the latent constructs.
### Table 3-8

**Indices for model assessment (Goodness of fits)**

<table>
<thead>
<tr>
<th>Name</th>
<th>Abbreviator</th>
<th>Assessment</th>
<th>Measuring Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-square</td>
<td>$\chi^2$</td>
<td>How it quantifies the differences between the observed and estimated covariance matrix</td>
<td>The smaller number the better fit</td>
</tr>
<tr>
<td>Root mean square error of approximation</td>
<td>RMSEA</td>
<td>How well a model fits a population not just a sample used for estimation (in case of large sample, RMSEA could be the best suited to use in confirmatory method)</td>
<td>&lt; .03: the best fit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.03 - .05: good fit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.05 - .08: acceptable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&gt;.10: poor fit</td>
</tr>
<tr>
<td>Non-normed fit index</td>
<td>NNFI</td>
<td>A relative fit index that compares the model being tested to a baseline model (null model), taking into account the degree of freedom</td>
<td>&gt;.90</td>
</tr>
<tr>
<td>Comparative fit index</td>
<td>CFI</td>
<td>The degree of fit between the hypothesized and null measurement models (based on the comparison of $\chi^2$)</td>
<td>&gt;.90</td>
</tr>
<tr>
<td>Goodness of fit index</td>
<td>GFI</td>
<td>The measure of the relative amount of variance and covariance in sample data that is jointly explained by sample data</td>
<td>&gt;.90</td>
</tr>
<tr>
<td>Adjusted goodness of fit index</td>
<td>AGFI</td>
<td>Adjusted value for the number of degree of freedom in CFI value in the specific model</td>
<td>&gt;.90</td>
</tr>
<tr>
<td>Root mean square residual</td>
<td>RMSR or RMR</td>
<td>The error in prediction for each covariance term creates a residual (an average of the residuals between individual observed and estimated covariance and variance terms)</td>
<td></td>
</tr>
<tr>
<td>Standardized root mean square residual</td>
<td>SRMR</td>
<td>Standardized value of RMSR and thus is more useful for comparing fit across models</td>
<td>&lt;.08</td>
</tr>
</tbody>
</table>

*Note.* Based on Byrne (1998); Hair, Black, Babin, Anderson, Tatham (2006)

### Thematic analysis

The open-ended short answers were analyzed based on clustering and thematic coding procedures (Boyatzis, 1998; Sherman & Webb, 1998; Stauss & Corbin, 1998). First of all,
contextually similar concepts were clustered together and seed concepts selected for the thematic coding process. Secondly, major categorical themes were created for categorizing the clustered items. Line-by-line analysis was conducted by the close examination of data and labeling of each meaningful unit. Then, the second step of axial coding, in which categories emerged from a process of comparing codes generated by the previous step, allowed the researcher to produce data clusters for each research question.

Chapter Summary

In this chapter, all relevant methodological issues have been discussed, including the hypothesized research model, target population and intended sample, research variables, instruments, translation procedures, data collection process, and data analysis strategies. An online based survey was used through the conglomerate’s Intra-Net server with selected participants of five subsidiary companies of a Korean private conglomerate. Of the approximately 1,900 employees recruited as participants, 633 employees responded, resulting in about a 33% response rate. Regarding the demographic information, the majority of respondents were (a) from a large company with more than 5,000 employees (68%), (b) had general and senior managerial positions (86%), and were working in several types of tasks in five different industries. As instruments, the dimensions of learning organization questionnaire (DLOQ) and knowledge creation theory were adapted, along with several validation procedures for translated versions of the measures, for measuring the inter-relations among the variables and causal relations among the latent factors. Finally, also described in this chapter were the data analysis strategies -- correlation, canonical correlation analysis (CCA), multiple regression analysis, and structural equation modeling (SEM) including confirmatory factor analysis (CFA).
Chapter 4 reports the results of the statistical data analysis proposed in the previous chapters. The primary purpose of this study was to identify the ways in which integrative influences -- the dimensions of the learning organization and dynamic process of knowledge creation -- impact the organizational performance improvement in five private organizations in the republic of Korea. In order to achieve this research objective, the following four research questions and four hypotheses were proposed:

**Research Questions:**

1. Are the hypothesized measurements valid and reliable in Korean business organization contexts?
2. What are the relationships among the cultural aspects of the learning organization, the practices of the dynamic organizational knowledge creation, and organizational performance improvement?
3. Do cultural aspects of the learning organization and organizational knowledge creation practices jointly contribute to organizational performance improvement?
4. What factors do participants report as most influential and encouraging for effective learning organization culture and active knowledge creation practices?

**Hypotheses:**

Hypothesis 1: Two measurements of learning organization and knowledge creation processes are valid and reliable concepts in the Korean context..
Hypothesis 2: *Cultural aspects of the learning organization will be positively related to processes of the organizational knowledge creation.*

Hypothesis 3: *Cultural aspects of the learning organization will be positively related to organizational performance improvement.*

Hypothesis 4: *The processes of the organizational knowledge creation will be positively related to organizational performance.*

From the statistical standpoint, the primary task for data analysis was Structural Equation Modeling (SEM), and its sub-analysis technique, Confirmatory Factor Analysis (CFA). Based on these statistical concepts, SPSS 16.0 and LISREL 8.80 were used for reliable data analysis. The results are presented by research question.

**Item Reliability Analysis**

As reported in Chapter 3, data were collected from 663 employees in five different industries, which include electronics, financial, service, heavy industrial, and IT-related companies in the Korean conglomerate.

An item scale analysis procedure was used to assess the internal consistency for each item of the measurements, and Cronbach’s alpha coefficients were used to estimate the item reliability. The results (shown in Table 4-1) demonstrate that measures for three factors of this research -- the dimensions of the learning organization, knowledge creation process, and the levels of organizational performance improvement -- are internally consistent and thus tend to be reliable in the Korean business context (coefficient alpha ranges from .70 to .89).
Table 4-1

Reliability estimates for measures of current and previous cross-cultural studies

<table>
<thead>
<tr>
<th>Measures</th>
<th>U.S. context</th>
<th>Latin Context</th>
<th>Chinese Context</th>
<th>Taiwan Context</th>
<th>Korean Context</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 208</td>
<td>n = 469</td>
<td>n = 906</td>
<td>n = 477</td>
<td>n = 679</td>
</tr>
<tr>
<td>Continuous Learning</td>
<td>.81</td>
<td>.79</td>
<td>.80</td>
<td>.80</td>
<td>.72</td>
</tr>
<tr>
<td>Inquiry &amp; Dialogue</td>
<td>.86</td>
<td>.85</td>
<td>.81</td>
<td>.78</td>
<td>.89</td>
</tr>
<tr>
<td>Team Learning</td>
<td>.85</td>
<td>.84</td>
<td>.79</td>
<td>.78</td>
<td>.86</td>
</tr>
<tr>
<td>Embedded System</td>
<td>.85</td>
<td>.80</td>
<td>.81</td>
<td>.82</td>
<td>.71</td>
</tr>
<tr>
<td>Empowerment</td>
<td>.84</td>
<td>.75</td>
<td>.81</td>
<td>.82</td>
<td>.75</td>
</tr>
<tr>
<td>System Connection</td>
<td>.87</td>
<td>.82</td>
<td>.80</td>
<td>.84</td>
<td>.89</td>
</tr>
<tr>
<td>Providing Leadership</td>
<td>.89</td>
<td>.86</td>
<td>.84</td>
<td>.85</td>
<td>.91</td>
</tr>
<tr>
<td>Knowledge Sharing</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Creating Concept</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Justifying Concept</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Building Prototypes</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Financial Performance</td>
<td>.75</td>
<td>.71</td>
<td>n/a</td>
<td>.80</td>
<td>.89</td>
</tr>
<tr>
<td>Knowledge Performance</td>
<td>.80</td>
<td>.74</td>
<td>.82</td>
<td>.81</td>
<td>.87</td>
</tr>
</tbody>
</table>

In more detail, the proposed seven dimensions of the learning organization measures were identified as acceptable instruments in the Korean context (coefficient alpha ranges from .70 to .83); four dynamic procedures of knowledge creation measures also showed acceptable reliability estimates (coefficient alpha ranges from .84 to .89); and the two perceptional measures of organizational performance improvement were also identified as reliable measurements (coefficient alpha was .79 and .85, respectively).

Assessing Measurement Model Fit

As discussed in this section, one objective of the data analysis was to examine the construct validities and reliabilities of the theory-based measurements: the seven-dimensional measure of the learning organization (Watkins & Marsick, 1993, 1996) and the four modes of knowledge creation process measurement (Nonaka & Tackeuchi, 1995).
Hypothesis 1: The two measurements of learning organization and knowledge creation processes are valid and reliable concepts in the Korean context.

Several techniques were employed to determine a final form of the instruments with adequate psychometric properties and demonstrable construct validities. Construct validity refers to the extent to which a scale developer can ensure exactly what the instrument is measuring (AERA, APA, & NCME, 1985; Crocker & Algina, 1986 - cited by Yang, Watkins, & Marsick, 2004). Confirmatory factor analysis (CFA) was conducted to estimate the quality of the structural reliabilities and designated factor loading by testing the model fit between the proposed measurement models and the collected data. CFA could be adapted to verify the adequacy of the item to factor associations and the number of dimensions underlying the construct (Bollen, 1989; Thompson & Daniel, 1996). All model tests were analyzed based on the covariance matrix, which was generated by PRELIS, as implemented in LISREL 8.80 (Joreskog & Sorbom, 1993, 1996). Prior to the testing of the overall proposed model, separate CFAs were conducted for each model construct: the learning organization environmental factors and the dynamic process of knowledge creation.

According to Watkins and Marsick (1997), the construct of the learning organization consists of seven-sub dimensions: continuous learning, inquiry/dialogue, team learning, embedded system, empowerment, system connection, and strategic leadership provided at both the individual and system levels. The CFA of the measurement of learning organization cultural factors (questions 1 to 21 in Appendix A) demonstrated an acceptable model fit to the given data.
Two separate CFAs were conducted. The first CFA tested the overall seven dimensions of the learning organization environment with 21 items, and the second CFA was performed to verify that the seven dimensions are one factor to measure the levels of the learning organization.

First, the chi-square results $\chi^2 (633) = 376.50; \chi^2 / df = 2.44; p < .001$ were statistically significant, indicating a lack of close model fit with the data. Nevertheless, the chi-square test is sensitive to sample size and a holistic evaluation of the model needs to consider other fit indices (Song, Kim, & Chermack, 2008; Song & Chermack, 2008). All estimates of comparative fit indices (GFI, CFI, NNFI) were well above .90, indicating acceptable data-model fit. In addition, nearly 95% of the variances and covariances of the learning culture (GFI = .95) could be explained by the seven dimensions of the learning organization proposed by Watkins and Marsick (1993). Because of these fit statistics, further evidence of construct validity in the Korean cultural context was provided. Further, the small magnitude of residuals (SRMR = .02, RMSEA = .04) also indicated appropriate model-data fit.

Second, the higher-order CFA was conducted to verify that the measurement of the learning organization environment is the single measure with seven dimensions; and the results show that the construct validity is acceptable based on the estimations of comparative fit indices (GFI, CFI, and NNFI) and residual estimations (RMSEA and SRMR) except the chi-square estimation. While the chi-square statistic $\chi^2 (633) = 484.77; \chi^2 / df = 2.66; p < .001$ resulted in

Table 4-2

*Fit indices for the model structure of the learning organization culture*

<table>
<thead>
<tr>
<th>Models</th>
<th>$\chi^2$</th>
<th>$df$</th>
<th>RMSEA</th>
<th>NNFI</th>
<th>CFI</th>
<th>GFI</th>
<th>AGFI</th>
<th>RMR</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 items 7-Factors</td>
<td>376.50**</td>
<td>168</td>
<td>.04</td>
<td>.99</td>
<td>.99</td>
<td>.95</td>
<td>.93</td>
<td>.01</td>
<td>.02</td>
</tr>
<tr>
<td>7-Dimensions 1 Factor</td>
<td>484.77**</td>
<td>182</td>
<td>.05</td>
<td>.99</td>
<td>.99</td>
<td>.93</td>
<td>.91</td>
<td>.02</td>
<td>.03</td>
</tr>
</tbody>
</table>

*Note. ** p < .001*
the conclusion that the null hypothesis should be rejected and that the fit of the initial model was incorrect, several alternative model fit indices provided acceptable results. The RMSEA was .05, which is understood as indicating acceptable fit; the AGFI was .91, which is taken as indicating acceptable fit; and the CFI was .99, which was viewed as representing acceptable fit.

In short, all indices examined confirmed that the seven-factor structure -- the seven dimensions -- fit appropriately with the data obtained in Korea for measuring the learning organization environment uni-dimensionally. It can therefore be stated that the learning organization environmental factor structure holds and functions appropriately in the Korean cultural context.

The CFA for the measurement model of the dynamic knowledge creation process (questions 22 to 44 in Appendix A), which includes four modes -- sharing knowledge, creating concept, justifying concept, and building a prototype -- provided a marginally acceptable fit to the data.

Table 4-3  
*Fit indices for the model structure of the dynamic knowledge creation process*

<table>
<thead>
<tr>
<th>Models</th>
<th>$\chi^2$</th>
<th>df</th>
<th>RMSEA</th>
<th>NNFI</th>
<th>CFI</th>
<th>GFI</th>
<th>AGFI</th>
<th>RMR</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>23 items 4-Factors</td>
<td>1050.77**</td>
<td>224</td>
<td>.07</td>
<td>.98</td>
<td>.98</td>
<td>.87</td>
<td>.85</td>
<td>.02</td>
<td>.04</td>
</tr>
</tbody>
</table>

*Note. ** p < .001

Also, the chi-square estimations were not acceptable [$\chi^2 (633) = 1072.69; \chi^2 / df = 4.69; p < .001$]; this unacceptable level resulted from the large number of data sets in the estimation. Several indices were considered to examine the construct validity of the proposed measurement with the collected data in the Korean context. All estimates of comparative fit indices (GFI, CFI, NNFI) were above and near .90, indicating marginally acceptable data-model fit. In addition, 87% of the variances and covariances of the knowledge creation (GFI = .87) could be explained
by the four modes of the knowledge creation process (Nonaka & Tackeuchi, 1995). Further, the acceptable magnitude of residuals (SRMR = .04, RMSEA = .07) also indicated appropriate model-data fit (Browne & Cudeck, 1993). Because of these fit statistics, further evidence of construct validity in the Korean cultural context was provided. In short, all indices examined confirmed that the four-factor structure fit appropriately with the collected data from the five private organizations in Korea. It can therefore be stated that the knowledge creation structure holds and functions appropriately in the Korean cultural context.

