

*Full Length Research Paper*

## **Explanation of knowledge management enabler as a latent variable: A case study of SMEs in Iran**

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Attention to organizational knowledge is important for sustaining competitive advantage for companies. The factors that consider as knowledge management enablers are very important in process of knowledge management, because that can be affecting on knowledge creation processes. The aim of this research is to explain the knowledge management enablers in small and medium size enterprises (SMEs) of Mazandaran province industries and Mines organization using an empirical examination. To this purpose, after extensive studying about literature of knowledge management enablers and selecting standard questionnaire, research team distributed the questionnaire among managers of SMEs. The data was gathered from 300 active SMEs. The results demonstrate the proposed structural equation model have best-fitting comparison with data of real world and show the amount effects of any observed independent variables on latent independent variable (KME). Results showed variables of firm's culture such as collaboration and trust had more effect on structural equation model (SEM) of KME and IT support is not affected as one of knowledge management enablers on SEM of SMEs. Innovation aspect of this article is considering amount of direct and indirect effects of observed variables using SEM of KME as a latent variable. Manager of small and medium size enterprises can use the structural equation to measure KME and ability of their firm in this area.

**Key words:** Iran, explanation, knowledge management enabler, latent variable, small and medium size enterprises.

### **INTRODUCTION**

Knowledge is recognized as an important weapon for sustaining competitive advantage and many companies are beginning to manage organizational knowledge. Various empirical and theoretical evidences have proven knowledge management (KM) to be a key source of competitive advantage and subsequently leading to organizational success (Choy et al., 2006). Therefore, the main aim of this article is the explanation of knowledge management enablers in small and medium size enterprises (SMEs). Knowledge is a commodity to be traded (Gibbons et al., 2000) and needs to be managed (Dodgson, 2000, p. 37). According to Bhatt (2001) knowledge is different from data and information. Data are raw facts and when organized they become information.

Knowledge is meaningful information. They claim that "the most important parts of knowledge cannot be handled as a thing for others" (Scholl et al., 2004). Perhaps the most profound distinction in the study of knowledge has been made between knowledge as a subjective state in individual's minds embedded in organizations and communities– constructivist approach (Davenport and Prusak, 1998, p. 5; Lang, 2001), and knowledge as an objective state of things– objectivist approach (Spender, 1998). This distinction coincides to some extent with that made between tacit and explicit knowledge (Polanyi, 1966; Nonaka, 2002), soft and hard knowledge, background and foreground knowledge (Bhatt, 2001). The proponents of the second view would argue that knowledge management is a conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that strive to improve

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organizational performance (O'Dell and Jackson, 1998, p. 4). According to Blacker (2002, pp. 48-50) knowledge could be embedded in several ways: in brain; in terms of conceptual skills and cognitive abilities; embodied in terms of being action oriented, situational and only partially explicit, linked to individual's senses and physical abilities; in culture; in terms of shared understandings achieved in the process of socialization and acculturation; embedded in systemic routines that include relationships between technologies, roles, formal procedures and emergent routines and encoded in terms of information conveyed by signs and symbols in books, manuals, codes of practice and electronic media. KM is complex because knowledge is intangible and surfaces in a variety of forms (Rowley, 2004). A great deal of the literature review has emphasized the importance of three major and common factors in regards to managing knowledge, that is, enablers, processes and organizational performance (Beckman, 1999; O'Dell and Grayson, 1999). Much of the existing research on knowledge creation focuses on the source and state of knowledge. In fact, the term management control of processes that may be inherently uncontrollable or, at the least, stifled by heavy-handed direction (Krogh et al., 2000). Research is now needed that moves beyond that domain to consider the conditions that catalyst, or facilitate knowledge creation rather than control it. Knowledge management enablers (or effective factors) are the overall organizational activities that positively affect knowledge-creation. They include facilitating relationships and conversations as well as sharing local knowledge across an organization or beyond geographic and cultural borders. Knowledge management enablers can stimulate knowledge creation, protect knowledge, and facilitate the sharing of knowledge in an organization (Lee and Choi, 2003). Stonehouse et al. (2001) point out, that knowledge facilitators are aspects of an organization incorporated in its culture, structure and infrastructure (including information technology). Krogh et al. (2000) identify five knowledge enablers: Instill a knowledge vision, manage conversations, mobilization of knowledge activists, create the right context and globalize local knowledge. In reviewing the literature; one encounters a very broad range of factors, or knowledge management enablers, that possibly influence the success of knowledge management initiatives. They include: culture, leadership, technology, organizational adjustments, evaluation of knowledge management activities and/or knowledge resources, governing/administering knowledge activities and/or knowledge resources, employee motivation and external factors (Holsapple and Joshi, 2000).

