

Full Length Research Paper

Relationships among organizational innovation, learning and knowledge management in the information technology industry

Mei Liang Chen¹* and Kuang Jung Chen²

¹Department of International Business, Hsin Sheng College of Medical Care and Management, Taiwan. ²Department of Business Administration, Chihlee Institute of Technology, Taiwan.

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Knowledge is the most important management elements in business administration besides factors of production such as labor and capital. Challenge faced by high-tech industry in the era of knowledge economy is how to grasp and use knowledge. Only knowledge creates innovative thoughts. Goodness and badness of organizational knowledge is often closely related to organizational learning. Organizational knowledge is prerequisite and outcome of organizational knowledge shall be a niche for technology industry to survive. Innovation will be an essential principle for growth of enterprise, and meanwhile learning is a management mission for sustainable development of organization. The study investigates effect of organizational innovation and learning on knowledge management in the information technology industry. Characteristic of knowledge is the influential extraneous variable between organizational learning and knowledge management to explore the effect that of on knowledge management and organizational performance.

Key words: Organizational innovation, organizational learning, knowledge management, IT industry.

INTRODUCTION

The human is entering a knowledge-based society. Knowledge is the only source of advantage that will replace capital, land and labor. Technology has become a key factor for national economic growth; high-tech industry is even a mainstream in global industry develop-ment, which has knowledge-intensive and technology-intensive features in addition to sharp competition, short product life cycle and emphasis on innovation. To stay undefeated in a global competition, knowledge ought to be a niche for technology industry to survive; at the same time, innovation will be an essential principle for growth of enterprise. Therefore, gaining knowledge required, mas-tering and using it, plus development and management of matters inside and outside of an organization will be the key factors for competitive advantage. Enterprise and organization face the challenge of continuous innovation,

So establishment, protection and application of knowledge relevant to innovation become an important topic for existence and development of the enterprises of the time. Organizational innovation turns more and more essential for technology industry to exist and grow. Thus, how to fully use resource inside and outside of company to assist its research and development division in enhan-cing the speed and extent of innovation that advances dissemination and knowledge in organization, and to share and create new knowledge to achieve innovation will be a major task for high-tech industry in the new century.

Knowledge management has been the only way for a person or enterprise to stand out and maintain competitive advantage. Organizational learning, an extension of knowledge management developed by enterprise, is a long process that gains knowledge and improves performance. Goodness and badness of organizational knowledge is often closely related to organizational learning. On the other hand, organizational knowledge is

^{*}Corresponding author. E-mail: chrysanth2@hotmail.com.

prerequisite of organizational learning and of it is the result of the latter (Huang et al., 2007). Organizational learning stresses management of learning process while knowledge management emphasizes establishment and application of knowledge (Huang et al., 2007). As there is a complicated interaction between them, it is necessary to discuss organizational learning when knowledge management is studied. Accordingly, information and electronics manufacturers at the science parks in Northern Taiwan are selected as the empirical subject to investigate correlation among the three concepts including organizational innovation, organizational learning and knowledge management. Specifically, the study discusses (1) the relation between organizational innovation organizational learning and knowledge management; (2) the interference of knowledge characteristic on the effect of organizational learning on knowledge management; and (3) the relation between knowledge management and organizational performance.

Literature review

Organizational innovation

Lin (2001) indicated enterprise gains competitive advantage through innovations such as new technology and working in a new way. Huang (2000), in his research in influence of company's innovative ability on product research and development, defined ability of innovation as "overall ability to update knowledge in organization which is seen from factors including individual, group, output and structure." He held that organizational innovation is not a unilateral use of technical capability, managerial ability or learning-based organization (learning capacity), but an overall operation and performance of each ability of organization. Hence, for innovative dimensions of ability, comprehensive presentation of technical capability, managerial ability and learning capacity in organization should be taken into consideration. Therefore, consideration of entire system is necessary for innovation; that is, points above should be combined. Tsai (1997) was of the opinion that when organization faces rapidly changed environment, innovative ability becomes its major reliance to maintain competitive advantage. However, inventory of organization innovativeness (IOI) is guite tough. Not only should such objective factor as innovation output rate be considered, but commitment of senior leaders in organization and organizational culture are one of main decisive factors for IOI.