Table 4-4

*Factor loadings of the overall CFA*

<table>
<thead>
<tr>
<th>Learning Organization Environment</th>
<th>Process of Knowledge Creation</th>
<th>Financial Performance Improvement</th>
<th>Knowledge Performance Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL1_1</td>
<td>.62</td>
<td>KCP1_1</td>
<td>.59</td>
</tr>
<tr>
<td>DL1_2</td>
<td>.72</td>
<td>KCP1_2</td>
<td>.70</td>
</tr>
<tr>
<td>DL1_3</td>
<td>.67</td>
<td>KCP1_3</td>
<td>.63</td>
</tr>
<tr>
<td>DL2_1</td>
<td>.73</td>
<td>KCP1_4</td>
<td>.68</td>
</tr>
<tr>
<td>DL2_2</td>
<td>.72</td>
<td>KCP1_5</td>
<td>.58</td>
</tr>
<tr>
<td>DL2_3</td>
<td>.74</td>
<td>KCP1_6</td>
<td>.70</td>
</tr>
<tr>
<td>DL3_1</td>
<td>.74</td>
<td>KCP1_7</td>
<td>.71</td>
</tr>
<tr>
<td>DL3_2</td>
<td>.71</td>
<td>KCP2_1</td>
<td>.74</td>
</tr>
<tr>
<td>DL3_3</td>
<td>.81</td>
<td>KCP2_2</td>
<td>.72</td>
</tr>
<tr>
<td>DL4_1</td>
<td>.74</td>
<td>KCP2_3</td>
<td>.63</td>
</tr>
<tr>
<td>DL4_2</td>
<td>.73</td>
<td>KCP2_4</td>
<td>.62</td>
</tr>
<tr>
<td>DL4_3</td>
<td>.63</td>
<td>KCP2_5</td>
<td>.73</td>
</tr>
<tr>
<td>DL5_1</td>
<td>.67</td>
<td>KCP2_6</td>
<td>.77</td>
</tr>
<tr>
<td>DL5_2</td>
<td>.75</td>
<td>KCP2_7</td>
<td>.76</td>
</tr>
<tr>
<td>DL5_3</td>
<td>.70</td>
<td>KCP3_1</td>
<td>.77</td>
</tr>
<tr>
<td>DL6_1</td>
<td>.71</td>
<td>KCP3_2</td>
<td>.82</td>
</tr>
<tr>
<td>DL6_2</td>
<td>.69</td>
<td>KCP3_3</td>
<td>.80</td>
</tr>
<tr>
<td>DL6_3</td>
<td>.78</td>
<td>KCP3_4</td>
<td>.77</td>
</tr>
<tr>
<td>DL7_1</td>
<td>.77</td>
<td>KCP3_5</td>
<td>.81</td>
</tr>
<tr>
<td>DL7_2</td>
<td>.81</td>
<td>KCP4_1</td>
<td>.82</td>
</tr>
<tr>
<td>DL7_3</td>
<td>.80</td>
<td>KCP4_2</td>
<td>.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KCP4_3</td>
<td>.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KCP4_4</td>
<td>.82</td>
</tr>
</tbody>
</table>

Note. n = 633
Finally, the overall CFA for the whole hypothesized model was conducted. In this analysis, one more factor regarding organizational performance measures was added. Thus, a total of 56 observed variables -- 21 items in the learning organization environment, 23 items in the process of knowledge creation, and 12 items in organizational performance -- were included (see the Appendix A).

The CFA for all hypothesized measurements demonstrated a moderately acceptable model fit with collected data in the Korean context. All of the model fit indices provide satisfactory results, except the chi-square estimation \( \chi^2(633) = 3463.82; \chi^2/df = 2.46; p < .001 \), (RMSEA = .048, NNFI = .99, CFI = .99, and SRMR = .040), representing statistically acceptable model fit. Table 4-4 shows the factor loadings as a result of an overall CFA, and all of the factor loadings were over .50; thus, any sub-items were deleted.

**Relationship Analysis among Research Variables**

Several statistical techniques were performed to measure the relationships among the variables. First, the relationship between the learning organization environment and the processes of the organizational knowledge creation was measured. Second, the associations between the learning organization culture and two types of organizational performance were examined. Third, the relations between the organizational knowledge creation process and two types of organizational performance were assessed. In order to assess these inquiries, three statistical analyses were conducted. First, bivariate correlation analysis was used to examine the item inter-correlations of variables. Second, Canonical Correlation Analysis (CCA) was used for examining the association between two sets of variables (Stevens, 1996; Stowe, Watson & Robertson, 1980). The CCA is an appropriate statistical technique with which to explore an omnibus impact of the dimensions of the learning organization on a set of perceptional modes of knowledge creation.
process. Finally, the structural equation model (SEM) was used in terms of the statistical
standardized path coefficient (SPC) and squared multiple correlation (SMC).

The Relations between Learning Organization and Knowledge Creation

Hypothesis 2: Cultural aspects of the learning organization will be positively related to the
processes of the organizational knowledge creation

All the seven dimensions of the learning organization were significantly correlated with
four modes of the dynamic process of knowledge creation at the level of \( p < .001 \). Among all the
seven dimensions, providing leadership had the strongest correlation with the four modes of
knowledge creation process (\( r = \text{range from}.54 \text{ to } .71 \)).

Table 4-5

Means, standard deviations, and zero-order inter-correlations between the measures of
dimensions of learning organization and knowledge creation process

<table>
<thead>
<tr>
<th>Measures</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Continuous Learning</td>
<td>3.44</td>
<td>.64</td>
<td>1.00</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Inquiry &amp; Dialogue</td>
<td>3.47</td>
<td>.64</td>
<td>.62</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>3. Team Learning</td>
<td>3.45</td>
<td>.69</td>
<td>.51</td>
<td>.71</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4. Embedded System</td>
<td>3.38</td>
<td>.68</td>
<td>.59</td>
<td>.62</td>
<td>.60</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>5. Empowerment</td>
<td>3.32</td>
<td>.64</td>
<td>.52</td>
<td>.61</td>
<td>.66</td>
<td>.62</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. System Connection</td>
<td>3.62</td>
<td>.63</td>
<td>.58</td>
<td>.57</td>
<td>.56</td>
<td>.62</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Providing Leadership</td>
<td>3.62</td>
<td>.67</td>
<td>.64</td>
<td>.65</td>
<td>.63</td>
<td>.62</td>
<td>.66</td>
<td>.66</td>
<td>1.00</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8. Knowledge Sharing</td>
<td>3.80</td>
<td>.48</td>
<td>.54</td>
<td>.60</td>
<td>.61</td>
<td>.54</td>
<td>.58</td>
<td>.60</td>
<td>.69</td>
<td>.69</td>
<td>1.00</td>
<td></td>
<td></td>
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<tr>
<td>9. Creating Concept</td>
<td>3.74</td>
<td>.52</td>
<td>.54</td>
<td>.61</td>
<td>.57</td>
<td>.56</td>
<td>.56</td>
<td>.68</td>
<td>.79</td>
<td>.79</td>
<td>.80</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>10 Justifying Concept</td>
<td>3.53</td>
<td>.64</td>
<td>.61</td>
<td>.63</td>
<td>.62</td>
<td>.64</td>
<td>.63</td>
<td>.59</td>
<td>.71</td>
<td>.67</td>
<td>.74</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>11. Building Prototypes</td>
<td>3.64</td>
<td>.60</td>
<td>.57</td>
<td>.60</td>
<td>.60</td>
<td>.59</td>
<td>.60</td>
<td>.62</td>
<td>.70</td>
<td>.70</td>
<td>.74</td>
<td>.80</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Note: \( n = 633 \). All items are statistically significant at the level of \( p < .0001 \) (2 tailed)

Measures 1 through 7: 1 is Never and 5 is Always, Measures 7 through 11: 1 is Strongly Disagree and 5 is Strongly Agree
In more detail, the first mode of the knowledge creation process, knowledge sharing, had the strongest correlation with providing leadership \( (r = .69) \) followed by team learning \( (r = .61) \), and system connection \( (r = .60) \) in the seven dimensions of the learning organization. The second mode of the knowledge creation, creating concept had the strongest relation also with providing leadership \( (r = .68) \) followed by inquiry/dialogue \( (r = .61) \), and team learning \( (r = .57) \). The third step, justifying concept had correlations with providing leadership \( (r = .71) \), embedded system \( (r = .64) \), and inquiry/dialogue and empowerment \( (r = .63) \). The last mode of the knowledge creation process, building prototypes had the strongest correlation with providing leadership \( (r = .70) \) followed by system connection \( (r = .62) \).

In order to estimate the impact of the learning organization-related seven dimensions on the four modes of the knowledge creation process, canonical correlations analysis (CCA) was used. The underlying principle of CCA is to develop a linear combination of each of the variables (both independent and dependent) in a manner that maximizes the correlation between the two sets. The CCA was performed by the multivariate analysis of variance (MANOVA) procedure using the SPSS 15.0 statistical package.

Table 4-6

Multivariate analysis of significance for canonical correlation (CCA)

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Value</th>
<th>Approximate F</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>Significance of F</th>
<th>( r^2 ) Type</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pillais's</td>
<td>.773</td>
<td>21.614</td>
<td>28</td>
<td>2524.00</td>
<td>.000</td>
<td>.729</td>
<td></td>
</tr>
<tr>
<td>Hotelling's</td>
<td>2.533</td>
<td>56.677</td>
<td>28</td>
<td>2506.00</td>
<td>.000</td>
<td>.729</td>
<td></td>
</tr>
<tr>
<td>Wilks's</td>
<td>.271</td>
<td>35.644</td>
<td>28</td>
<td>2265.71</td>
<td>.000</td>
<td>.729</td>
<td></td>
</tr>
<tr>
<td>Roy's</td>
<td>.712</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The canonical correlation between the seven dimensions of the learning organization and the four modes of knowledge creation measures was also statistically significant \( (p < .001) \). In
more detail, the full model across all functions was statistically significant using the Wilks’s \( \lambda = 0.271 \) \((p < .001)\). Because Wilks’s \( \lambda \) represents the variance unexplained by the model, \( 1 - \lambda \) yields the full model effect size in an \( r^2 \) metric. Thus, for all the sets of the model, the \( r^2 \) type effect size was .729, which indicates that the two sets of measures explained a substantial portion, about 73%, of the variance shared between the learning organization measures and knowledge creation process. In other words, more than two thirds of the variance in the process of knowledge creation can be accounted for by the seven dimensions of the learning organization.

*The Relations between Learning Organization and Organizational Performance*

Hypothesis 3: *Cultural aspects of the learning organization will be positively related to organizational performance improvement*

All of the items in the dimensions of the learning organization were significantly correlated with both organizational financial performance \((r = \text{ranges from .37 to .43})\) and organizational knowledge performance \((r = \text{ranges from .53 to .60})\). Respectively, knowledge-related performance improvement measures had stronger correlations with the learning organization environmental factors than did the organizational financial performance measures.

For the organizational financial performance improvement level, *embedded system* was found as the strongest correlated factor \((r = .43)\) followed by *inquiry/dialogue* \((r = .42)\) and *providing leadership* \((r = .41)\). The organizational knowledge-related variable has the strongest correlation with *providing leadership* \((r = .60)\), followed by *embedded system* \((r = .56)\) and *system connection* \((r = .55)\). Finally, based on the results of Table 4-9, all of the seven dimensions of the learning organization significantly (moderate levels) accounted for the variance in both levels of the organizational performance improvement.
Table 4-7

Zero-order inter-correlations between the measures of dimensions of learning organization and organizational performance improvement

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8*</th>
<th>9*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Continuous Learning</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Inquiry &amp; Dialogue</td>
<td>.62</td>
<td>1.00</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Team Learning</td>
<td>.51</td>
<td>.71</td>
<td>1.00</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4. Embedded System</td>
<td>.59</td>
<td>.62</td>
<td>.60</td>
<td>1.00</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>5. Empowerment</td>
<td>.52</td>
<td>.61</td>
<td>.66</td>
<td>.62</td>
<td>1.00</td>
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<td>6. System Connection</td>
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<td>.57</td>
<td>.56</td>
<td>.62</td>
<td>1.00</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7. Providing Leadership</td>
<td>.64</td>
<td>.65</td>
<td>.63</td>
<td>.62</td>
<td>.62</td>
<td>.66</td>
<td>1.00</td>
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</tr>
<tr>
<td>8. Financial Performance*</td>
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<td>.38</td>
<td>.43</td>
<td>.38</td>
<td>.35</td>
<td>.41</td>
<td>1.00</td>
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<tr>
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<td>.54</td>
<td>.53</td>
<td>.56</td>
<td>.53</td>
<td>.55</td>
<td>.60</td>
<td>.68</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Note.* Dependent variable. All items are statistically significant at the level of p < .001 (2 tailed)

In order to assess the relations between the two sets of the variables, the canonical correlation analysis (CCA) approach was adapted. Each of the variables has the sub-set of the observed variables; CCA could be the appropriate analysis to measure the association of the two variables (Sherry & Henson, 2005).

Table 4-8

Multivariate analysis of significance for canonical correlation (CCA)

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Value</th>
<th>Approximate F</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>Significance of F</th>
<th>$r^2$ Type Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pillais's</td>
<td>.483</td>
<td>28.455</td>
<td>14</td>
<td>1250.00</td>
<td>.000</td>
<td>.476</td>
</tr>
<tr>
<td>Hotelling's</td>
<td>.888</td>
<td>39.556</td>
<td>14</td>
<td>1246.00</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Wilks's</td>
<td>.524</td>
<td>33.887</td>
<td>14</td>
<td>1248.00</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Roy's</td>
<td>.465</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results of the CCA could substantiate the analysis of the multiple regression and independent structural correlation coefficient for the dependent variables as well. The results
show that the analysis yielded two functions with squared canonical correlations ($R^2_c$) of .465 and .017 for each successive function. Broadly, the full model across all functions was statistically significant based on the Wilks’s $\lambda = .524$; $F (14, 1240.00) = 33.89$ at the level of $p < .001$. The value of the Wilks’s $\lambda$ represents “the variance unexplained by the proposed models, $1 - \lambda$ yields the full model effect size in an $r^2$ metric” (Sherry & Henson, 2005, p. 48). In this analysis, the $r^2$ type effect size is .476, which indicates that approximately 48% of the variances are shared between the two sets of variables -- learning organization culture and organizational performance.

Structural equation modeling (SEM) was used to explore the relationships among the variables: the learning organization culture, organizational financial performance, and knowledge performance improvement. SEM depicts all of the relationships among the constructs involved in the analysis; thus, SEM is a family of the statistical models that “seek to explain the relationships among the multiple variables based on the examination of the structure of interrelationships expressed in a series of equations” (Hair, Black, Babin, Anderson, & Tatham, 2006, p. 711).