One category of KM studies focus on the relationships among knowledge enablers. The emphasis is on the examination of the effect of knowledge enablers. To identify this effect, they have investigated various knowledge enablers such as knowledge management methods, structure, and culture. For example, Bennett

and Gabriel (1999) analyzed a number of knowledge management methods in view of organizational structure, culture, size, and environment. We can claim our study set in this category (Bennett and Gabriel, 1999).

The focus of this paper is the explanation of knowledge management enabler's factors in an empirical examination in SMEs of Mazandaran province in Iran. As we know, the most effective approach to the theoretical and empirical issues of KM would be an interdisciplinary and a multi-disciplinary one. The most pressing and challenging practical problem for the understanding and advancement of KM is to give priority to human factors (Svetlik and Stavrou-Costea, 2007). Therefore, consideration of this factor as knowledge management enablers is important. There are three main aims, which motivate the study. The first, considering direct and indirect effect of knowledge management enablers' variables on latent independent variable as explanation of KME. The second, managers face a dilemma in selecting the most effective knowledge management enablers to solve organizational problems and finally, presenting a structural equation model (SEM) for knowledge management enabler (Figure 1).

## EXPLANATION OF THE HYPOTHESES

This study recognized knowledge enablers as preconditions of knowledge processes (Appleyard, 1996; Hansen, 1999; Szulanski, 1996). Whither, enablers of knowledge help in knowledge creation. Nonaka and Takeuchi (1995) use "enabling conditions for organizational knowledge creation", while Davenport and Prusak (1998) use "conditions contributing to organizational effectiveness by enabling knowledge projects". Instead of conditions, some authors such as Nevis et al. (1995) use terms such as 'action', or activities that facilitate organizational learning and, "facilitate the transfer of knowledge". These enablers and facilitators include a healthy culture, and support infrastructure (Beckman, 1999; Zand, 1997; Quinn et al., 1997); management support and proactive leadership (Davenport, 1996; Beckman, 1999); empowerment of employees (Davenport and Prusak, 1998; Liebowitz and Beckman, 1998); understanding knowledge management as a business strategy; strong communication channels and a commitment to developing and sustaining a climate for learning within the organization (Starbuck, 1997; Liebowitz and Beckman, 1998).

### Organizational culture

Organizational culture is increasingly recognized as a factor in promoting intellectual assets. Culture is defined by Schein (1985) as the, "... basic assumptions and beliefs that are shared by members of an organization,

## Knowledge Management Enablers

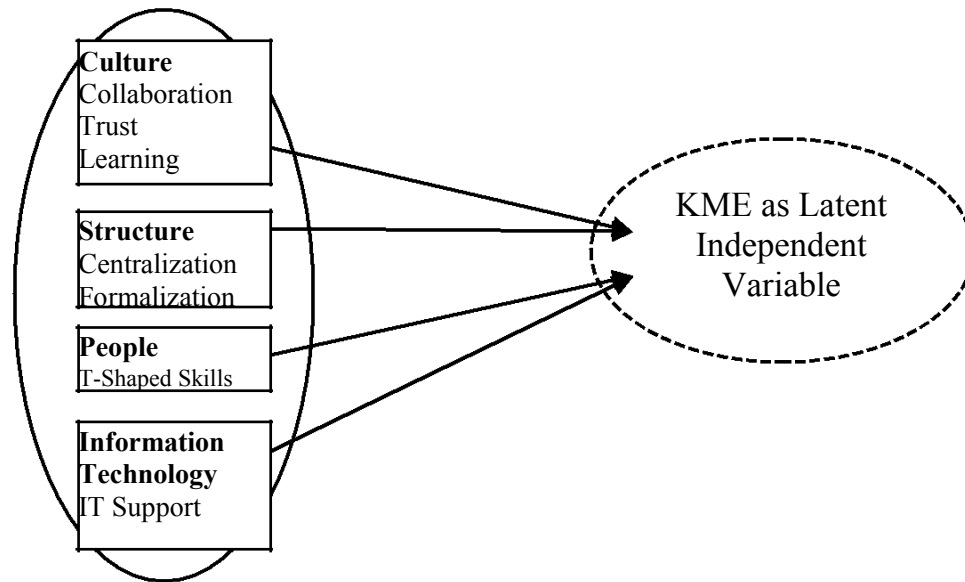


Figure 1. Research model.