From the perspectives of scholars above, it is known that innovative ability of organization is not just limited to technological performance of enterprise; such factors concerning business operation as organizational culture, management and learning atmosphere should be included

as well. The study plans to adopt the scholar Damanpour's (1991) view to investigate organizational innovation of enterprise, and thinks organizational innovation comprise two dimensions "technological innovation" and "managerial innovation" which interact and have comprehensive influence on organizational According to Damanpour's (1991)performance. conclusion on theory of organizational innovation, the dual-core model is more accepted and adopted by scholars. Damanpour and Evan (1984) indicated that although managerial innovation does not often appear or is not easily seen compared with technological innovation, both have the same impact on organizational performance and complement each other.

Organizational Learning

The concept of organizational learning has been established for years, but many scholars from various angles in research hold different opinions about its definition and development. Some scholars adopt "instrumentalism", "structuralism", "concept of culture-society" and "cognitive model". Shrivastava (1983) integrated viewpoints of many scholars and defined organizational learning as a form of adaptation and information processing - a theory-in-use development in organization as well as institutionalization of organizational experience. The scholar Shrivastava (1993) investigated organizational learning from four angles: 1. Adaptive learning; 2. Hypothetic sharing; 3. Development of knowledge base; 4. Effect of institutio-nalization of experience. Dodgeson (1993) indicated that the organizational learning creates and provides knowledge and conventional practice of company activity which are combined with primary organizational culture. Garvin (1993) pointed out enterprise must review and systematically evaluate experiences of success and failure, and record lessons learned which are then open to all employees for learning. This is the organizational learning that learns past history. In addition, he believed organizational learning is a process that organization creates, acquires and diffuses knowledge. Three scholars Nevis, DiBella, and Gouid (1995) integrated the process of organizational learning into three phases containing knowledge acquisition, knowledge sharing and use of knowledge. Accordingly, it is known that scholars interpret the concept of organizational learning mainly from its process and result. In a word, organizational learning is a chronic improvement relevant to knowledge acquisition and advancement in performance. It is also an extension of knowledge management developed by enterprise. Enterprise sets up knowledge base to store, acquire and diffuse knowledge. Organizational learning also implies knowledge digestion and consideration that with the new knowledge adapts to new environment and amends

improper behavior.

Knowledge management

Spek and Spijkervet (1967) thought knowledge management contains four basic activities: knowledge creation, knowledge storage, knowledge diffusion and knowledge retrieval. The knowledge refinery contains five including acquisition, refinement, storage, phases retrieval, and presentation. According to the five phases, it is known that knowledge platform is created and updated through acquisition, refinement and storage; phases such as retrieval, distribution and presentation are different perspectives obtained from the knowledge refinery. Sarvary (1999) said knowledge management is a business process when enterprise creates and uses organizational knowledge or gathers knowledge, which involves three procedures: organizational learning, knowledge production and knowledge distribution. According to Lin (2001), the so-called knowledge management is to manage knowledge as property. Knowledge-related activities that effectively enhance property value such as inventory, evaluation, supervision, planning, acquisition, learning, circulation, integration, protection and innovation are knowledge management. Shie (2001) defines the key concept of knowledge management in organization as acquisition, creation, accumulation and diffusion of knowledge.

The acquisition of knowledge aims to extend organizational knowledge, so absorptive capability of organization is vital for creation, diffusion and accumulation of knowledge. Helleloid and Simonin (1994) believed organization obtains knowledge-based resource from outside through external assistance in internal development. They also indicated efficient organizational learning relies on the following four steps: development, processing, storage and acquisition; the latter three procedures are directly influenced by development method which is categorized into five types such as full internal development, external assistance in internal development, open market purchase, inter -organization collaboration and mergers and acquisitions. Nonaka and Takeuchi (1995) proposed a model of knowledge creation which starts from individual and gradually to group, organization and finally to outside of organization. In the process, there are continuous knowledge integrations including socialization, externalization, combination and internalization that ceaselessly interact and form a knowledge spiral. Huang et al. (2007) indicated four settings suitable for knowledge creation in organization: solve problem with creativity, carry out and integrate new technological processes and tools, with high operational efficiency in internal organization, constantly experiment and develop prototype, as well as introduce and absorb new expertise from outside. In other words, the process

of knowledge creation emphasizes development of each phase, and even has to place importance on settingmolding to better the effect of knowledge creation.