In order to assess the influential relationships among the variables, the first model evaluation was considered. To evaluate the overall fit of the data to the proposed model, the authors reported six model fit indices, which include general chi-square, Goodness of Fit index (GFI), Incremental Fit Index (Bollen, 1989), Comparative Fit Index (Bentler, 1990; Bentler & Bonett, 1980), and two types of residual fit indices (RMR and RMSEA). For the assessment of the relationships among the variables, squared multiple correlations for the endogenous variables were estimated for the identification of the predictive power for the proposed sequential models. The squared multiple correlations for a latent variable “indicate the percentage of variations of that construct that can be explained by the hypothesized model” (Egan, Yang, & Bartlett, 2004, p. 290). All of the model fit indices provide reasonably acceptable results, except the chi-square estimation ($\chi^2 = 849.46$, $df = 150$, $p < .001$, $\chi^2 /df = 5.66$, RMSEA = .08, NNFI = .96, CFI = .96,
and SRMR = .08). Those results indicate that the hypothesized structural model could be considered as a reasonably well-fitted model with the collected data. Figure 3 shows the estimates of both measurement and structural influential models of the hypothesized concept with the factor loadings of each sub-construct.

Figure 4-1. Parameter estimates for a structural equation model of the hypothesized model and factor loadings of each measure
In this structural diagram, indicators (seven dimensions and 12 measuring items) of the latent factors (learning organization culture, and financial and knowledge performance improvement) are represented by rectangles, and the single-headed arrows show the associations between observed items and latent factors. These relations represent the factor loadings of the indicators, which indicate the adequacy of the measurement model with the collected data. The results revealed that all seven dimensions had significant and homogeneous factor loadings on the latent factor of the learning organization culture (factor loadings ranged from .74 to .81), and that 12 items for the two latent factors of the performance improvement had statistically significant loadings (from .52 to .76 for financial performance and from .61 to .76 for knowledge performance).

In Figure 3, the numbers near each arrow, which are represented by the ellipses and which link the three latent factors, denote the statistical standardized path coefficient (SPC). This statistic could be interpreted in the same way as the standardized regression coefficient. The results indicate that organizational learning culture had statistically positive and significant contributions to both organizational financial performance (SPC = .64, \( p < .01 \)) and organizational knowledge performance improvement (SPC = .79, \( p < .01 \)). Finally, the squared multiple correlation (SMC) for the construct of organizational financial performance was .41, meaning that more than 40% of the variance of the financial performance factor could be explained by the concept of the learning organization culture, and the SMC for the knowledge performance was .62, showing that 62% of the variance of the factor could be explained by the learning organization culture based on the given data.
Hypothesis 4: The processes of the organizational knowledge creation will be positively related to organizational performance

All of the items in the four modes of knowledge creation process were significantly correlated with both organizational financial performance ($r = $ ranges from .41 to .44) and organizational knowledge performance ($r = $ ranges from .56 to .62). Respectively, knowledge-related performance improvement measures had stronger correlations with the learning organization environmental factors than did the organizational financial performance measures.

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5*</th>
<th>6*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Knowledge Sharing</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Creating Concept</td>
<td>.79</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Justifying Concept</td>
<td>.67</td>
<td>.74</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Building Prototypes</td>
<td>.70</td>
<td>.74</td>
<td>.80</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Financial Performance*</td>
<td>.41</td>
<td>.44</td>
<td>.41</td>
<td>.41</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>6. Knowledge Performance*</td>
<td>.56</td>
<td>.56</td>
<td>.61</td>
<td>.62</td>
<td>.68</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Note. * Dependent variable. All items are statistically significant at the level of $p < .0001$ (2 tailed)

For the organizational financial performance improvement level, creating concept ($r = .44$) had the strongest relationship. The organizational knowledge-related variable had the strongest correlation with building prototypes ($r = .62$), followed by justifying concept ($r = .61$), creating concept ($r = .56$), and team knowledge sharing ($r = .56$).
The results of the CCA analysis show that two sets of the variables -- knowledge creation process and organizational performance improvement -- shared the statistically significant portion of the variances.

The results show that the analysis yielded two functions with squared canonical correlations ($R^2_c$) of .458 and .016 for each successive function. From the holistic perspective, the full model provides statistically significant level of $F$-value in terms of the Wilks’s testing results: Wilks’s $\lambda = .535; F (8, 1254.00) = 58.10, p < .001$. According to Sherry and Henson (2005), the $r^2$ type effect size is .465, which indicates that approximately 47% of the variances is shared between the two sets of variables -- knowledge creation process and organizational performance.

Table 4-10

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Value</th>
<th>Approximate $F$</th>
<th>Hypothesis $df$</th>
<th>Error $df$</th>
<th>Significance of $F$</th>
<th>$r^2$ Type Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pillais's</td>
<td>.495</td>
<td>48.949</td>
<td>8</td>
<td>1256.00</td>
<td>.000</td>
<td>.465</td>
</tr>
<tr>
<td>Hotelling's</td>
<td>.864</td>
<td>67.655</td>
<td>8</td>
<td>1252.00</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Wilks's</td>
<td>.535</td>
<td>58.109</td>
<td>8</td>
<td>1254.00</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Roy's</td>
<td>.458</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Finally, in order to examine to what extent organizational performance improvement is predicted independently by four modes of knowledge creation process, multiple regression analysis was conducted. To assure that no multicollinearity was present in the model, the variance inflation factors (VIFs) were tested as well.
The multiple regression results suggest that four modes of the organizational knowledge creation process accounted for around 40% of variance on the overall level of organizational performance improvement, which is statistically significant at the $p < .001$ as depicted by the coefficient of multiple determination ($R^2$). Furthermore, all of the modes of the knowledge creation process had statistically significant impacts on the organizational performance improvement in terms of t-values.

Finally, according to Kutner, Nachtsheim, & Neter (2004), there were not any issues regarding the multicollinearity found for the regression model (VIF ranges from 2.949 to 3.420); and there were no serial (auto) correlation issues found (Durbin-Watson = 1.857).

To assess the relations between the knowledge creation process and the two types of organizational performance, separate multiple regressions were conducted. The results are shown in the following tables.

### Table 4-11

*Multiple regression analysis of the knowledge creation with overall performance*

<table>
<thead>
<tr>
<th>Variables</th>
<th>$b$</th>
<th>$SE_b$</th>
<th>$b$</th>
<th>$t$</th>
<th>$R^2$</th>
<th>$\Delta R$</th>
<th>$F(p)$</th>
<th>Durbin-Watson</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Knowledge Sharing</td>
<td>.154</td>
<td>.054</td>
<td>.151</td>
<td>2.84*</td>
<td>.399</td>
<td>.395</td>
<td>104.069**</td>
<td>1.857</td>
<td>2.949</td>
</tr>
<tr>
<td>2. Creating Concepts</td>
<td>.130</td>
<td>.056</td>
<td>.136</td>
<td>2.31*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.590</td>
</tr>
<tr>
<td>4. Building Prototypes</td>
<td>.199</td>
<td>.047</td>
<td>.244</td>
<td>4.26**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.420</td>
</tr>
</tbody>
</table>

*Note.* *$p < .05$. **$p < .01$. Dependent variable: Organizational performance improvement; and enter method.
Table 4-12

Multiple regression analysis of the knowledge creation with knowledge performance

<table>
<thead>
<tr>
<th>Variables</th>
<th>$b$</th>
<th>SE $b$</th>
<th>$t$</th>
<th>$R^2$</th>
<th>$\Delta R$</th>
<th>$F (p)$</th>
<th>Durbin-Watson</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Knowledge Sharing</td>
<td>.165</td>
<td>.048</td>
<td>.175</td>
<td>3.46*</td>
<td>.458</td>
<td>.455</td>
<td>132.874**</td>
<td>1.874</td>
</tr>
<tr>
<td>2. Creating Concepts</td>
<td>.047</td>
<td>.049</td>
<td>.053</td>
<td>0.95</td>
<td>\</td>
<td>\</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Justifying Concepts</td>
<td>.220</td>
<td>.054</td>
<td>.219</td>
<td>4.05**</td>
<td>\</td>
<td>\</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Building Prototypes</td>
<td>.398</td>
<td>.072</td>
<td>.300</td>
<td>5.53**</td>
<td>\</td>
<td>\</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. * $p < .05$. ** $p < .01$. Dependent variable: Knowledge performance improvement; and enter method

Table 4-13

Multiple regression analysis of the knowledge creation with financial performance

<table>
<thead>
<tr>
<th>Variables</th>
<th>$b$</th>
<th>SE $b$</th>
<th>$t$</th>
<th>$R^2$</th>
<th>$\Delta R$</th>
<th>$F (p)$</th>
<th>Durbin-Watson</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Knowledge Sharing</td>
<td>.990</td>
<td>.057</td>
<td>.103</td>
<td>1.73</td>
<td>.240</td>
<td>.235</td>
<td>49.468**</td>
<td>1.830</td>
</tr>
<tr>
<td>2. Creating Concepts</td>
<td>.176</td>
<td>.059</td>
<td>.196</td>
<td>2.98*</td>
<td>\</td>
<td>\</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Justifying Concepts</td>
<td>.095</td>
<td>.065</td>
<td>.094</td>
<td>1.46</td>
<td>\</td>
<td>\</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Building Prototypes</td>
<td>.199</td>
<td>.086</td>
<td>.149</td>
<td>2.31*</td>
<td>\</td>
<td>\</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. * $p < .05$. ** $p < .01$. Dependent variable: Financial performance improvement; and enter method

The results of the separate multiple regression analyses indicated that organizational knowledge creation had statistically significant influences on both types of performance in organization ($R^2 = .458$ for knowledge performance and $R^2 = .240$ for financial performance). However, with regard to the knowledge performance, the second mode of the knowledge creation, creating concepts, was found to be not a significant factor; and in terms of the financial performance, only two practices, creating concepts and building prototypes were found to be significant components. Finally, knowledge creation practices had greater impacts on the knowledge performance than did financial performance in the organization.
Structural Equation Model Assessment

The purpose of the structural model analysis is to determine whether the theoretical relationships specific at the conceptualization stage are supported by the collected data (Diamantopoulos & Siguaw, 2000). According to this structural equation modeling analysis, the results presented to what extent the combination of the independent variables, learning organization cultural factors and the modes of the knowledge creation process, jointly contribute to the organizational performance improvement.

The magnitudes of the estimated parameters and the squared multiple correlations (SMC) for the structural equations were examined. The former provides significant information on the strength of the proposed relationship, whereas the latter indicates the amount of variance in each endogenous latent variable that is accounted for by the exogenous latent variables that are expected to impact it. Furthermore, the significance of the estimated paths between the proposed latent variables was also considered in finding a best model fit on the basis of the theoretical foundation.

In this analysis, a two-step approach was adopted. In the first stage, a hypothesized model was tested in terms of the model fit and the construct validity; and in the second stage, the structural theory of the proposed model was assessed. According to Hair, Black, Babin, Anderson, & Tatham (2006), this two-step approach with two separate testings of the measurement model is viewed as essential since valid structural theory tests would not be valuable with bad measures; in other words, “with bad measures we would not know what the constructs truly mean” (p. 848).

The following hypothesized model was tested.
First of all, the model fit and construct validity of the proposed model was tested. The first construct had 7 sub-dimensions, which represented the learning organization culture, and the second construct had four modes of the knowledge creation process.

The overall fit of the hypothesized model indicated a good fit in all indices except the chi-square statistic $\chi^2 (633) = 332.15; \text{df} = 62; \chi^2 / \text{df} = 5.35, p < .001; \text{RMSEA} = .08; \text{NNFI} = .98; \text{CFI} = .98; \text{SRMR} = .02$ respectively. To be statistically significant, the t-value should be higher than $|1.96|$. Table 4-15 summarizes the path estimates and their t-values.
Table 4-14

*Model fit indices for hypothesized measurement model*

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>RMSEA</th>
<th>NNFI</th>
<th>CFI</th>
<th>GFI</th>
<th>AGFI</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesized Model</td>
<td>332.15**</td>
<td>62</td>
<td>.08</td>
<td>.98</td>
<td>.98</td>
<td>.93</td>
<td>.89</td>
<td>.02</td>
</tr>
</tbody>
</table>

*Note.* **$p < .001$*

Table 4-15

*Parameter estimates in the hypothesized structural model*

<table>
<thead>
<tr>
<th>Path</th>
<th>Hypothesized Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Path Coefficient</td>
</tr>
<tr>
<td>Learning Organization Culture</td>
<td>.91*</td>
</tr>
<tr>
<td>Knowledge Creation Process</td>
<td>.41*</td>
</tr>
<tr>
<td>Organizational Performance</td>
<td>.35*</td>
</tr>
</tbody>
</table>

*Note.* *$p < .05$* ($t > 1.96$)

All the paths among the proposed constructs were statistically significant with each other.

With regard to the squared multiple correlations (SMCs), 82% and 55% of variances in the knowledge creation process and organizational performance improvement accounted for respectively. In brief, the cultural aspects of the learning organization had more influential impacts on the knowledge creation process, which is more directly related to the process than organizational outcomes, performance improvement in terms of the path coefficient estimates, and SMCs.
In order to look at the organizational performance as two different types \textit{financial performance} and \textit{knowledge performance}, another SEM analysis was conducted. A two-step approach was used as well for both analyses of the measurement model and the structural model. Table 4-16 shows the results of the measurement model fit indices; and Figure 4-2 and Table 4-17 show the summary of the path coefficient estimates and another hypothesized model.

Table 4-16.

\textit{Model fit indices for the hypothesized structural model}

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>RMSEA</th>
<th>NNFI</th>
<th>CFI</th>
<th>GFI</th>
<th>AGFI</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesized Model</td>
<td>1108.67**</td>
<td>225</td>
<td>.07</td>
<td>.97</td>
<td>.97</td>
<td>.87</td>
<td>.84</td>
<td>.07</td>
</tr>
</tbody>
</table>

\textit{Note.} **$p < .001$

The overall results present an acceptable range of the model fit of the hypothesized structural model except the chi-square estimate [$\chi^2 (633) = 1108.67; df = 225; \chi^2 / df = 4.92, p < .001; \text{RMSEA} = .07; \text{NNFI} = .97; \text{CFI} = .97; \text{SRMR} = .07$]. Thus, it is possible to confirm that the hypothesized model is statistically well proposed.

As a second step, overall path estimations were analyzed among the proposed constructs based on the t-value and along with SMC estimations.

All the path coefficient estimates among the constructs were defined as statistically significant based on the t-values. With regard to squared multiple correlations (SMCs), 82%, 41%, and 63% of variances in the knowledge creation process, financial performance, and knowledge gaining performance improvement were accounted for respectively. In more detail, while the direct impact of the learning organization on both types of performance improvement [statistical standardized path coefficient (SPCs) = .29 and .44], the influence on the process-oriented knowledge creation practices was .91 in terms of the statistical standardized path
coefficient. This means that the cultural aspects of the learning organization exhibited more direct influence on the process-oriented knowledge creation than did the outcome variables of performance improvement.