that operate unconsciously, and that define in a basic taken-for-granted fashion an organization's view of itself and its environment." This "organizational cognition perspective" is probably the most thoroughly developed view of culture (Berthon et al., 2001). Therefore, an organization's values, principles, norms, unwritten rules and procedures comprise its cultural knowledge resource (Holsapple and Joshi, 2001).

A culture of confidence and trust is required to encourage the application and development of knowledge within an organization (Moffett et al., 2003). This study will focus on trust, collaboration and learning on the basis of the concept of care (Eppler and Sukowski, 2000). Care is a key enabler for organizational relationships (Krogh, 1998).

### Trust

Lee and Choi (2003) identify trust as maintaining reciprocal faith in each other in terms of intentions and behaviors. The presence of a high level of trust can reduce this risk (Nelson and Coopriider, 1996; Roberts, 2000; Scott, 2000). The lack of trust among employees is one of the key barriers against knowledge exchange (Szulanski, 1996). Trust is also critical in a cross-functional or inter-organizational team because with holding information because of a lack of trust can be especially harmful to knowledge creation (Hedlund, 1994; Jarvenpaa and Staples, 2000). Regard the level of trust in the organization as the most important factor affecting

the willingness to share knowledge. The level of trust that exists between the organization, its subunits and its employees greatly influences the amount of knowledge that flows both between individuals and from individuals into the firm's databases, best practices archives and other records (Long and Fahey, 2000). Hence, the decision makers feel that they do not have to protect themselves from their partners' opportunistic behavior.

H<sub>1</sub>: KME as a latent variable is explanatory of trust as one of observed independent variables.

### Collaboration

Zucker et al. (1996) examine the relationship between the collaborative culture and knowledge creation in the biotechnology industry. They confirm the significance of collaborative culture in knowledge creation. Collaborative culture affects knowledge creation through increasing knowledge exchange (Lee and Choi, 2003). It can help organizational members develop a shared understanding about their organization's internal as well as external environments through supportive, reflective and comprehensive communication. External collaboration is also critical for companies that want to stretch the business boundaries and innovate around markets and business models (Stamm, 2004). Mintzberg et al. (1996) suggest that successful collaboration is neither a cerebral activity that can take place in the abstract, nor an interpersonal process that can focus on effect per se. It needs to occur

in context. Therefore, without shared understanding ('shared context') among organizational members, little knowledge is ever created (Hedlund, 1994; Fahey and Prusak, 1998).

H<sub>2</sub>: KME as a latent variable is explanatory of collaboration as one of observed independent variables.

### **Learning**

According to Ingelgard et al. (2002), several scholars as well as industries have stressed the importance of the ability to create an organization capable of learning, that is, the ability to create, use the knowledge and disperse it throughout the organization. (Bhatt, 2000) indicates that accumulated prior knowledge increases the ability to accrue more knowledge and learn subsequent concepts more easily. Because of the higher learning capability of people in organizations, people in these organizations usually refine and recombine knowledge from different sources for viewing interesting and novel patterns, leading to break through discoveries (Nonaka, 1994). Organizational learning culture can directly affect the process of knowledge creation.

H<sub>3</sub>: KME as a latent variable is explanatory of learning as one of observed independent variables

### **Organizational structure**

The organizational structure within an organization may encourage or inhibit knowledge management (Lee and Choi, 2003). Organizational structure should foster solid relationships and effective collaboration. Structure acts not only as a channel for knowledge flows among individuals, but also can provide a platform for changing and improving those flows (Okhuysen and Eisenhardt, 2002). Organizational structure consists of centralization and formalization for the purpose of this study.