Managerial activity that organizational knowledge is effectively and efficiently spread and diffused to each division for knowledge sharing is called knowledge diffusion. Tarn et al. (1999) thought enterprise can diffuse individual knowledge to other members and further to entire organization. Grant (1996) believed degree of knowledge diffusion has something to do with amount and level of common knowledge. Much common knowledge with higher level makes diffusion easier. After acquisition, creation and diffusion of knowledge, organization must accumulate knowledge to form organizational memory that facilitates reuse of organizational knowledge and advances knowledge leverage inside of organization. Tsai (1997) supposed that enterprise normally adopts the following ways during accumulation of core resources:

(1) Knowledge acquisition: By making written document or file gradually transfer intangible property or personal ability to public information integrated into daily operation of organization.

(2) Knowledge diffusion: Through task force, group cooperation, or apprenticeship, enterprise gradually diffuses personal knowledge to participative members and all organizations. Some companies formalize knowledge diffusion through internal training.

(3) Institution: It is valuable that enterprise has resources, but these resources are often distributed over different divisions.

Resources that are not systematically managed lose their due value, but enterprise can designate personnel or establish responsible institution to manage these resources.

Characteristic of knowledge

The research integrates concepts of many scholars such as Teece (1996), Nonaka and Takeuchi (1995), and Li et al. (1997) and concludes five characteristics of knowledge - knowledge variation, knowledge modularity, path dependence of knowledge, knowledge explicitness and knowledge complexity. Different knowledge characteristics have distinct impacts on knowledge acquisition, creation, diffusion and accumulation of organizational knowledge management. lansiti (1995) after study found variation of technological knowledge affects capability of external organizational integration. When knowledge varies slower, organization emphasizes integration of customer knowledge more; when technological knowledge varies faster, organization will lay particular stress on integration of technological knowledge.



Figure 1. Research framework.

Li (2000) proposed manufacturer with faster knowledge variation tends to impart experiences among personnel and participate in different project trainings for knowledge accumulation and diffusion. Cohen and Levinthal (1990) posed good innovation performance has something to do with technological path dependence. When organization had the research and development as well as investment in such technology, internal innovation is easily achieved after company absorbs external capability. Lo et al. knowledge concerning (2002) said, absorption, development project with low path dependence relies more on external resource; others, on the contrary, count more on internal organizational resource. Nonaka and Takeuchi (1995) and Li (1997) indicated in their study that under higher technological explicitness, knowledge absorption is mainly from documentation; under higher tacitness of technology, knowledge absorption is chiefly from human. In terms of knowledge accumulation, higher technological knowledge explicitness of makes accumulation explicit (e.g. technology showcase) while under higher tacitness of technological knowledge, knowledge accumulation is mainly from personnel's experience (e.g. apprenticeship).

RESEARCH METHODOLOGY

Research framework

The research purports to investigate effect of organization innovation and learning in information and electronics industry on knowledge management. Knowledge characteristic is chosen as the influential variable between organizational learning and knowledge management to explore its strength of effect on knowledge management and further discuss interaction between knowledge management and organizational performance. The research framework is shown as Figure 1.

Questionnaires

The research work in the study is questionnaire. The scale of questionnaire is designed based on the research purposes, which is mainly divided into four parts. The first part is organizational innovation, the scale of which refers to the scale developed by Tsai (1997) which attempts to define organizational innovation with five managerial functions to cover organizational activities. The scale involving two dimensions of organizational innovation such as "managerial innovation" and "technological innovation" contains 22 items.

The second part is the scale of organizational learning. The study uses the scale developed by two groups of scholars Hult and Ferrell (1997) and Sinkula et.al. (1997) due to its intact and comprehensive measurement of organizational learning, for measuring dimensions of organizational learning. Subject to three dimensions including "Learning commitment", "Sharing of prospect" and "Open-mindedness", the scale is composed of 19 variables.