Figure 4-3. Hypothesized model with two types of performance improvement
Table 4-17

Parameter estimates in hypothesized structural model with two types of performance

<table>
<thead>
<tr>
<th>Path</th>
<th>Hypothesized Model</th>
<th>Path Coefficient</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Organization Culture ===&gt; Knowledge Creation Process</td>
<td>.91*</td>
<td>19.39</td>
<td></td>
</tr>
<tr>
<td>Learning Organization Culture ===&gt; Financial Performance</td>
<td>.29*</td>
<td>2.41</td>
<td></td>
</tr>
<tr>
<td>Learning Organization Culture ===&gt; Knowledge Gaining Performance</td>
<td>.44*</td>
<td>4.37</td>
<td></td>
</tr>
<tr>
<td>Knowledge Creation Process ===&gt; Financial Performance</td>
<td>.37*</td>
<td>3.08</td>
<td></td>
</tr>
<tr>
<td>Knowledge Creation Process ===&gt; Knowledge Gaining Performance</td>
<td>.37*</td>
<td>3.78</td>
<td></td>
</tr>
</tbody>
</table>

*Note. *p < .05 (t > 1.96)

Finally, the comparison between the two proposed models provided no significant difference keeping nearly equivalent fits to the data, and in terms of parsimony, the first model, which deals with the organizational performance as one construct, would be better than the second model with two types of performance.

Hypotheses Tests

As described above, several statistical techniques were analyzed to identify the given research questions. As this section will describe, the developed four hypotheses were tested, providing statistical evidence.

Hypothesis 1 was supported. The proposed instruments were validated through confirmatory factor analysis (CFA) and item reliability. The results showed that measurements
for assessing the cultural aspects of the learning organization and the process of knowledge creation were valid and reliable instruments in the Korean context based on the data.

Hypothesis 2 was supported. The two constructs of the learning organization culture and knowledge creation process had considerable relation ($r^2$ type effect size = .729, $p < .001$). Furthermore, the learning organization culture had a sizable influence on the knowledge creation process in terms of the path coefficient of the final SEM test ($\gamma_{21} = .91$, $t = 19.39$).

Hypothesis 3 was supported. The learning organization culture showed considerable impact on the perceived overall organizational performance improvement regarding the SEM path coefficient ($\gamma_{31} = .41$, $t = 4.25$). In addition, these two sets of the construct had satisfactory association in terms of the $r^2$ metrics ($r^2$ type effect size = .476, $p < .001$).

Hypothesis 4 was supported. The knowledge creation process had substantial impact on the perceived overall organizational performance improvement ($\beta_{32} = .35$, $t = 3.62$). Moreover, the relation between the two constructs was statistically significant as predicted ($r^2$ type effect size = .465, $p < .001$).

Additional results are presented in Table 4-18 below.
Table 4-18. *The Summary of the Hypotheses Testing*

<table>
<thead>
<tr>
<th></th>
<th>Model Fit</th>
<th>Impacts</th>
<th>Relations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CFA / SEM</td>
<td>Path</td>
<td>r^2 type effect</td>
</tr>
<tr>
<td><strong>H1</strong> Measurement Model</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Learning Organization Culture</td>
<td>RMSEA=.04</td>
<td>.91*</td>
<td>r^2 = .729**</td>
</tr>
<tr>
<td>2. Knowledge Creation Process</td>
<td>RMSEA=.07</td>
<td>.41*</td>
<td>r^2 = .476**</td>
</tr>
<tr>
<td><strong>H2</strong> Learning Organization Culture</td>
<td></td>
<td>Knowledge Creation Process</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>.91*</td>
<td>(19.39)</td>
</tr>
<tr>
<td><strong>H3</strong> Learning Organization Culture</td>
<td></td>
<td>Overall Organization Performance</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>.41*</td>
<td>(4.25)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Financial Performance</td>
<td>.29*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Knowledge Performance</td>
<td>.44*</td>
</tr>
<tr>
<td><strong>H4</strong> Knowledge Creation Process</td>
<td></td>
<td>Overall Organization Performance</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>.35*</td>
<td>(3.62)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Financial Performance</td>
<td>.37*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Knowledge Performance</td>
<td>.37*</td>
</tr>
<tr>
<td><strong>R3</strong> Structural Model</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Overall Performance</td>
<td>RMSEA=.08</td>
<td>.35*</td>
<td>(3.62)</td>
</tr>
<tr>
<td>2. Two types of Performance</td>
<td>RMSEA=.07</td>
<td>.35*</td>
<td>(3.62)</td>
</tr>
</tbody>
</table>

**Thematic Analysis**

Two short answer questions were included in the survey questionnaire. The participants were asked to consider the most influential and encouraging factors for the effective learning organization culture and active knowledge creation practices in their organizations. Compared
with the number of completed survey questionnaires \( n = 633 \), fewer short-answer responses were provided (76 responses -- 36 cases for the learning organization and 40 for the knowledge creation). The collected 76 cases were analyzed by theme coding and thematic analysis (Strauss & Corbin, 1998).

**Influential and Encouraging Factors for the Learning Organization Culture**

As encouraging factors for building a more effective learning organization, 36 responses were categorized into three levels: individual, group/team, and organization/management. At the individual level support, most frequent responses were the individual’s willingness to change and the individual’s competitive expertise in each one’s task (11 responses – i.e. “Willingness to change is the most critical for continuous organizational development”; and “Everyone needs to have job expertises for more dynamic collaboration process”). Regarding the group/team level, participants reported (5 cases) that member’s humanistic relations beyond the task-oriented relation and interpersonal trust in the team/group are the most important factors for fostering effective learning organization culture (i.e. “Emotional trust could lead more dynamic collaboration”; and “Workplace needs to be enjoyable palce with trustful co-workers”). Finally, at the level of management and organization, the CEO’s supportive mind-set / frequent buy-in of the proposed initiates and changes in autonomy (13 responses) are the additional issues reported as leadings to a more supportive culture of the learning organization (i.e. “Top manager’s willingness to the changing process greatly influence to the employees’ actions”; “Self-controlled work process could lead more successful outcomes”; and “Autonomy to the employees could make us to be more responsible”). In addition, motivation with a reward system, more flexible work-time, and more learning opportunity were presented (7 cases – i.e. “Team-based reward policy encourages team collaboration and commitment”; and “Providing learning
opportunities for degrees after official work time could be the motivation for the better outcomes.

**Influential and Encouraging Factors for the Active Knowledge Creation**

With regard to the considerable factors for the active knowledge creation practices in the organization, more than half of the responses (23 cases) are related to team-based collaboration (i.e. “Informal communities inside organization would encourage informal knowledge sharing”; and “Task-force team based on the inter-departmental approach could increase the chances of new product development”), ten responses concerns the importance of the user-friendly knowledge repository system (i.e. “Systematic knowledge storage would decrease the time-consuming for information browsing”; and “Expert-yellow page system is an essential protocol for knowledge easy access system”) and seven participants point to the individual member’s expertise / competency, and readiness (i.e. “Individuals’ willingness to share their knowledge is the most critical point for organizational knowledge sharing”; and “Prior to the knowledge sharing process, individuals should have competitive task-related knowledge and expertise”).

In brief, several issues were raised as effective encouraging factors for building learning organization culture and activating knowledge creation practices, which include individual’s readiness / quality of the expertise, and humanistic relation and interpersonal trust beyond the proposed constructs in the current research. Those factors need to be studied in depth for developing more comprehensive measurements for assessing learning organization culture and the knowledge creation process based on theoretical synthesizing.
Chapter Summary

This chapter provided the results of various analyses based on the given research questions and hypotheses. First, the hypothesized measurement models were tested to assess the validity and reliability in the Korean context by CFAs. Second, the relations and influential associations were tested among the variables, which include cultural aspects of the learning organization, the process of knowledge creation, and the outcomes of organizational performance. All those constructs have strong and positive relations with each other based on the correlation analysis and CCA; and their influential associations were found to be positive and statistically significant in terms of the path coefficient estimates, squared multiple correlations, and regression coefficient. Third, the hypothesized structural model was tested, and the results presented the acceptable model fit to the data in the Korean context. Fourth, short-answer responses provided additional information regarding perceptions of study variables. In brief, four research questions were answered, and four hypotheses were supported based on the data analyses. Further summary of the research, implications, limitations, and final conclusions are discussed in the following chapter.
CHAPTER FIVE
SUMMARY, DISCUSSION, IMPLICATIONS, AND FUTURE RESEARCH

The purpose of this chapter is to summarize the results of the research and to provide discussion of the practical applications and academic implications of the research. A summary of the statistical analyses based on the results of the research is provided. Implications for the strategic management and HRD practices are discussed, research limitations are addressed, and recommendations for further research are proposed.

Summary of the Research

It is of great importance to integrate the learning and organizational knowledge creation for organizational performance improvement. To date, while the concept of knowledge creation, which has more possibility of leading to tangible organizational outcomes (Gilley, Boughton & Maycunich, 1999; Leonard, 1998) has been proposed and discussed in the field of organizational behavior and management innovation, little regard has been given to how this learning-related concept could be ultimately integrated with the organizational knowledge creation process for improving performance in the fields of human resource development (HRD). With emergence of the knowledge economic era, more focus has been given to the knowledge creation activities in the organization (von Krogh, 2005; von Krogh. Ichijo & Nonaka, 2000). Furthermore, the basis of the knowledge creating practices was the organization’s capability of a continuous learning process (Gilley & Maycunich, 2000; Leonard, 1998). This research provides a comprehensive infrastructure to support the evidence of the nomological pathways of knowledge creation practices in learning organization culture for improving performance improvement. From the
In a statistical standpoint, the reliability and validity of the hypothesized measurement models were tested for the applications in a different cultural context, the Korean firms.

**Research Objectives and Hypotheses**

The primary purpose of this research aims to investigate the integrative impacts of learning organization cultural aspects and organizational knowledge creation practices on the performance levels of the Korean firms. There are three major conceptual questions in terms of the measurement validations, relational associations among the three variables, and the structural equation modeling of the hypothesized model. The specific research questions are as follows:

1. Are the hypothesized measurements valid and reliable in Korean business organization contexts?
2. What are the relationships among the cultural aspects of the learning organization, the practices of the dynamic organizational knowledge creation, and organizational performance improvement?
3. Do cultural aspects of the learning organization and organizational knowledge creation practices jointly contribute to organizational performance improvement?
4. What factors do participants report as most influential and encouraging for effective learning organization culture and active knowledge creation practices?

In order to answer the given research questions, empirical analyses were conducted based on the collected data from the Korean firms. The integrative hypothesized model was established based on the review of relevant literatures providing the theoretical relevance among the variables. The research hypotheses of the study were the following:
Hypothesis 1: Two measurements of learning organization and knowledge creation processes are valid and reliable concepts in the Korean context.

Hypothesis 2: Cultural aspects of the learning organization will be positively related to processes of the organizational knowledge creation.

Hypothesis 3: Cultural aspects of the learning organization will be positively related to organizational performance improvement.

Hypothesis 4: The processes of the organizational knowledge creation will be positively related to organizational performance.

Research Procedures

Research instruments were developed and applied as measures in three major areas -- learning organization culture, process of knowledge creation, and performance improvement. English versions of the instruments were translated into Korean versions throughout the rigorous procedures. An in-house intra-net based on-line survey with a total of 66 items, along with 6 demographic and 3 additional short-answer questions, was administrated. The sample firms include electronic, finance, IT solution service, and heavy industry, and a total of 633 completed surveys were returned out of 1,900 participants, corresponding to a 33% return rate. The collected data were analyzed through the various statistical techniques, which include general descriptive and item internal consistency tests, correlation and multiple regression analysis, and confirmatory factor analysis (CFA), and simple structural equation model (SEM). The short-answer questions were coded using thematic analysis.
Results

The results of this study were categorized into three major sections: measurement model fit and item analysis, general relational and influential association analyses, and structural relation analysis.

First of all, the translated versions of the instruments were found to be reliable measures in the Korean context. Each item of the measures in the three categories demonstrated an adequate level of item reliability (α ranging from .70 to .89). Confirmatory factor analysis (CFA) approach was used to assess the construct validity of the hypothesized measurements. The results of the overall CFA with 66 items shows acceptable model fit with the collected data [χ² (633) = 3463.82; χ² / df = 2.46; p < .001; RMSEA = .048, SRMR = .040, NNFI = .99, CFI = .99]. Separate CFAs represented the acceptable model fits of each sub-measurement. With regard to both the learning organization culture and knowledge creation process, with the exception of the chi-square statistic, overall model fit indices were proven as an appropriate model-data fit. In addition, factor loadings of each item were greater than .50, which indicates further evidence of the construct validity of the hypothesized measurement model. In brief, hypothesis one was supported.

Secondly, the relational and influential associations among the constructs were analyzed by correlation analysis, multiple regression, and canonical correlation analysis. Regarding the relations between the learning organization culture and the knowledge creation process, two variables have positive correlations (r ranging from .54 to .71). Additionally the results of the canonical correlation analysis (CCA) show that approximately 73% of the variances were shared between the two constructs in terms of the r² type effect. In short, the second hypothesis was positively supported. With regard to the relations between learning organization culture and performance improvement, an acceptable level of correlations was found. However, knowledge-
related performance \((r = \text{ranges from } .53 \text{ to } .60)\) items demonstrated higher correlations than finance-related performance \((r = \text{ranges from } .37 \text{ to } .43)\) with learning organization culture. The result of the CCA represents that approximately 48% of the variance is shared between the two sets of variables. As supplemental analysis, the structural equation model (SEM) approach was used, and the results show that the learning organization cultural factors have statistically positive and significant contributions to both financial performance \((\text{SPC} = .64, p < .01)\) and knowledge-related performance \((\text{SPC} = .79, p < .01)\) in terms of the standardized regression coefficient. In brief, hypothesis three was supported. Finally, the results of the relation between knowledge creation and performance improvement represent that approximately 40% of variance on the overall level of organizational performance could be accounted for by four modes of knowledge creation practices at the \(p < .001\). Also, hypothesis four was supported.

Third, the structural equation model (SEM) approach was used for assessing the overall sequential and influential relations among the constructs which have been synthesized based on the theoretical integration. A two-step approach was used to assess both the measurement model and the structural model. The results show that the hypothesized measurement was reasonably acceptable in the Korean context, showing the model fit to the data in terms of model fit indices; and the structural equation model analysis demonstrates the statistically significant influential relations among the proposed constructs in terms of the path coefficient estimates.

Finally, the responses which were collected from the open-ended qualitative approach suggest that individuals’ task-related readiness, emotional-related interpersonal trust, and CEO’s supportive mind-set could be considered as important factors for creating a learning organization; and for encouraging dynamic knowledge creation practices, easy-access knowledge repository system, and task-related competency and expertises need to be considered.
Discussion

In this research three major themes were integrated -- learning organization cultural aspects as distal factors, knowledge creation practices as proximal factors, and perceived organizational performance improvement as the exogenous variable. The analysis results identified that learning organization cultural aspects have direct and significant impacts on the knowledge creation practices ($\gamma_{21} = .91, t = 19.39 / r^2$ type effect size = .729, $p < .001$), and perceived performance improvement ($\gamma_{31} = .41, t = 4.25 / r^2$ type effect size = .476, $p < .001$); and their relations were found to be significant. The relation between knowledge creation practices and perceived performance improvement was also shown to be significant ($\beta_{32} = .35, t = 3.62 / r^2$ type effect size = .465, $p < .001$). Furthermore, separate analyses with two types of the performance improvement were conducted, and the results demonstrated that both the learning organization cultural aspects and the process of the knowledge creation have greater impacts on the organizational knowledge performance than does organizational financial performance. The details are discussed in the following sections.