### **Centralization**

A decentralization organizational structure has been found to facilitate an environment where employees participate in knowledge building process more spontaneously (Hopper, 1990). Decentralization demands that each employee learns to behave more responsible with regards to making independent work-related decisions that support the organization's interests and not only the employee's (Ortenblad, 2004). In conjunction with this, Cormican and O'Sullivan (2003), point out that decentralization promotes learning and knowledge generation, and enables faster and more effective decision making in dynamic information rich environments. Therefore, decreased centralization in the form of locus of authority

can lead to increased creation of knowledge (Lee and Choi, 2003).

H<sub>4</sub>: KME as a latent variable is explanatory of decentralize structure as one of observed independent variables.

### **Formalization**

Germain and Spears, (1999) point out that written work rules and work policies restrict the free flow of information, limit the discretionary behavior of employees, stifle individual initiative, risk taking behavior, sense of worker empowerment and restrict the range of new ideas, which in turn, may have an inverse relationship on innovative behavior. Formalization may inhibit the flexibility of managers, limiting their time in reading and creatively interpreting the report (Low and Mohr, 2001). Flexibility can accommodate better ways of doing things (Graham and Pizzo, 1996). In conjunction with this, (Wang and Ahmed, 2003), claim that informal structure better depicts actual organizational activities and reflects dynamic interaction that is critical to knowledge creation. Past literature has found that players in informal networks play especially important roles in knowledge creation and transfer (Desouza, 2003).

H<sub>5</sub>: KME as a latent variable is explanatory of informal structure as one of observed independent variables.

### **T-Shaped skills of people**

Successful knowledge management is mainly linked to organizational culture and people (Chase, 1997) for two reasons. First, because learning and sharing knowledge is social activities. They take place among people. Second, practices are complex. To ensure that practices and knowledge not only transfer but, transfer effectively and make a difference, you have to connect people who can and are willing to share the deep, rich, tacit knowledge they have (O'Dell and Grayson, 1999, p.13). People skills in this research model incorporate T - shaped skills, because of the importance of its existence in organizations.

People with T -shaped skills are extremely valuable for knowledge creation since they are able to integrate diverse knowledge assets (LeonardBarton, 1995; Madhavan and Grover, 1998). They have the ability both to combine theoretical and practical knowledge and to see how their branch of knowledge interacts with other branches. Therefore, people with T-shaped skills are able to expand their competence across several functional areas, and hence, create new knowledge (Johannessen et al., 1999; Madhavan and Grover, 1998).

H<sub>6</sub>: KME as a latent variable is explanatory of T-shaped

skills as one of observed independent variables

### Information technology (IT) support

The use of IT capabilities in a cyber environment is advocated to enhance the efficiency of the combination mode of knowledge creation (Nonaka and Conno, 1998). Alavi and Leidner (2001) state that information systems designed for support of collaboration, coordination and communication processes, as a component of the interacting base, can facilitate teamwork and thereby increase an individual's contact with other individuals. Electronic mail and group support systems have been shown to increase the number of weak ties in organizations Pickering and King (1995). IT can support different forms of knowledge transfer, but has mostly been applied to informal, impersonal means (through such venues as Lotus Notes discussion database) and formal, impersonal means, such as knowledge maps or corporate directories (Alavi and Leidner, 2001). Therefore, the researcher claims that IT support plays a critical role in enabling both knowledge creation and transfer.

H<sub>7</sub>: KME as a latent variable is explanatory of information technology support as one of observed independent variables.

Based on the above discussions, the main hypothesis is as follows:

H: The generality of the proposed model and their related variables (Trust, Collaboration and Learning Culture, Decentralize and Informal structure, T-Shaped Skills and Information Technology (IT) Support) are confirmed and has significant fitness in SMEs of Mazandaran province in Iran.

### METHODOLOGY

This study is conducted a standard questionnaire-based survey of middle managers from Iranian small and medium sized enterprises to present the structural equation model of KME in an empirical examination. Samples are selected from active SMEs of Mazandaran province in Iran. The sample is selected randomly with the same probability. A manager of each surveyed firms is asked to respond to the questionnaire. Questionnaires were distributed among 500 middle manager of sample out of 1,500 SMEs. 300 usable responses were received, providing a response rate of 60%. The alpha level selected 0.05 (Lee and Choi, 2003; Saarenket et al., 2003). A multiple-item method was used to construct the questionnaires. Each item was based on a ten point scale, from "very low" to "very high". Questionnaire items for the explanation of the knowledge management enabler, which were used in this study, had been validated. Because in this research the items of Nonaka and Takeuchi's model take from Lee and Choi's (2003) study and be localized, then two professors and two doctoral candidates had been studying on KM for years, confirmed the validity of questionnaire.