The third part is the scale of knowledge characteristic. This research refers to the concept in Li (1997) study and categorizes knowledge characteristic into five dimensions including variation, modularity, path dependence, explicitness and complexity as well as 17 items. Respondents are requested to circle a number from 1 to 5 based on their relative agreement on organizational innovation, organizational learning and knowledge characteristic.

The fourth part is the scale of knowledge management. As scholars have not specifically defined knowledge management and the method for its measurement, the research, on the basis of its purpose, by referring to classification and measurement of knowledge management carried out by Nonaka and Takeuchi (1995), classifies organizational knowledge management into four dimensions containing acquisition, innovation, diffusion and accumulation as well as 30 items to measure awareness and emphasis on executives on knowledge management. Likert scale is used and respondents are requested to circle a number from 1 to 5, based on their awareness and emphasis on knowledge management.

The fifth part is the scale of organizational performance which in accordance with the research purpose refers to 12 variables in terms of short- and long-term business performance developed by Govindarajan (1984) such as operating income, return on investment, sales growth and research and development result. Respondents are requested, in light of their relative satisfaction with organizational performance, to circle a proper number from the Likert scale.

As to data collection, the information and electronics industry in business directory compiled by the northern Taiwan science park administration is selected as sample of the research. The research categorizes the information and electronics industry in business directory compiled by the Administrations of Hsinchu, Jhunan and Neihu science parks into four groups (integrated circuit, photonics, computer peripheral and communications industry) to do questionnaire survey, data collected from which is the source for verifying the hypothesis in this study and the research purpose.

The study adopts different measurements which particularly include reliability analysis to examine internal consistency of each variable with Cronbach's coefficient. With basic information of manufacturers collected from returned questionnaires, descriptive statistics is utilized to document frequency distribution, percentage, mean and standard deviation for each variable to understand sample distribution. Pearson correlation is used to analyze relations and interactions among variables such as organizational innovation, organizational learning, organizational characteristic, knowledge management and organizational performance. Analysis of variance is finally applied to analyze influence of characteristic of extraneous variable.

RESULTS AND ANALYSIS

Information and electronics manufacturers at the science parks in northern Taiwan are the object of study. According to online business directory of Hsinchu Science Park, as of the end of 2009, there are 393 information and electronics manufacturers in the science parks. After contact, 200 manufacturers in total as samples that meet the research purpose accept cooperation. One questionnaire is issued to the management level of each participative manufacturer. Questionnaire survey on managers of 200 manufacturers is done through inperson interview or mailing.

Total 200 questionnaires are issued in the study and 163 questionnaires are returned. Valid questionnaires are 142 with 71% of valid return rate. The participative manufacturers have been established for more than four years and most are 10 years (approximately account for 47.2%). Most enterprises have 501-1000 employees (32.4%) and some, in the next place, have less than 300 employees (29.6%). Age of respondent managers is chiefly between 37 and 50 (67.3%).

Variables in the study particularly include knowledge management, organizational innovation, organizational learning, knowledge characteristic and organizational performance. Results of descriptive statistics and reliability analysis are shown in Table 1. As to reliability analysis, the research adopts coefficient created by L. J. Cronbach and the principle proposed by Nunnally (1978) that Cronbach's value must be higher than 0.70 to test reliability of the questionnaire. It is found the values of dimensions such as organizational learning and organizational performance are over 0.80 and the values of knowledge management, organizational innova-tion and knowledge characteristic are higher than 0.70, which is in compliance with the judgment principle of Nunnally (1978) showing an appropriate internal consistency of the questionnaire.

Concerning the research dimensions, the scale of organizational innovation shows the means of managerial innovation and technological innovation are about 3.8 indicating 2 types of organizational innovation are generally adopted by the manufacturers of science parks without extremity. For organizational learning, the means of learning commitment, sharing of prospect and openmindedness are over 3.6; learning commitment, in particular, is the highest. It is noticeable that managers in information industry value learning. As to knowledge characteristic, it is shown that most information manufacturers place importance on path independence and variation, the means of which are over 4.0; explicitness and complexity of knowledge are less emphasized comparatively. In terms of knowledge management including acquisition, innovation, diffusion and accumulation, the mean of knowledge acquisition is relatively high at 4.15 while accumulation is only at 3.43 appearing to be improved. For organizational performance, the table demonstrates the means of long-term and short- term performances are at 3.23. The performance of the manufacturers is just acceptable so it is apparent that advancement in long- and short-term performances is the dimension that technology suppliers shall strive toward.