Impacts of learning organization culture

Learning organization culture has been an increasing area of interest in the fields of general management, human resource development, and organization change and innovation (Cavaleri, 2004; Kontogiorghes, Awbrey & Feurig, 2005; Levitt, 1998; Marquardt, 2002; McHargue, 1999; Watkins & Marsick, 1996). Empirical studies have been done to address the impacts of the cultural aspects of the learning organization on various themes, some of which are performance improvement, organizational commitment, and job satisfaction. However, little regard was given to these in the Korean context; furthermore, none of the empirical research for
assessing the relations with organizational knowledge creation practices has been published in the Korean culture. Aspects of the learning organization culture could be considered as supportive environmental factors which encourage performance-improving activities and which are expected to lead to actual improvement in the organization (Song, Kim & kim, 2007; Joo, 2007; Wang, Ynag, & McLean, 2007). However this expectation is just one side of the coin. The linkage between learning organization and performance could be the practices of organizational knowledge creation, which is more than an artificial concept, and application-oriented activities that have more direct impacts on improving performance. In this regard, the learning organization culture accounts for a great portion (73%) of the knowledge creation practices based on the canonical correlation approach. In brief, it can be said that learning organization cultural factors play a key role in promoting organizational knowledge creation practices.

With regard to the impact on the perceived performance improvement, learning organization cultural factors have a greater impact on the organization’s knowledge-related performance than on financial performance, and this result corresponds to the previous results of the impacts on the knowledge creation. It can be said that learning organization cultural aspects definitely result in new knowledge creating-related activities; however, the determinants of the organizational financial performance could be more complex than simple learning-related practices, which might include economic trends, market situation, and competitors. Nevertheless, according to the results of the standardized path coefficient (SPC) and squared multiple correlation (SMC), the results indicate that at least a statistically significant amount of both types of organizational performance – knowledge-related and finance-related -- could be explained by learning organization culture.

Regarding the results of the structural equation model analysis, organizational learning culture has a greater direct impact on the process-related concept of knowledge creation ($\gamma_{21} = .91$, $t = 19.39$) than outcome-related performance improvement ($\gamma_{31} = .41$, $t = 4.25$). It can be
assumed that cultural factors would have more influence on the practices in the organization directly rather than on the outcome itself. In addition, the learning organization culture has less impact on organizational financial performance ($\gamma_{41} = .29, t = 2.41$) than on organizational knowledge gain ($\gamma_{51} = .44, t = 4.37$). Further research needs to be considered with more market-oriented constructs to measure the influential relations with organizational financial performance improvement beyond the simple learning-related constructs.

**Impacts of knowledge creation practices**

The concept of knowledge creation has been a focus of study since the hallmark research of Nonaka and Takeuchi in 1995. As the most competitive component for the organizational success in terms of the market share and continuous improvement, knowledge creation is considered a valuable concept of organizational practices currently as well (Nonaka & Takeuchi, 1995; Nonaka, von Krogh & Voelpel, 2006; Reber, 1993). While much attention has been given to the importance of organizational knowledge, no identified study has yet investigated the linkage with learning organization culture empirically.

The results of this research present interesting issues from the methodological standpoint regarding the impacts of the knowledge creation practices on the two types of the perceived organizational performance. With regard to the multiple regression analysis, while the knowledge creation process accounted for approximately 24% of variance of the financial performance improvement, the knowledge creation process could explain 46% of the variance of knowledge performance. In that procedure, the construct of the learning organization culture was not included. However, according to the structural equation model analysis, the cultural aspects of the learning organization were simultaneously included in the formula and their variances were not controlled, for assessing the two types of performance improvement. Consequently, the
knowledge creation process was mediated by the learning organization factors and in turn influences the performance levels. The results presented that the knowledge creation process, when it is combined with cultural aspects, has the same amount of impact on the two types of performance (path coefficient to the financial performance = .37, t-value = 3.08; path coefficient to knowledge performance = .37, t-value = 3.78). Regarding these results, a greater portion of the organizational financial performance could be explained by the joint influence of both constructs.

**Summary of discussion**

In general, both constructs of learning organization and organizational knowledge creation practices have statistical significance and positive influence on the performance improvement, indicating significant relations between those independent constructs. This finding represents the successful results of the initial objective of this research and confirmation of the theoretical hypothesized models based on the collected data.

With regard to the perceived organizational performance, the researcher initially intended to measure two different levels of performance -- finance- and knowledge-related performance. However, both independent constructs were found to be more related to knowledge-related performance improvement than to perceived level of the organizational financial performance. As discussed in the previous section, organizational financial performance could be associated with more complex determinants than the proposed learning organization cultural and knowledge creating practice factors in reality. At least, the results of this research provides the statistically significant levels of the associations among the constructs; however, further study is needed, details of which are discussed in the limitation section.
Implications

In this section, both the academic and practical applications in the field of HRD and general management strategies are recommended. Also discussed are the implications of this research in terms of the comprehensive constructs, which cover learning organization cultural aspects and more practical knowledge creation and which were theoretically integrated to measure the influences on organizational performance improvement.

Theoretical Academic Implications

Regarding academic and theoretical implications, this research has at least two contributions: (a) measurement validation in the Korean context and (b) an integrative approach encompassing both environmental and practice-related factors for improving performance.

First, with regard to the academic contribution, one of the most common and most frequent critiques in the HRD field is the absence of the critically validated measurement tools of the HRD activities (Holton, 1996; Holton, Chen & Naquin, 2003; Marsick & Watlins, 2003; Yang, Watkins & Marsick, 2004). Furthermore, a culturally different context requires a different measurement, which should be an appropriate instrument in terms of culture, context, and organizational norms. In these regards, this research provides culturally validated measurements for assessing learning organization culture and organizational knowledge creation practices in the Korean context. Culturally embedded measurement could assess the given situation correctly, and its application could be assumed as more appropriate. The current study could shed light on the standardization of further Korean research on the learning organization and knowledge creation in terms of successfully validated versions of the measurement and its validation procedures.

Secondly, in this research both critical cultural aspects and key practical factors for performance improvement were considered. In terms of the environmental cultural aspect, the
learning organization culture was considered. While the learning organization is no more than
cultural supportive components, it could have an indirect impact on the performance. To link
environmental factors and outcomes in the organization, a practice-oriented perspective needs to
be considered. On the other hand, organizational knowledge creation is more related to a practical
concept (Leonard, 1998; Nonaka, Toyama & Byoière, 2001), and it needs to be jointly considered
with supportive environmental factors to explain the outcomes of organizational activities. With
regard to integration of both aspects for explaining the performance outcomes, this research
comprehensively considered environment- and practice-related concepts simultaneously. This
point could provide an accumulative approach to assess the performance outcome in an
organization.

In brief, this research makes academic contributions in that (a) it provides validated
measurements to assess the learning organization culture and the knowledge creation process as
core-determinants of performance in the organization and (b) it synthesizes theoretical integration
between an environmental approach and a practice-oriented concept to elucidate the level of
organizational performance.

**Practical Implications for HRD practices**

The results from this research provide HRD practitioners with insight into the limited
relationship among learning culture, more practical knowledge creation process, and perceived
organizational outcomes as defined in this research.

In terms of the practical field-oriented implications, the results of this research provide at
least three major implications for the HRD practitioners: (a) linkage between the supportive
learning process and practical knowledge creation, (b) applicable design of HRD programs for the
workplace, and (c) innovative changes of organizational culture.
A recent focus has been on the continuous learning activities in organizations and the key roles of the learning activities are given to HRD professionals (Gilley & Maycunich, 2000a, 2000b). Corresponding to this trend is learning-based performance improvement, which includes individual competency development, knowledge-based industrial development, and physical performance improvement. With regard to these issues, HRD practitioners need to consider the linkage between learning activities and their application in the workplace simultaneously. This research presented the significant contribution of the knowledge creation practices, as influential factors for performance improvement and as mediating components of the learning organization culture. Along with these empirical results, HRD professionals could focus more on the four critical modes of knowledge creation practices, which lead to effective applications and continuous interactions in the workplace for daily HRD initiatives.

Second, one of the critical issues in HRD practices and one of the primary concerns of the organizations’ stakeholders is the measuring of their return on investment (Swanson, 1995, 1998, 2007). Learning process and culture are considered as intangible and immeasurable concepts (Wenger, McDermott & Snyder, 2002). Thus, one of the key roles of the HRD practitioners is providing tangible evidence of the relations between learning-oriented efforts and measurable performance. In this perspective, the current research presented the more practical concepts of the knowledge creation, which has been deeply related with learning culture. It could be assumed as a more concrete construct than a simple learning process, which leads to performance improvement. HRD practitioners could design the learning-based HRD programs based on the proposed four modes of knowledge creation process, which might be one step forward in the approach to link the intangible learning and tangible organizational outcomes.

Third, this research deals with cultural perspectives and a practical approach. The result showed that the joint impact of those integrative constructs has more influence on organizational performance in terms of financial and general knowledge improvement. This is evidence that both
organizational culture and practical HRD practices need to be considered as the promoting concepts for the survival of organizations. In that regard, HRD practitioners need to design the organizational culture to be a supportive and dynamic one, in which continuous learning and applicable knowledge creation can be initiated. Not only planning and delivering learning activities, but also the encouraging innovative cultural changes are the scope of the HRD professionals. In addition, the inter-departmental collaborative culture would be the key factor for the continuous organizational knowledge-based performance. The persistent effort for fostering and building a human interaction-based knowledge management system would be another assignment for the HRD professionals, and that could be achieved not only via the systematic approach but also through the restructuring approach of the organizational cultural mental model.

In summary, according to the results, HRD practitioners need to focus more on the integrative constructs of cultural and practical concepts for their daily-based HRD practices. HRD initiatives would be designed with the alignment of applicable knowledge creation, which could be linked with tangible performance beyond theoretical learning concepts. Furthermore, cultural changes and restructuring toward the building of a collaboration-based interactive organization mental model would be the priority for HRD endeavors. A practical approach will lead to more productive outcomes along with more potential for performance improvement through the knowledge transfer, knowledge retention, learning application, and organizational innovation.

**Reflections on Research Limitations**

It is important to identify the limitations of the research for the further research in terms of increasing the quality of the corresponding studies. In fact, there are several limitations regarding the constructs, analytical method, and sampling process.

First, this research investigates the determinants of the organizational performance improvement in a broad perspective in terms of supportive culture and collective process rather
than focusing on the individual perspective. Several studies on the learning organization, learning transfer, and knowledge creation point to the importance of individual aspects, which include individual motivation, the employee’s readiness, and willingness of the changes. Those individual characteristics could be considered as one of the most influential constructs. Considering the individual-related concept would increase the rationale of the findings. Furthermore, the two sections of the performance measurement were based on the employee’s perception-based self-response. The nature of the perceptual data increases the possibility of a percept-percept bias (Joo, 2007). For more objectivity of the measurement, hard data from organizational financial reports is desired. However, attaining confidential revenue-related information is not realistic.

Secondly, with regard to the data analysis, one of the most critical factors of this research is the process of the organizational knowledge creation inside the organizations. The construct of the knowledge creation is more associated with interactive interaction among the employees; for this reason, in order to investigate the holistic process of the knowledge creation practices, a qualitative approach could integrate the research in a more cohesive fashion. However, the given questionnaire-based approach does not threaten the reliability of the perception-based data in that the questionnaire consists of four modes of the practices with sub-items which cover all bases of the process. Furthermore, additional open-ended questions were provided to collect unstructured perceptions.

Finally, regarding the sampling issues, two possible major limitations should be addressed. First of all, a purposive sampling procedure was conducted. However, as the concept of the learning organization and process of the knowledge creation are more contextually understandable phenomena in respectively larger organizations, one of the best and largest Korean conglomerates was intentionally selected as the target sample pool. Secondly, corresponding with the first issue, all of the completed data from the 633 participants were collected from one united conglomerate, which raises the possibility of another sample-related
limitation. More diverse demographic cohorts would increase the generalizability of the findings. Thus, to increase the multiplicity of the participants, five subsidiary companies were included as target samples, and this effort could enhance the bottom line of the sample diversity.

**Recommendations for Further Research**

Several limitations were discussed, and based on these, recommendations are provided for further related studies.

As the determinants of the performance in organization, cultural- and process-related concepts were synthesized through the theoretical integration. Based on the nature of the constructs, more longitudinal studies are recommended along with a more observation-oriented qualitative approach. Furthermore, more complex compositions of the influential constructs are suggested in order to consider the impacts of the individual-focused characteristics. Finally, considering more reliable generalization of the findings, comparison-based studies are recommended across the different types of the organization with more diverse samples.

First, the learning organization has cultural aspects which have considerable impact on several outcomes in organizations. The cultural aspects vary depending on the organizational culture and structures in terms of the value propositions, workflow, and orientations of the outcomes. Based on these differences, cross-cultural comparison studies are recommended because the sample subsidiaries have similar organizational culture and structure under the umbrella of the mother conglomerate.

Second, even though impact of the two influential constructs – financial and knowledge performance -- on the overall performance improvement has been assessed, the relations with financial performance are comparatively lower than those with knowledge performance improvement. In this regard, the presence of other constructs, which could influence the
organizational financial outcomes such as market, competitors, and national economic circumstances, could be assumed. Along with those factors, the given research constructs could be inter-correlated with each other, meaning more complex analyses in terms of the mediating and moderating influences of those complex components on the performance. As mentioned in the previous discussion of the limitations of this study, the actual revenue-related information of the organization would be a strong construct as the financial-performance measurement for the future research.

Third, the linkage between the learning organization culture and the organizational knowledge creation process was defined through the literature review-based integration. However, the learning organization culture would promote the learning process more than the knowledge creation itself; so that more in-depth research is recommend defining the transitional process from the learning process to knowledge creation practice from the perspective of the holistic learning theory. Organizational knowledge creation is the sub-outcome of the organizational reflective and interactive learning process, which has the individual learning process as a proactive agent. In brief, delineating the theory-building research would increase the theoretical reliability for the constructs of the current research, and such a theory-building study would be the longitudinal process for the future research.