The time period of this research is from March to August, 2008. The subject matters relevant to knowledge management,

entrepreneurial companies and small and medium size enterprises are considered as the scope of the present research. Research constructs were operationally on the basis of related studies (Lee and Choi, 2003). One tests of this study was for measuring reliability. There are various methods to determine the reliability of the tools of measurement one of which is the assessment of internal conformity (Conca et al., 2004). The internal conformity of measurement tools can be measured by the coefficient of Chronbach Alpha (Chronbach, 1951) and it was equal 0.904 by using SPSS software for the all of items. The other tests of this study were T-value test, estimate model, standard solution, structural equation modeling (SEM) and focuses on important indexes of Lisrel software similar to Root Mean Square Error of Approximation (RMSEA), Goodness of Fit Index (GFI), as appropriate indexes in statistical analysis (Joreskog and Sorbom,

1989), As fit indices, the  $\chi^2$  statistics (and associated P-values) and other fit indices are recommended by numerous researchers from a number of different disciplines. These selected fit indices the normed-fit index (NFI), the non-normed-fit index (NNFI), and the critical N statistic. Values of GFI, AGFI, NFI and NNFI range from zero to 1.00 with a value close to 1.00 indicating good fit (Byrne, 1989).

### Data analyze

#### Descriptive data

According to descriptive data 44.7% of managers (respondents) were from 30 to 40 years old. Small and medium sized enterprises (SMEs) categorized in six groups such as food and pharmaceutical industries, metal industries, loom and clothing industries, chemical industries, machinery industries and final other of industries. Much of the survived SMEs have been related to food and pharmaceutical industries plus metal industries (more than 50%). Sample surveying has determined that almost SMEs in Mazandaran province in Iran have employees less than 100 persons (more than 99%). In addition, other data of SMEs have brought in Table 1.

### RESULTS OF TESTS

The statistics for reliability tests are shown in Table 2. For other testes, we use from Lisrel8.50 software. The advantage of this software is measuring the direct and indirect effects on depend variable. Therefore, this is better than other statistical software that only computes the direct effects of independent variables on the dependent variable. The output of tests is presented thus (Figure 2).

The T-Value showed there is not direct relation between IT support and KME ( $F_0$ ) as a latent variable, because the number of T-Value test between IT support and KME has red color, that is, the latest hypothesis (H<sub>7</sub>) did not confirm. But, other hypotheses have been confirmed (H<sub>1</sub>, H<sub>2</sub>, ..., H<sub>6</sub>). All of the composite reliabilities are above 0.90. The goodness of fit index (GFI) was 0.96 (GFI = 0.96 > 0.90), then the validity of models has confirmed. The Root Mean Square Error of Approximation (RMSEA) = 0.031 < 0.05, then the model have a best-fitting with data of real world. Further, the

overall fit of this final measurement model is  $\chi^2$  (P = 0.0); AGFI=0.92; NFI = 0.96; and NNFI=0.95 (Figures 3 and 4).

**Table 1.** Descriptive data from sample of population.

<b>Age</b>	Range	[20-30)	[30-40)	[40-50)	50						Total
	Number	37	134	84	45						
	Percent	12.3	44.7	28	15						
<b>Background</b>	Range	Under diploma	diploma	Associate	Bachelor	MS	Phd				Total
	Number	18	83	51	89	37	22				300
	Percent	6	27.7	17	29.7	12.3	7.3				100
<b>Level of voucher</b>	Range	0-5	5-10	10-15	15-20	20-25	25				Total
	Number	54	57	52	38	33	66				300
	Percent	18	19	17.3	12.7	11	22				100
<b>Type of firms</b>	Range	Food pharmaceutical	Metal	Loom clothing	Chemical	Machinery	Other				Total
	Number	91	62	48	27	68	4				300
	Percent	30.3	20.7	16	9	22.7	1.3				100
<b>Number of employees</b>	Range	2-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	Other	Total
	Number	65	54	46	38	22	24	17	31	3	300
	Percent	21.7	18	15.3	12.7	7.3	8	5.7	10.3	1	100