The research through correlation analysis and analysis of variance understands relationship among dimensions in the framework and tests fitness of each hypothesis in Table 1. Descriptive statistics and reliability analysis on variables studied.

Dimension	Minimum		Maxii	num	Mean		Standard deviation		Cronbach's	
Organizational innovation										
1. Managerial innovation	2.87		4.82		3.90		0.71		0.76	
2. Technological innovation	2.5	1	5.3	30	3.82		0.74		0.8	3
Organizational learning										
1. Learning commitment	3.4	3	5.2	21	4.3	37	0.7	6	0.8	3
2. Sharing of prospect	2.6	3	5.1	1	3.9	92	0.6	3	0.8	2
3. Open- mindedness	2.9	3	4.8	32	3.6	63	0.6	3	0.8	9
Knowledge menegement	Awaranaaa	Emphasia	Awaranaaa	Emphasia	Awaranaaa	Emphasia	Awaranaaa	Emphasia	Awaranaaa	Emphania
	Awareness	Emphasis	Awareness	Emphasis	Awareness		Awareness		Awareness	
1. Acquisition	2.53	2.83	5.00	5.00	4.15	4.13	0.62	0.47	0.86	0.83
2. Creation	1.82	1.82	5.10	5.10	3.74	3.73	0.73	0.74	0.77	0.76
3. Diffusion	1.83	1.83	4.23	5.10	3.67	3.43	0.61	0.63	0.87	0.85
4. Accumulation	1.10	1.10	5.00	5.00	3.43	3.63	0.74	0.67	0.83	0.87
Knowledge characteristic										
1. Variation	3.1	0	5.0	00	4.1	0	0.6	1	0.7	8
2. Modularity	2.3	7	5.00		3.87		0.57		0.77	
3. Path dependence	3.2	0	5.00		4.20		0.57		0.76	
4. Explicitness	1.00		5.00		3.63		0.72		0.89	
5. Complexity	2.31		5.00		3.66		0.49		0.82	
Organizational performance										
1. Short-term	1.2	0	5.0	00	3.2	23	.77		.92	
2. Long-term	1.2	0	5.0	00	3.2	23	.88		.87	

the research.

(1) Correlation among organizational innovation, organizational learning and knowledge management: A correlation analysis is done to understand the correlation between organizational innovation and knowledge management (acquisition, creation, diffusion and accumulation of knowledge). Table 4 has the results. Through correlation analysis as shown in Table 2, it is found that both two sorts of organizational innovation have positive and significant influence on four activities of knowledge management (p<0.05). That is, different organizational innovations help acquisition, cre-ation, diffusion and accumulation of knowledge. Table 4 demonstrates correlation analysis on activities of knowledge management and organizational innovation. Regarding correlation between organizational learning and knowledge management, it is seen from Table 3 that learning commitment and openmindedness significantly and positively affect acquisition, creation, diffusion and accumulation of knowledge. However, there is an insignificant positive correlation between sharing of prospect and the said four activities. This may be due to changeful nature of technology industry so

Table 2. Correlation analy	vsis on activities	of knowledge m	nanagement an	nd organizational	innovation.

Emphasis	Acquisition	Creation	Diffusion	Accumulation
Managarial innovation	0.31**	0.42***	0.77***	0.76***
Managenal Innovation	0.64**	0.57**	0.62***	0.57***
Technological innovation	0.42***	0.67***	0.32**	0.55***
	0.54***	0.76***	0.65***	0.67***

* indicates p<0.1, ** indicates p<0.05, *** indicates p<0.01. Note: Values at the upper row are awareness and those at the lower row are emphasis.

Table 3. Correlation analysis on activities of knowledge management and organizational learning.