Fourth, as discussed in the limitation section, due to the sample diversity, the generalization of the research results is limited. Therefore, it is necessary to expand the data sources to include the school settings, government sectors, and other types of firms. This diversity of the sample sources increases the reliability of the results. Furthermore, comparison analysis among those samples may result in the academically interesting discussion. Those further studies would be valuable to understand unique approaches depending on the differences of the organization cultures in terms of the application of the proposed framework in the certain workplace, and even for training and organization development purposes.
In conclusion, further studies are needed to develop and expand the current research. Based on a more theoretical network between the given constructs, comparison studies across different types of businesses and different organizational contexts with more diverse samples through a more ontological qualitative approach are recommended.

**Final Thoughts**

Currently, intangible knowledge is the most critical asset for most organizational strategies and initiatives (Corno, Reinmoeller & Nonaka, 1999; Nonaka & Takeuchi, 1995). Moreover, the continuous organizational learning process is another of the most influential factors involved in persistent performance improvement. (Argyris, & Schön, 1996; Marsick & Watkins, 2003; Watkins & Marsick, 1996).

To date, HRD practitioners have usually focused more on the learning-related concepts than on the practical knowledge creation process. However, the focus on the learning process could cover only one side of the coin. The occurrence of learning does not guarantee the application in the workplace. This issue results in the severe critique of that HRD practices apart from the real workplace performance. The human learning process should be transformed into actionable knowledge, which could be applied in the workplace; and, consequently, applied knowledge leads to the creation of new knowledge based on the experiences of the field applications through the reflection process. More critically, organizational knowledge, which has been created by the organizational learning process, needs to be embedded in the organization through the continuous applications and re-creation process.

From this knowledge creation-focused perspective, HRD practitioners need to expand the areas of their tasks to knowledge creation and its application practices in the workplace. Traditionally, developmental practices are the major areas of the HRD profession, including
training and development initiatives; however, to overcome the curiosity on the subject of the HRD practices, more focus is required on the practical-oriented trends. Finally, beyond the event-type HRD practices, more systematic areas of the management approach, including organizational change and innovation, knowledge management system development, and knowledge retention strategy applications, need to be covered by the HRD profession.

Last, but not least, from the HRD practitioners’ and researchers’ standpoint, developing a systematic and comprehensive theory of cognitive learning-based knowledge creation would be the agent for assessing the effectiveness of HRD practices based on a more accurate measurement. This would also include the linkage among the individual learning theory, organizational learning process, dynamic knowledge creation, and systematic knowledge management strategies.

This empirical research could be the cornerstone for developing a theoretical system of learning-based knowledge creation, which is practically related to organizational performance improvement.

**Chapter Summary**

In this chapter, an overall summary of the research was presented. The procedure of the research was summarized along with the primary purpose and the given research hypotheses. A concise synopsis of the results was recapitulated based on the proposed research constructs. To the point, all of the four hypotheses were positively supported and the three major research questions were countered. Implications based on the discussion of the results were proposed both academically and practically. The practical contributions of this research to the HRD profession were discussed. Self-reported research limitations were presented, and critical recommendations
were put forward for the related further studies. Finally, concluding thoughts were expressed by the researcher.
REFERENCES


Appendix A:

Questionnaires for Survey (English and Korean Versions)
Survey for measuring Learning Organization Environment, Knowledge Creation Process, and Performance Improvement

The Integrative Determinants for Organizational Performance Improvement: The Impacts of the Learning Organization and Dynamic Knowledge Creation

First of all, the administration of this survey has been approved by the Human Subject Protection office at the Pennsylvania State University, and approval IRB # is 27713.

Thank you for your participation. I am Ji Hoon Song, a doctoral candidate at the Pennsylvania State University, majoring Human Resource Development (HRD). This survey is a part of doctoral dissertation research for the data collection procedures in your organization.

The purpose of this dissertation is to identify the impact of the cultural aspects of the learning organization and process of knowledge creation practices on the performance improvement in your organization. Your information that you provide will be kept anonymously and confidentially, and the results and summary of the results will be used only for academic research purpose.

The questionnaire would take approximately 30-35 minutes to complete. This questionnaire consists of five parts, which include demographic section and final open-ended questions. Details will be provided following section.

Before, during and after the participation if you have any questions or comments, please feel free to contact the researcher at jus205@psu.edu or USA (949) 533.5102. Thank you again for your participation.

Sincerely,

Ji Hoon Song
Researcher
Survey Introduction

This questionnaire is designed to assess your perceptions of learning organization environmental factors and knowledge creation processes and their impact on performance improvement in your organization. It is very important that you answer each question as thoughtfully and frankly as possible to reflect your accurate opinion.

Overview of Questionnaire

This questionnaire has five major sections. The first section asks for general personal information. The second part asks your current situation regarding environmental learning organization factors in your organization. For that part we are using the Dimensions of Learning Organization Questionnaires (DLOQ) with the permission of the authors. The third part asks your perception of the knowledge creation processes in your organization. The fourth part asks your perception of the levels of performance improvement in your organization. The final part of this questionnaire consists of short-answer questions, and asks your perception of the priorities of learning organization construction and knowledge creation processes in your organization.

Instructions

This is a general survey asking your perceptions. It is not a test; thus there are no right or wrong answers. Please check the one response on each survey item that best reflects your perception.

Example:

Question: In my organization, leaders continually look for opportunities to learn. 1 2 3 4 5

In this example, if you believe that leaders always look for opportunities to learn, you might score this as a five [5]; and if you believe that leaders never do this, you might score this as a [1]

Contact

During or/and after your survey, if you have any questions please contact one of researchers through following contact information:

Ji Hoon Song: 949-533-5102 (USA), email: jus205@psu.edu
Dr. Judith A. Kolb: 814-865-1876 (USA), email: jak18@psu.edu
# Part 1 (General Demographic Questionnaires)

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<tr>
<th>1. Gender</th>
<th>Male [ ]</th>
<th>Female [ ]</th>
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<td>2. Type of Task</td>
<td>HR / Management [ ]</td>
<td>Sales / Marketing [ ]</td>
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<tr>
<td>3. Work Experience</td>
<td>Less than 3 years [ ]</td>
<td>More than 3 but less than 5 years [ ]</td>
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<tr>
<td>4. Position</td>
<td>Employee [ ]</td>
<td>Assistant Manager [ ]</td>
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<td>5. Unit of Business</td>
<td>Electronic [ ]</td>
<td>Finance [ ]</td>
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DLOQ is an instrument to measure levels of environmental factors of the learning organization, which includes learning-related factors, system connection, leadership, and organizational support. Please circle only one response for each item.

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<th>Question</th>
<th>Never</th>
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<th>4</th>
<th>5</th>
<th>Always</th>
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<tbody>
<tr>
<td>1 In my organization, people help each other learn.</td>
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<td>2 In my organization, people take time to support learning.</td>
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<td>3 In my organization, people are rewarded for learning.</td>
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<td>4 In my organization, people give open and honest feedback to each other.</td>
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<tr>
<td>5 In my organization, whenever people state their view, they also ask what others think.</td>
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<td>6 In my organization, people spend time building trust with each other.</td>
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<tr>
<td>7 In my organization, people have the freedom to adapt their goals as needed.</td>
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<td>8 In my organization, people revise thinking as a result of organization discussions or information collected.</td>
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<tr>
<td>9 In my organization, we are confident that the organization will act on our recommendations.</td>
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<tr>
<td>Question</td>
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<tr>
<td>11 My organization makes its lessons learned available to all employees.</td>
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<td>12 My organization measures the results of the time and resources spent on training and learning.</td>
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<td>13 My organization recognizes people for taking initiative.</td>
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<td>14 My organization gives people control over the resources they need to accomplish their work.</td>
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<tr>
<td>15 My organization supports members who take calculated risks.</td>
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<td>16 My organization encourages people to think from a global perspective.</td>
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<tr>
<td>17 My organization works together with the outside community or other outside resources to meet mutual needs.</td>
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<tr>
<td>18 My organization encourages people to get answers from multiple locations and perspectives when solving problems.</td>
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<tr>
<td>19 In my organization, leaders mentor and coach those they lead.</td>
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<td>20 In my organization, leaders continually look for opportunities to learn.</td>
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<tr>
<td>21 In my organization, leaders ensure that the organization’s actions are consistent with its values.</td>
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</tbody>
</table>
### PART III (Knowledge Creation Process)

Knowledge creation process has four parts of measure to examine the four modes of organizational knowledge creation process. Please circle only one response for each item.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 In my organization, I gather information from other departments.</td>
<td>[ ] [ ] [ ] [ ] [ ] [ ]</td>
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</tr>
<tr>
<td>23 In my organization, share experiences with other people.</td>
<td>[ ] [ ] [ ] [ ] [ ] [ ]</td>
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</tr>
<tr>
<td>24 In my organization, I gather information and ideas from the life-experience.</td>
<td>[ ] [ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>25 In my organization, I collect work-related information and ideas from (in) formal relationship with other people.</td>
<td>[ ] [ ] [ ] [ ] [ ] [ ]</td>
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</tr>
<tr>
<td>26 In my organization, Our team has team diversity in work units.</td>
<td>[ ] [ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>27 In my organization, I have autonomy for task-related approach.</td>
<td>[ ] [ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>28 In my organization, our team and I have clear and challengeable task-related goals.</td>
<td>[ ] [ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>29 When we develop new ideas, I facilitate creative and constructive conversation among group members.</td>
<td>[ ] [ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>30 When we develop new ideas, I develop general rules and concepts based on the several examples.</td>
<td>[ ] [ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>31 When we develop new ideas, I express new concepts by using metaphor.</td>
<td>[ ] [ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>Questions</td>
<td>Strongly Disagree</td>
<td>Strongly Agree</td>
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<tr>
<td>--------------------------------------------------------------------------</td>
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<tr>
<td>32  I express new ideas by using utilizing pictures and diagrams.</td>
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<tr>
<td>33  When we develop new ideas,</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>I share and consider several ideas to reach a conclusion.</td>
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<tr>
<td>34  When we develop new ideas, our team engages in continuous dialogue</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>through reflection among group members.</td>
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<tr>
<td>35  When we develop new ideas,</td>
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<tr>
<td>our team develops new ideas through constructive dialogue.</td>
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<tr>
<td>36  In our organization, newly developed concepts are evaluated by</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>a reasonable evaluation system and organizational vision/mission.</td>
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<tr>
<td>37  In our organization, newly developed concepts are evaluated</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>in a timely manner.</td>
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<tr>
<td>38  In our organization, I engage in developing criteria to determine</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>the value of new concepts.</td>
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<tr>
<td>39  In our organization, our team leader has strategy or vision against</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>which we can evaluate our new ideas.</td>
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<tr>
<td>40  In our organization, I conduct experiments and share the newly</td>
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<tr>
<td>developed concepts with the entire organization</td>
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<tr>
<td>to evaluate the value of the concepts.</td>
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<tr>
<td>41  In our organization,</td>
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<tr>
<td>our team is good at developing ideas into tangible results.</td>
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<tr>
<td>42  In our organization,</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>I am good at developing ideas into results.</td>
<td></td>
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<tr>
<td>43  In our organization,</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>various departments collaborate to build the final model.</td>
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<tr>
<td>44  In our organization, our team combines existing and new concepts</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>in meaningful ways.</td>
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</tbody>
</table>
Organizational performance improvement will be measured by two parts, which include knowledge gaining and financial improvement. Please circle only one response for each item. Answer the given questions based on the comparison between year of 2006 and 200.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 In my organization, return on investment is greater than last year.</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
</tr>
<tr>
<td>46 In my organization, average productivity per employee is greater than last year.</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>47 In my organization, time to market for products and services is less than last year.</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>48 In my organization, response time for customer complaints is better than last year.</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>49 In my organization, market share is greater than last year.</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>50 In my organization, the cost per business transaction is less than last year.</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>Question</td>
<td>Strongly Disagree</td>
<td>Strongly Agree</td>
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<td>1 2 3 4 5</td>
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<tr>
<td>51 In my organization, customer satisfaction is greater than last year</td>
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<td>1 2 3 4 5</td>
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<td>52 In my organization, the number of suggestions implemented is</td>
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<td>greater than last year</td>
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<td>1 2 3 4 5</td>
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<tr>
<td>53 In my organization, the number of new products or service is</td>
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<td>greater than last year</td>
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<td>[ ] [ ] [ ] [ ] [ ]</td>
<td>1 2 3 4 5</td>
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<tr>
<td>54 In my organization, the percentage of skilled workers compare to</td>
<td></td>
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<tr>
<td>the total workforce is greater than last year</td>
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<tr>
<td>[ ] [ ] [ ] [ ] [ ]</td>
<td>1 2 3 4 5</td>
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<tr>
<td>55 In my organization, the percentage of total spending devoted to</td>
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<tr>
<td>technology and information processing is greater than last year</td>
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<td>[ ] [ ] [ ] [ ] [ ]</td>
<td>1 2 3 4 5</td>
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<tr>
<td>56 In my organization, the number of individuals' learning new skill</td>
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<td>is greater than last year</td>
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<td>[ ] [ ] [ ] [ ] [ ]</td>
<td>1 2 3 4 5</td>
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PART V (Short-Answer Questions)

Please answer for following short-answer questions. These questions are asking your perceptions about the most important factors for learning organization structure and knowledge creation processes in your organization.

1. What do you think are the most important factors to sustain and encourage the learning organization structure in your organization? (Please list 3 factors in declining order of importance.)
   
   A. 
   B. 
   C. 

2. What do you think are the most important factors to encourage the processes of the knowledge creation in your organization? (Please list 3 factors in declining order of importance.)

   A. 
   B. 
   C. 

3. What other comments, if any, do you have about these two factors in your organization?
The Integrative Determinants for Organizational Performance Improvement: The Impacts of the Learning Organization and Dynamic Knowledge Creation
연구 참여 설명서

본 연구는 귀하의 조직에서의 학습 조직 문화와 지식 창출 과정이 조직의 성과에 미치는 복합적 관계를 설명 하기 위한 연구를 위한 설문입니다. 본인이 생각하고 느끼는 최적의 답변을 해 주시는 것은 본 연구 결과에 긍정적인 영향을 줄 수 있습니다.

설문 구성

본 설문지는 다섯 부분으로 구성 되어 있습니다. 첫번째는 본인의 신상 정보를 묻는 부분입니다. 두번째는 조직의 학습 조직 문화 상태를 묻고 있습니다. 세번째는 귀하의 조직의 지식 창출 과정을 측정하고자 하는문항들 입니다. 네번째는 본인들이 느끼는 조직의 성과 향상을 측정하는 문항들 입니다. 그리고 마지막으로 주관식 형태의 부가적인 의견들을 묻는 문항들로 구성 되어 있습니다.

답변 요령

본 문항들은 여러분들이 느끼고 있는 의견을 바탕으로 답변 해 주시면 됩니다. 본 설문지는 시험 형태가 아니기 때문에 정답이 존재 하지 않습니다. 본인의 의견을 가장 잘 대변 할 수 있는 답변을 해 주시면 됩니다.