**Table 2.** Reliability tests of measures (by Cronbach ).

Measure	Number of Items	Reliability (Cronbach )
Collaboration	5	0.825
Trust	6	0.814
Learning	5	0.846
Centralization	5	0.867
Formalization	5	0.822
T-shaped skills	5	0.851
IT support	5	0.893
Total (All Questions)	36	0.904

### Structural equation

Explanation of the direct and indirect effects of knowledge management enabler variables ( $F_{11}$ ,  $F_{12}$ , ...) on KME ( $F_0$ ) and compute of that effects is the highlight innovation of this study. As we know, computing the indirect effects of knowledge management enabler variables through a usual mechanism is not visible. In addition, explanation of KEM measurable variable is difficult, because we have only the signable variables of it (not specially KME). That is, KME is independent similar to four dimensions of it (based on research model), but it is not observable. That is, KME is as an independent latent variable. Therefore, the structural equation of KME is equal to direct and indirect effects of knowledge

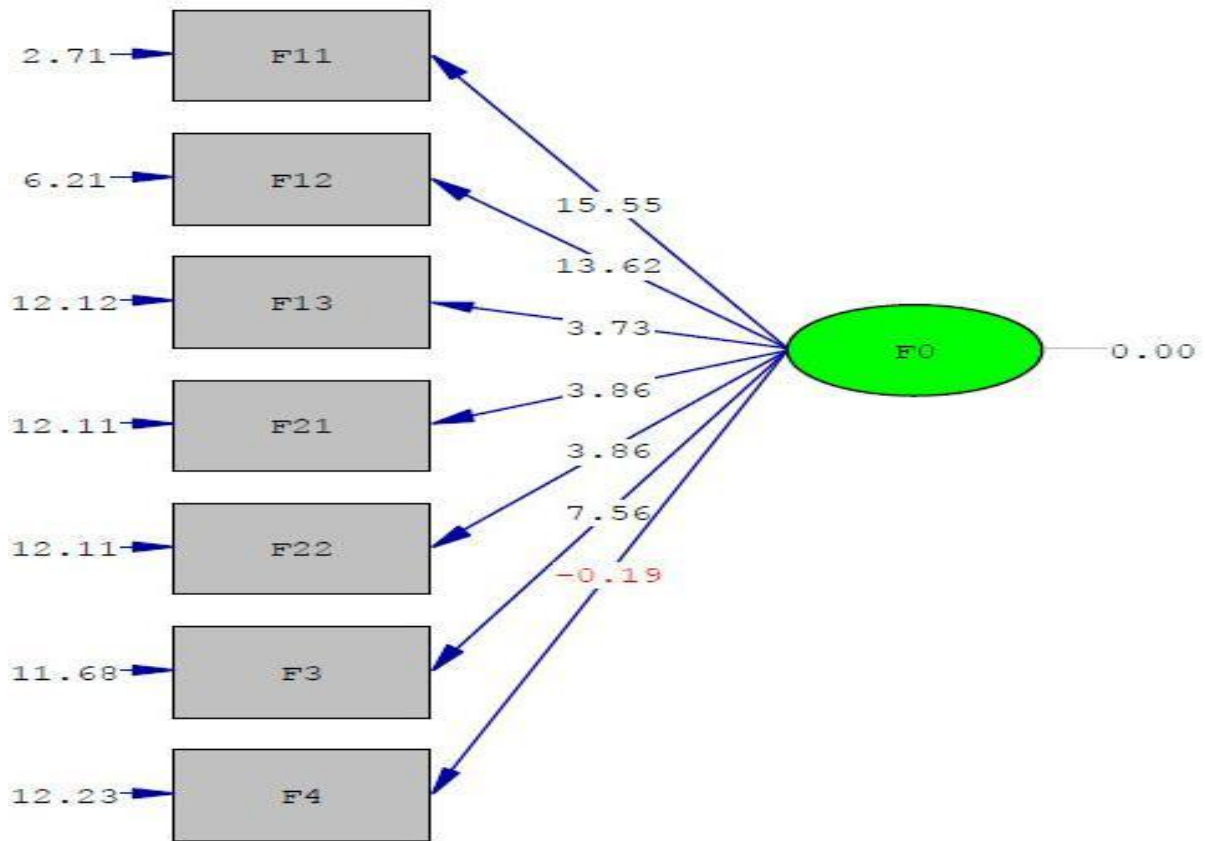
management enablers variables effects (KME= direct effects of KME's variables + indirect effects of it). The equation of direct and indirect effects of KME will be shown below:

$KME = \text{direct effects of KME's variables } (KME_0) + \text{indirect effects of it } (KME_1, KME_2, \dots, KME_6)$

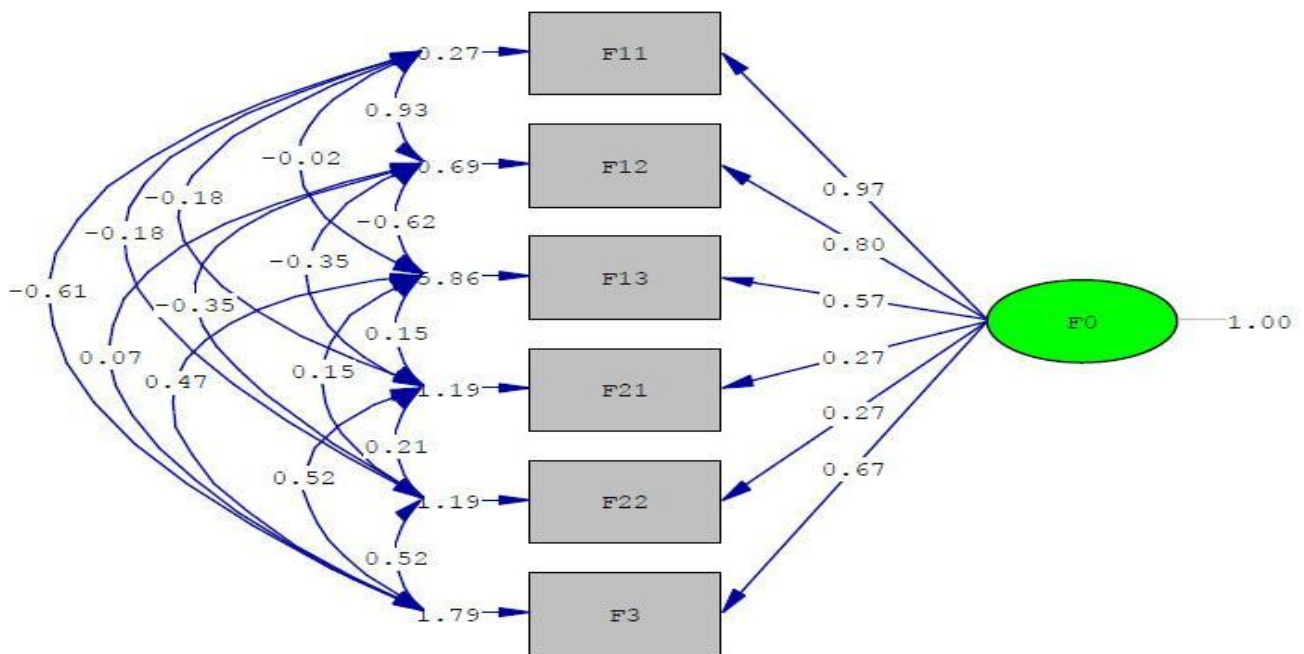
$KME = KME_0 + (KME_1 + KME_2 + \dots + KME_6)$

$KME_0 = (\text{Direct effect of variables}) = (0.97X_1 + 0.80X_2 + 0.57X_3 + 0.27X_4 + 0.27X_5 + 0.67X_6)$

$KME_1 = (\text{Indirect effect of Collaboration}) = 0.97X_1(0.93X_2 - 0.02X_3 - 0.18X_4 - 0.18X_5 - 0.61X_6)$



**Figure 2.** T-Value test. F11: Collaboration, F12: Trust, F13: Learning, F21: Decentralization, F22: Informal structure, F3: T-shaped skills, F4: IT support, F0: Knowledge management enabler.