Awareness Emphasis	Learning commitment	Sharing of prospect	Open-mindedness
Acquisition	0.32***	0.54***	0.28***
	0.46***	0.37***	0.42***
Creation	0.28***	0.40***	0.27***
	0.38***	0.31***	0.43***
Diffusion	0.36***	0.37***	0.37***
	0.31***	0.35***	0.42***
Accumulation	0.35***	0.06	0.31***
	0.42***	0.07	0.41***

*indicates p<0.1, ** indicates p<0.05, *** indicates p<.01. Note: Values at the upper row are awareness and those at the lower row are emphasis.

employees are not easy to have confirmed plan for future. Therefore, knowledge accumulation performed in company is not obviously helpful.

(2) Correlation between knowledge characteristic and knowledge management: A correlation analysis is done to know correlation between dimensions of knowledge management and knowledge characteristic, the results of which are demonstrated in Table 4. Through correlation analysis as shown in the table, it is found that five knowledge characteristics including variation, modularity, path independence, explicitness and complexity have an apparent positive effect on four activities of knowledge management (awareness and emphasis) containing acquisition, creation, diffusion and accumulation (p<0.05). That is to say, classification of knowledge characteristic assists organization in carrying out activities of knowledge management.

(3) Correlation between knowledge management and organizational performance: A correlation analysis is done to know correlation between knowledge management and dimensions of organizational

performance (short-term and long-term performances), the results of which are demonstrated in Table 5. Through correlation analysis as shown in the table, it is seen that four activities of knowledge management have an apparent positive impact on short-term and long-term performances (p<0.05). That is to say, activities related to knowledge management carried out in organization are helpful to enhance company's growth rate and operational performance.

(4) Interference of knowledge characteristic with impact of organizational learning on knowledge management: The research uses analysis of variance to understand influence of organizational learning and knowledge characteristics (variation, modularity, path independence, explicitness and complexity) on knowledge management, and obtains the results as indicated in Table 6. With regard to knowledge management, 4 groups of significant correlation are found in Table 6 after data arrangement. Firstly, learning commitment has an obvious influence on acquisition, creation and accumulation in organization (p<0.1); knowledge variation significantly affect knowledge

Awareness Emphasis	Awareness Variation Modularity		Path independence	Explicitness	Complexity	
Acquisition	0.41***	0.56***	0.56***	0.06	0.23***	
Acquisition	0.40***	0.42***	0.04	0.07	0.23***	
Ore etien	0.47***	0.48***	0.64***	0.59***	0.22***	
Creation	0.31***	0.34***	0.53***	0.46***	0.23***	
Diffusion	0.38***	0.04	0.65***	0.60***	0.12***	
Diffusion	0.47***	0.33***	0.57***.	0.48***	0.26***	
	0.51***	0.68***	0.48***	0.58***	0.29***	
Accumulation	0.42***	0.53***	0.38***	0.56***	0.33***	

Table 4. Correlation analysis on knowledge management and knowledge characteristic

* indicates p<0.1, ** indicates p<0.05, *** indicates p<.01. Note: Values at the upper row are awareness and those at the lower row are emphasis.

Table 5. Correlation analysis on knowledge management and organizational performance.

Awareness Emphasis	Acquisition	Creation	Diffusion	Accumulation
Short-term performance	0.38***	0.25**	0.47***	0.58***
	0.32**	0.26**	0.33***	0.48***
Long-term performance	0.56***	0.46***	0.56***	0.60***
	0.56***	0.33***	0.31***	0.47***

* indicates p<0.1, ** indicates p<0.05, *** indicates p<0.01. Note: Values at the upper row are awareness and those at the lower row are emphasis.

acquisition and creation (p<0.1). That is, learning commitment and knowledge variation have different and significant impacts on knowledge acquisition and creation. Next, learning commitment significantly affects knowledge acquisition and accumulation (p<0.1); modularity has a conspicuous effect on knowledge acquisition and accumulation. That is to say, higher level of learning commitment and modularity are more beneficial to acquisition and accumulation of knowledge. Thirdly, sharing of prospect greatly impacts knowledge acquisition and diffusion (p<0.05). Fourthly, open-mindedness has significant influence on knowledge creation and diffusion (p<.05); complexity also has apparent influence on knowledge creation and accumulation (p<0.1). Namely, higher level of open-acquisition and creation (p<0.1). That is, learning commitment and knowledge variation have different and significant impacts on knowledge acquisition and creation. Next, learning commitment significantly affects knowledge acquisition and accumulation (p<0.1); modularity has a conspicuous effect on knowledge acquisition and accumulation. That is to say, higher level of learning commitment and