예시

질문: 우리 조직에서는, 상사들이 항상 학습 할 수 있는 기회를 찾아 본다. 1 2 3 4 5

본 예시에서, 만일 귀하의 조직에서 상사들이 항상 새로운 학습 기회를 찾는다고 생각하시면, 5번에, 그렇지 않다고 생각하시면, 1번에 답해 주시면 됩니다.

연락처

본 설문과 관련해서 언제든지 질문이 있으시면, 연구자 (송지훈) 혹은 논문 지도 교수 (Dr. Judith A. Kolb) 에게 연락해 주십시오.

송지훈: 이메일: jus205@psu.edu / 전화: 1-949-533-5102 (USA)
Dr. Judith A. Kolb: 이메일: jak18@psu.edu / 전화: 1-814-865-1876 (USA)
## PART 1 (일반 개인 정보)

| 1. 성별                  | 남자 | [ ]  
|-------------------------|------|-------  
|                         | 여자 | [ ]   |

| 2. 업무의 종류                      | 인적자원/경영지원 | [ ]  
|-----------------------------------|------------------|-------  
|                                   | 영업/마케팅 | [ ]  
|                                   | 생산관리 | [ ]   
|                                   | IT/고객관리 | [ ]  
|                                   | 기타 | [ ]   |

| 3. 직장 경력                      | 3년 미만 | [ ]  
|-----------------------------------|---------|-------  
|                                   | 3년이상 5년 미만 | [ ]  
|                                   | 5년 이상 7년 미만 | [ ]  
|                                   | 7년 이상 9년 미만 | [ ]  
|                                   | 9년 이상 | [ ]   |

| 4. 직책                           | 사원 | [ ]  
|-----------------------------------|-----|-------  
|                                   | 대리급 | [ ]  
|                                   | 과장급 | [ ]   
|                                   | 차장급 | [ ]   
|                                   | 부서/임원급 | [ ]  
|                                   | 기타 | [ ]   |

| 5. 업종                           | 전자 | [ ]   
|-----------------------------------|------|-------  
|                                   | 금융 | [ ]   
|                                   | IT관련 | [ ]  
|                                   | 중공업 | [ ]   
|                                   | 기타 | [ ]   |
PART II (학습 조직 문화 진단)

<table>
<thead>
<tr>
<th>질문 문항</th>
<th>전혀 아니다</th>
<th>아니다</th>
<th>그렇다</th>
<th>그럴다</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  우리 회사에서는, 임직원들이 상호간에 학습을 도와준다.</td>
<td>[ ]</td>
<td>[ ]</td>
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<tr>
<td>2  우리 회사에서는, 임직원들이 학습하는데 시간을 투자 한다.</td>
<td>[ ]</td>
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<tr>
<td>3  우리 회사에서는, 임직원들이 학습에 대한 보상을 받는다.</td>
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<tr>
<td>4  우리 회사에서는, 임직원들이 상호간에 개방적이도 솔직한 피드백을 준다.</td>
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<tr>
<td>5  우리 회사에서는, 임직원들이 언제든지 자신의 의견을 말할 수 있고, 다른 사람들의 의견을 물어 볼 수 있다.</td>
<td>[ ]</td>
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<tr>
<td>6  우리 회사에서는, 임직원들이 상호간에 신뢰를 쌓기 위해 시간을 투자 한다.</td>
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<tr>
<td>7  우리 회사에서는, 임직원들이 필요시 자신의 업무목표를 자유롭게 수립 할 수 있다.</td>
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<tr>
<td>8  우리 회사에서는, 임직원들이 수집된 정보나 부서내 토론의 결과에 따라 자신의 생각을 수정한다.</td>
<td>[ ]</td>
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<tr>
<td>9  우리 회사에서는, 자신들이 제시한 의견과 건의사항을 조직이 수용하고 있다고 믿는다.</td>
<td>[ ]</td>
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</tr>
<tr>
<td>질문 문항</td>
<td>전혀 아니다</td>
<td>매우 그렇다</td>
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<td><strong>10</strong></td>
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<tr>
<td>우리 회사에서는, 현재의 성과와 예상되는 성과간의 차이를 측정 할 수 있는 시스템을 가지고 있다.</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<td>우리 회사에서는, 조직원들이 습득한 정보를 모든 임직원들이 이용하고, 공유할 수 있도록 한다.</td>
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<td><strong>12</strong></td>
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<td>우리 회사에서는, 임직원들이 교육을 받고, 학습하는데 드는 시간과 자원대비 얼마의 성과를 거두었는지 측정한다.</td>
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<tr>
<td>우리 회사에서는, 사업안을 처음 가회한 임직원을 인정해 준다.</td>
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<td><strong>14</strong></td>
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<td>우리 회사에서는, 임직원들이 업무를 수행하는데 필요한 자원을 스스로 관리하고 사용 할 수 있도록 권한을 준다.</td>
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<td>우리 회사에서는, 임직원들이 위험 요소가 있는 업무도 추진 할 수 있도록 지원한다.</td>
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<td>우리 회사에서는, 임직원들이 글로벌 시각으로 생각 할 수 있도록 독려한다.</td>
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<td>우리 회사에서는, 상호간의 요구를 충족시키기 위하여 지역사회의 외부기관, 자원들과 함께 협력한다.</td>
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<td><strong>18</strong></td>
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<td>우리 회사에서는, 임직원들이 문제를 해결할 때 다양한 시각과 관점으로 답을 얻을 수 있도록 독려한다.</td>
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<tr>
<td>우리 회사에서는, 리더 또는 상사들이 부서원들의 멘토와 코치의 역할을 해 준다.</td>
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<td>우리 회사에서는, 리더 또는 상사들이 부서원들이 지속적으로 학습 할 수 있도록 기회를 찾아준다.</td>
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<td>우리 회사에서는, 리더 또는 상사들이 회사의 가치와 업무의 가치가 일치 할 수 있도록 노력한다.</td>
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</table>
### PART III (조직의 지식 창출 과정 진단)

<table>
<thead>
<tr>
<th>질문 문항</th>
<th>전혀 아니다</th>
<th>매우 그렇다</th>
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<tbody>
<tr>
<td>22 우리 조직에서, 일반적으로 나는 다른 부서로부터도 업무에 관련된 정보를 수집한다.</td>
<td>[ ] [ ] [ ] [ ]</td>
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<tr>
<td>23 우리 조직에서, 일반적으로 나는 조직내의 다른 임직원들과 업무에 관련된 정보를 서로 공유한다.</td>
<td>[ ] [ ] [ ] [ ]</td>
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<td>24 우리 조직에서, 나는 일상적인 생활로 부터 업무에 필요한 정보와 아이디어를 얻는다.</td>
<td>[ ] [ ] [ ] [ ]</td>
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<td>25 우리 조직에서, 임직원들은 공식적 혹은 비공식적 교류를 통해 업무에 필요한 다양한 정보를 얻는다</td>
<td>[ ] [ ] [ ] [ ]</td>
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<td>26 우리 조직에서는, 일반적으로 팀 구성원들간에 다양성이 있다. (개인 성향, 전공, 성별, 주요 역량 등)</td>
<td>[ ] [ ] [ ] [ ]</td>
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<td>27 우리 조직에서는, 일반적으로 나는 업무 추진과 관련하여 발생할 수 있는 다양한 과정에 있어 자율성을 가지고 일할 수 있음니다.</td>
<td>[ ] [ ] [ ] [ ]</td>
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<td>28 우리 조직에서, 일반적으로 나는 업무 추진에 있어서 분명하고, 도전할 가치가 있는 목표를 가지고 수행한다.</td>
<td>[ ] [ ] [ ] [ ]</td>
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<td>29 우리 조직에서는, 새로운 아이디어를 창출해 내는 과정에서, 나는 다른 팀 구성원들이 창조적으로 건설적인 대화를 할 수 있도록 돕기(촉진) 한다.</td>
<td>[ ] [ ] [ ] [ ]</td>
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<td>30 우리 조직에서는, 새로운 아이디어를 창출해 내는 과정에서, 나는 다양한 경향성의 에시를 바탕으로 일반적인 원리와 진행 컨셉을 만들어 간다.</td>
<td>[ ] [ ] [ ] [ ]</td>
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<td>31 우리 조직에서, 새로운 아이디어를 창출해 내는 과정에서, 나는 새로운 아이디어를 남들이 이해 할 수 있는 은유적, 비유적 예시를 통해서 표현한다.</td>
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<tr>
<td>질문 문항</td>
<td>전혀 아니다</td>
<td>매우 그렇다</td>
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<td>질문 문항</td>
<td>전혀 아니다</td>
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<td>45 우리 회사는, 작년에 비해 이익 투자 대비 수익율이 좋아졌다</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>46 우리 회사에, 조직원들의 평균 생산성이 작년에 비해 높아졌다</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<td>47 우리 회사의 상품 출시나 시장에 서비스를 제공하는데 걸리는 시간이 작년에 비해 줄어 들었다</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<td>48 우리 회사는 고객의 소리나 불만에 응대하는데 걸리는 시간이 작년에 비해 줄어 들었다</td>
<td>[ ] [ ] [ ] [ ] [ ]</td>
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<tr>
<td>49 우리 회사의 시장 점유율은 작년에 비해 늘어났다</td>
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<td>50 우리회사에서, 사업을 운영하는데 드는 비용을 작년에 비해 절약할 수 있게 되었다</td>
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<tr>
<td>질문 문항</td>
<td>전혀 아니다</td>
<td>매우 그렇다</td>
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PART V (주관식 답변 문항)

1. 본 설문 문항에서 제시된 문항들 외에, 본인이 생각하는 학습 조직 문화를 구성하기 위한 요소들은 어떤 것들이 있습니까? 중요도 순서 상관 없이 답변해 주시면 됩니다.

1. 
2. 
3. 

2. 본 설문 문항에서 제시된 문항들 외에, 본인이 생각하는 조직에서의 지식 창출을 위한 중요한 요소들은 어떤 것들이 있습니까? 중요도 순서 상관 없이 답변해 주시면 됩니다.

1. 
2. 
3. 

3. 본 연구에 관련하여, 의견이 있으시면 말씀해 주시면 됩니다.
Appendix B:
 References and Descriptions of Knowledge Creation Measures
Table B1. References and Descriptions of Knowledge Creation Measures

<table>
<thead>
<tr>
<th>Phase of Knowledge Creation</th>
<th>Sub-Questionnaires</th>
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<tbody>
<tr>
<td>Sharing tacit knowledge</td>
<td>In general, in our organization,</td>
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</tbody>
</table>
|                             | - I gather information from other departments  
  (Nonaka, 1994; Nonaka & Takeuchi, 1995) |
|                             | - I share experiences with other people  
  (Nonaka & Takeuchi, 1995; Nonaka, Peltokorpi, & Tomae, 2005) |
|                             | - I gather information and ideas from the life-experience  
  (Nonaka & Takeuchi, 1995) |
|                             | - I collect work-related information and ideas from (in) formal relationship with other people  
  (von Krogh, Ichijo, & Nonaka, 2000) |
|                             | - Our team has a team diversity in work units  
  (Nonaka & Takeuchi, 1995; von Krogh, Ichijo, & Nonaka, 2000) |
|                             | - I have autonomy for task-related approach  
|                             | - Our team and I have clear and challengeable task-related goals  
  (Nonaka & Takeuchi, 1995; Nonaka & Nishiguchi, 2001) |
| Creating concepts          | In our organization, when we develop new ideas, |
|                             | - I facilitate creative and constructive conversation among group members  
  (Nonaka & Takeuchi, 1995; Nonaka, von Krogh, & Voelpel, 2006) |
|                             | - I develop general rules and concepts based on the several examples  
  (Nonaka & Takeuchi, 1995; Nonaka & Toyama, 2005) |
|                             | - I express new concepts by using metaphor  
  (Nonaka & Takeuchi, 1995; Nonaka, Toyama, & Konno, 2000) |
|                             | - I express new ideas by utilizing pictures or diagrams  
  (Nonaka, 1994; Nonaka & Takeuchi, 1995) |
|                             | - I share and consider several ideas to reach a conclusion  
  (Nonaka & Takeuchi, 1995) |
|                             | - Our team engages in continuous dialogue through reflection among group member  
  (Nonaka & Takeuchi, 1995; von Krogh, & Voelpel, 2006) |
|                             | - Our team develops new ideas through constructive dialogue  
<table>
<thead>
<tr>
<th><strong>Justifying concepts</strong></th>
<th>In our organization,</th>
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<tr>
<td>- Newly developed concepts are evaluated by a reasonable evaluation system and organizational vision / mission (Nonaka &amp; Takeuchi, 1995; Nonaka &amp; Toyama, 2003, 2005)</td>
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<tr>
<td>- Newly developed concepts are evaluated in a timely manner (Nonaka &amp; Takeuchi, 1995; Ichijo &amp; Nonaka, 2007)</td>
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<tr>
<td>- I engage in developing criteria to determine the value of new concepts (Nonaka &amp; Takeuchi, 1995)</td>
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<tr>
<td>- Our team leader has strategy or vision against which we can evaluate our new ideas (von Krogh, Ichijo, &amp; Nonaka, 2000; von Krogh, &amp; Voelpel, 2006)</td>
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<tr>
<td>- I conduct experiments and share the newly developed concepts with the entire organization to evaluate the value of the concepts. (Nonaka &amp; Takeuchi, 1995; Nonaka &amp; Toyama, 2005)</td>
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<tr>
<th><strong>Building prototypes</strong></th>
<th>In our organization,</th>
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<tbody>
<tr>
<td>- Our team is good at developing ideas into tangible results (Nonaka, 1994; Nonaka &amp; Takeuchi, 1995)</td>
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<tr>
<td>- I am good at developing ideas into tangible results (Nonaka, 1994; Nonaka &amp; Takeuchi, 1995)</td>
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<tr>
<td>- Various departments collaborate to build the final model (Nonaka &amp; Takeuchi, 1995; Nonaka &amp; Toyama, 2003)</td>
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<tr>
<td>- Our team combines existing and new concepts in meaningful ways (Nonaka &amp; Takeuchi, 1995; Nonaka &amp; Toyama, 2003; von Krogh, 1998)</td>
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</table>
Appendix C:

IRB Approval and Recruitment Letter (English and Korean Versions)
Hello, my name is Ji Hoon Song, a doctoral student at the Penn State University in the U.S.A. I am conducting my doctoral dissertation, and I would like to invite you to participate in a research study. You were selected, as a possible participant because your company agreed to take part in this research under the condition your participation is completely voluntary. In order to participate in this research, you need to be employed currently in your companies and you are 18 years of age and older. Please read this form carefully and ask any questions you may have before agreeing to be in the study.

You decision of whether or not participate will not affect your current or future relations with Penn State University or your company. No physical or psychological risks are expected during your participation in this study. The benefit of participation of your company and participants is to receive a summary of the results if should you and/or your company desire a copy.

All data will be kept in a locked password personal laptop computer. Employers will NOT have access to any individual responses. In the completed report, we will not include any information that will make it possible to identify any of your individual subjects.

You may contact the following with any questions:

Ji Hoon Song at jus205@psu.edu, 949-522-5102 (USA) at any time if you have any questions and need additional information or Dr. Judith A. Kolb (thesis advisor) at jak18@psu.edu, 814-865-1876 (USA)

If you are considering participation in this study, please read the following document before you make any decisions.

Sincerely

Researcher Ji Hoon Song
연구 참여 초청서

안녕하십니까, 저는 미국 펜실베니아 주립대학 박사 과정 중에 있는 송지훈 입니다. 진행 중인 저의 박사 학위 논문을 위한 데이터 수집을 위한 설문에 귀하를 초청하고자 합니다.

귀하는 귀하의 회사의 동의를 통해 가능한 응답자로 선택 되셨습니다. 또한 설문 참여는 전적으로 자발적인 참여에 의해 이루어 집니다. 설문 참여를 위해서 귀하는 현재 근무중이 업직원 이어가 하여 18세 이상의 성인 이어야 함을 알려 드립니다. 본 초청장을 잘 읽어 보시고 참여를 결정해 주시면 됩니다.

귀하의 본 설문에 대한 참여는 위의 회사와의 펜실베니아 주립대학의 관계에 어떠한 영향도 미치지 않음을 알려 드립니다. 또한 본 설문 참여에 있어서 어떠한 물리적, 심리적 위험 요소가 존재 하지 않음을 알려 드립니다. 본 연구의 결과는 요청에 의해 귀하 혹은 귀하의 회사에 제공 되어 질 수 있습니다.

본 연구를 위한 수집된 자료는 연구자의 개인 컴퓨터에 보관 될 것이며, 귀하의 회사에는 개개인의 응답에 접근 할 수 있는 권한이 없음을 알려 드립니다. 본 연구의 진행 중에, 수집된 모든 개인 정보는 개인의 사생활 보호를 위해 삭제 됐을알려 드립니다.

본 연구에 대한 어떠한 문의 사항이 있으시면 다음의 연락처로 연락해 주시면 됩니다.

연구자: 송지훈 – 이메일: jus205@psu.edu / 전화: 1-949-533-5102
지도교수: Dr. Judith A. Kolb – 이메일: jak18@psu.edu / 1-814-865-1876

본 연구의 참여 결정은 다음 장의 연구 개요를 잘 읽으신 후 결정 하시면 됩니다.

연구자 송지훈 드림
Implied Informed Consent Form for Social Science Research
The Pennsylvania State University

Title of Project:
THE INTEGRATIVE DETERMINANTS OF ORGANIZATIONAL PERFORMANCE IMPROVEMENT: THE IMPACTS OF DIMENSIONS OF THE LEARNING ORGANIZATION AND DYNAMIC KNOWLEDGE CREATION PROCESS

Principal Investigator: Ji Hoon Song / 409J Keller Building, The Penn State University, University Park, PA 16802 jus205@psu.edu / 814-863-1303

Advisor: Dr. Judith A. Kolb / 401A Keller Building The Penn State University, University Park, PA 16802 jak18@psu.edu / 814-863-3858

1. Purpose of the Study: The purpose of this research is to examine concepts of a learning organization and knowledge creation practices, which may positively improve organizational performance.

2. Procedures to be followed: You will be asked to take an online survey, which has five parts: 1-Learning organization concepts (21 items); 2-Knowledge creation practices (23 items); 3-Performance improvement (12 items); 4-demographic questions (5 items); and 5-Short answer questions (3 items).

3. Discomforts and Risks: There are no risks in participating in this research beyond those experienced in everyday life.

4. Benefits: The benefit of participation of your company and participants is to receive a summary of the results if your company and any individuals want to. Based on the research results, society will recognize the importance of supportive learning-related factors in a business organization, and also will recognize the importance of the human-based knowledge creation systems.

5. Duration/Time: It will take about 30 to 35 minutes to complete the survey.

6. Statement of Confidentiality: Your participation in this research is confidential. The survey does not ask for any information that would identify to whom responses belong. The following may review and copy records related to this research: The Office of Human
Research Protections in the U.S. Department of Health and Human Services, Penn State University’s Social Science Institutional Review Board, and Penn State University’s Office for Research Protections. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared because your name is in no way linked to your responses. Your confidentiality will be kept to the degree permitted by the technology used. No guarantees can be made regarding the interception of data sent via the Internet by any third parties. Employers will NOT have access to any individual responses.

7. **Right to Ask Questions:** Contact Ji Hoon Song at 1-(949) 533-5102 with questions, complaints or concerns about the research. You can also call this number if you feel this study has harmed you. If you have questions about your rights as a research participant, or you have concerns or general questions about the research, contact The Pennsylvania State University’s Office for Research Protections at (814) 865-1775.

8. **Payment for participation:** There will be no financial compensation for participating in this study.

9. **Voluntary Participation:** Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer. Refusal to take part in or withdrawing from this study will involve no penalty or loss of benefits you would receive otherwise.

You must be 18 years of age or older to take part in this research study.

Completion and return of the survey implies that you have read the information in this form and consent to take part in the research.

**If you agree to participate in this research click on “I Agree” button, and you will precede the survey on the next page.**

Your voluntary participation in the research project would imply your informed consent to participate. Please print a copy of this form for your records or future reference.
사회과학 연구를 위한 연구 지원 동의서
펜실베이니아 주립대학교

연구 제목:
조직의 성과 향상을 위한 복합적 영향력에 관한 연구: 학습 조직 문화와 조직의 지식 창출 과정에 미치는 복합적 영향력에 대한 관계 분석

연구자: 송지훈
미국 펜실베이니아 주립대학, 409 Keller 빌딩
jus205@psu.edu / 814-863-1303 / 949-533-5102 (미국)

논문 지도 교수: Dr. Judith A. Kolb / 301A Keller 빌딩
미국 펜실베이니아 주립대학, 301A Keller 빌딩
jak18@psu.edu / 814-863-3858 (미국)

1. 연구목적: 본 연구의 목적은 조직의 성과 향상을 위한 학습 조직 문화와 조직의 지식 창출 과정의 복합적 영향 관계를 규명하기 위함입니다.

2. 연구 진행: 귀하는 귀사의 온라인 Intra-net을 통해 설문 참여하시게 됩니다. 본 설문은 5 부분의 영역으로 구성되어 있습니다: 1 ~ 21개의 문항을 통한 학습 조직 문화 진단; 2 ~ 23개의 문항을 통한 조직 내 지식 창출 과정에 대한 진단; 3 ~ 12 문항을 통한 조직의 성과 향상 정도에 관한 진단; 4 ~ 5문항의 일반적인 개인 정보; 그리고 5 ~ 3문항의 부가적인 주관적 응답

3. 설문 참여 과정 중 위험 요소: 본 연구 참여에 있어서, 어떠한 위험 요소도 없을을 알려 드리며, 일과 시간중에 참여 하실 수 있습니다.

4. 연구를 통한 혜택: 본 연구의 결과는 요청에 의해 귀하 혹은 귀사로 전달 되어집니다. 본 연구의 결과를 통해 귀사는 조직의 성과 향상을 위한 학습 조직 문화의 중요성과, 조직 내의 협력을 통한 지식 창출과정의 영향 관계를 알아 볼 수 있으며, 본 연구의 긍정적인 결과는 귀사의 학습 조직 문화 형성과 조직내의 지식 창출 시스템을 재 규명 해 보실 수 있습니다.

5. 소요시간: 본 연구는 약 30분에서 35분 정도가 소요됩니다.

6. 의문성과 개인정보 보호: 본 연구의 참여에 있어서 개인정보의 관리는 매우 중요 합니다. 본 설문 응답은 익명으로 보호 됩니다. 본 설문에 대한 개인정보 보호는 The Office of Human Research Protections in the U.S. Department of Health and Human Services, Penn State University’s Social Science Institutional Review Board, and Penn State University’s Office for Research
Protections 의해 검토 / 확인 절차를 거칠 수 있습니다. 본 연구 결과의 발표와 논문 개재시에는 개인 정보는 모두 삭제 되어 진행 됩니다. 또한 귀하의 응답은 철저하게 보안 유지 등을 알려 드리고, 연구자 외에 누구도 응답 결과를 열람 할 수 없습니다. 마지막으로 귀하의 회사는 응답에 대한 접근이 불가 함을 알려 드립니다.

7. 문의 사항에 대한 연락: 본 연구에 대한 모든 문의 사항은 연구자: 송지훈 (jus205@psu.edu) 로 문의가 가능 하며, 또한 펜실베니아 주립대학 사회과학 연구 관리 사무소: The Pennsylvania State University’s Office for Research Protections at (814) 865-1775 로도 문의가 가능 할을 알려 드립니다.

8. 연구 참여에 대한 보상: 본 연구의 참여는 자발적이며, 참여에 대한 어떤 금전적 보상도 없음을 알려 드립니다.

9. 연구 참여: 본 연구 참여는 자발적인 의사 결정에 의해 이루어 지며, 참여 중에도 언제든지 응답을 중단 할 수 있으며, 그로 인한 불이익은 발생 하지 않음을 알려 드립니다.

본 연구의 참여를 위해 귀하는 반드시 18세 이상의 성인이어야 합니다.

본 연구 계획 / 참여 동의서를 읽으시고, 참여를 원하시면, 연구에 참여 하실 수 있습니다.

마지막으로, 연구 참여를 원하시면, 아래의 [동의] 버튼을 누르시면, 설문 응답을 시작하실 수 있습니다.

귀하의 연구 참여는 자발적인 결정에 의해 이루어집니다. 또한 귀하의 기록을 위해 본 페이지를 프린트 하실 수 있습니다.
Date: January 22, 2008

From: Jacqueline K. Gardner, Compliance Coordinator

To: Ji H. Song

Subject: Results of Review of Proposal - Expedited (IRB #27113)

Approval Expiration Date: December 10, 2008


The Social Science Institutional Review Board (IRB) has reviewed and approved your proposal for use of human participants in your research. By accepting this decision, you agree to obtain prior approval from the IRB for any changes to your study. Unanticipated participant events that are encountered during the conduct of this research must be reported in a timely fashion.

COMMENT: (1) Please use the attached documents for translation into Korean and (2) Please provide documentation from someone in a leadership position that permission was granted to conduct the approved research activities at Samsung.

Enclosed is/are the dated, IRB-approved informed consent(s) to be used when recruiting participants for this research. Participants must receive a copy of the approved informed consent form to keep for their records.

If signed consent is obtained, the principal investigator is expected to maintain the original signed consent forms along with the IRB research records for this research at least three (3) years after termination of IRB approval. For projects that involve protected health information (PHI) and are regulated by HIPAA, records are to be maintained for six (6) years. The principal investigator must determine and adhere to additional requirements established by the FDA and any outside sponsors.

If this study will extend beyond the above noted approval expiration date, the principal investigator must submit a completed Continuing Progress Report to the Office for Research Protections (ORP) to request renewed approval for this research.

On behalf of the IRB and the University, thank you for your efforts to conduct your research in compliance with the federal regulations that have been established for the protection of human participants.

Please Note: The ORP encourages you to subscribe to the ORP listserv for protocol and research-related information. Send a blank email to: L-ORP-Research-L-subscribe-request@lists.psu.edu

JKG/jkg
Enclosure
cc: Judith A. Kolb
From: jkg10@rtto.psu.edu

Subject: Approval Notification for "The Integrative Determinants of Organizational Performance Improvement: The Impacts of Dimensions of the Learning Organization and Dynamic Knowledge Creation Process" (IRB#27713)

Date: January 22, 2008 12:14:32 PM EST
To: jus205@psu.edu, jak18@psu.edu

The above referenced study has been approved. You may begin your research study.

Attached please find:
- The formal approval letter on PSU letterhead (customsearch.rtf)
- The dated, IRB-approved informed consent form(s) to be used when enrolling participants in this research study, if applicable.

THIS IS THE ONLY APPROVAL NOTIFICATION YOU WILL RECEIVE. HARD COPIES OF THESE MATERIALS WILL NO LONGER BE SENT.

Please print out these documents in order to have copies for your records.

If a funding source requires a signature on the approval letter, please do not hesitate to contact me.

Thank you,

Jackie
Appendix D:
Permission Letters for Using the Instrument, the Dimensions of the Learning Organization Questionnaires (DLOQ)
We are delighted to grant you permission to use the instrument. It's too bad that you have already done this work since one of Dr. Marsick's students, Young Saing Kim, had already one that. It will be interesting to see whether or not your data and his agree.

I'd like to see the articles you mention below if you could send us a copy.

Many thanks,

--
Karen E. Watkins
Associate Dean for Research and External Affairs
College of Education
The University of Georgia
G10 Aderhold Hall
Athens, GA 30602
W 706-542-4355
F 706-542-8125
http://www.coe.uga.edu/adrresearch/
Hello Ji Hoon Song:

We would be pleased to give you permission for the use of the DLOQ in your research without charge.

We would appreciate your sending us information about the results for our records.

It was a pleasure to meet you at AHRD. I am delighted your work is being published by IJTD and hope that the version under review for HRDQ also meets with success. Best of luck.

Regards,
Victoria Marsick

Victoria J. Marsick
Co-Director, J.M. Huber Institute for Learning in Organizations

Teachers College
525 West 120th Street (207 Main Hall)
New York, NY 10027
USA

Email: <marsick@xchange.tc.columbia.edu>

Tel: 212-678-3754--
JI HOON,

I am Columbus for the 2006 AHRD conference now. Here are two files with the DLOQ instrument, one is the old version and the other is a newer version with some edits. If you decide to use the instrument, please keep me informed about your study. Good luck.

Baiyin Yang, Ph.D.
Associate Professor
Human Resource Development and Adult Education
University of Minnesota
1954 Buford Avenue, Room 420E
St. Paul, MN 55108
Tel: 612-625-6265
Fax: 612-624-4720
E-mail: YinYang@umn.edu
http://education.umn.edu/WHRE/Faculty/YangB.html
VITA
Ji Hoon Song

Assistant Professor                 July 2008 ~ present
School of Teaching and Curriculum Leadership, Oklahoma State University, Still Water

EDUCATION

- Doctor of Philosophy (Ph.D.) August 2008  
  Training and Human Resource, Workforce Education and Development Program, Dept. of Learning and Performance Systems, The Pennsylvania State University, University Park

- Master of Science (M.S.) August 2005  
  Training and Human Resource, Workforce Education and Development Program, Dept. of Learning and Performance Systems, The Pennsylvania State University, University Park

- Bachelor of Arts (B.A.) February 2004  
  Dept. of Educational Technology, College of Education, Han Yang University, Seoul, Korea

HONORS & AWARDS

- Outstanding research paper presentation (1st place): The annual conference of Career Technical Education Research Conference (Dec. 2005), Kansas City, MO.


- Student Leadership Award: Division of Student Affairs, The Pennsylvania State University (Dec. 2006)

SELECTED PUBLICATIONS