modularity are more beneficial to acquisition and accumulation of knowledge. Thirdly, sharing of prospect greatly impacts knowledge acquisition and diffusion (p<0.05). Fourthly, open-mindedness has significant influence on knowledge creation and diffusion (p<0.05); complexity also has apparent influence on knowledge creation and accumulation (p<0.1). Namely, higher level of open mindedness and knowledge complexity are more helpful to creation in knowledge management.

Conclusion

The research investigates effect of organizational innovation and learning in information and electronics industry on knowledge management, the result of which can be explained from two parts. For influence of knowledge innovation and learning on knowledge management, the study shows varied methods for organizational learning in technology industry positively affect measures of knowledge management implemented in organization. As to organizational innovation, managerial

Table 6. ANOVA for organizational	learning and knowledge	ge characteristic against	knowledge management.

Veriekle	Acquisition		Crea	Creation		Diffusion		Accumulation	
	F value	p value	F value	p value	F value	p value	F value	p value	
Learning commitment	4.32	0.04**	6.42	0.01***	0.31	0.82	3.62	0.06*	
Variation	7.82	0.05*	7.13	0.00***	5.47	0.66	2.23	0.33	
Learning commitment × Variation	9.12	0.05*	.78	0.05**	0.70	0.83	4.21	0.31	
Learning commitment	5.37	0.00***	4.66	2.56	2.13	0.13	3.42	0.07**	
Modularity	5.12	0.00***	3.62	2.31	1.55	0.20	2.38	0.06*	
Learning commitment × Modularity	4.12	0.00**	4.63	2.61	1.62	0.21	4.13	0.09*	
Sharing of prospect	8.61	0.04**	0.36	0.42	3.18	0.03**	2.13	0.10	
Complexity	0.71	0.74	0.63	0.74	1.53	1.52	1.06	0.30	
Sharing of prospect × Complexity	0.23	0.84	0.31	0.52	0.72	0.72	2.11	0.16	
Open-mindedness	0.47	0.85	2.63	0.01**	4.12	0.03**	1.42	0.43	
Complexity	4.13	0.35	3.12	0.00***	3.13	0.36	4.12	0.09*	
Open-mindedness × Complexity	2.13	0.64	7.23	0.00***	0.87	0.46	2.36	0.30	

* indicates p<.1, ** indicates p<.05, *** indicates p<.01.

and technological innovation offers significant help to acquisition, creation, diffusion and accumulation of knowledge in a company. Besides, promotion of measures related to knowledge management is beneficial to advance operational performance and assists organization in improving long- and short-term performance. Evidently, such issue as comprehensive knowledge management must be valued by technology manufacturer during operation to develop a greater niche for company and organization. Hence, to gain better competitive advantage and organizational performance than other players under sharp global competition and with characteristic of short product life cycle, high-tech manufacturer should rely on its learning ability and employees' identification with its prospect to more efficiently make use of knowledge, technology and capability it has than rivals, and further obtains the best organizational performance through innovation.

Moreover, the influence with of knowledge characteristic. the study finds such knowledge characteristic as variation and learning commitment have diversified effects on knowledge acquisition and creation; such knowledge characteristic as modularity and learning commitment obviously affect activities of knowledge management including acquisition and accumulation. In addition, complexity and open-mindedness help creation relevant to knowledge management. High levels of variation, modularity and complexity in regard to knowledge characteristic, noticeably, avail against influence of organizational learning (learning commitment, sharing of prospect, open-mindedness), advancement of knowledge acquisition, creation and accumulation. Therefore, hightech enterprise should adjust its managerial policy according to its knowledge characteristic and attach importance to acquisition, creation, diffusion and accumulation of various knowledge. Strategic planning regarding constant learning of knowledge necessary and suitable for organization as well as comprehensive sharing and storage system cannot be waited by technology industry.

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