**Figure 3.** Estimates test of path diagram.



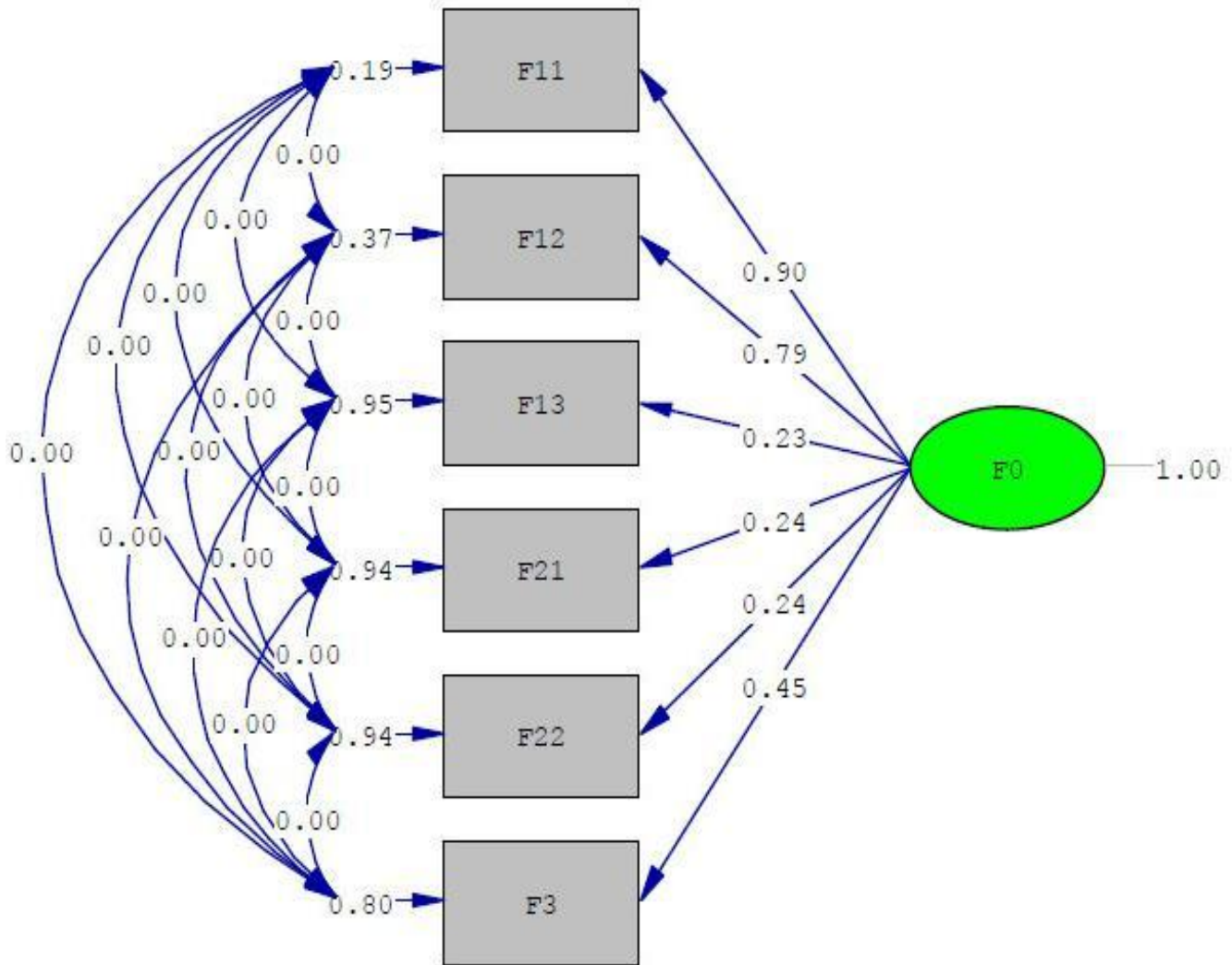


Figure 4. Standard solution in path diagram test.

$$KME_2 = (\text{Indirect effect of Trust}) = 0.80X_2(0.93X_1 - 0.62X_3 - 0.35X_4 - 0.35X_5 + 0.07X_6)$$

$$KME_3 = (\text{Indirect effect of Learning}) = 0.57X_3(-0.02X_1 - 0.62X_2 + 0.15X_4 + 0.15X_5 + 0.47X_6)$$

$$KME_4 = (\text{Indirect effect of Decentralizing}) = 0.27X_4(-0.18X_1 - 0.35X_2 + 0.15X_3 + 0.21X_5 + 0.52X_6)$$

$$KME_5 = (\text{Indirect effect of Informal Structure}) = 0.27X_5(-0.18X_1 - 0.35X_2 + 0.15X_3 + 0.21X_4 + 0.52X_6)$$

$$KME_6 = (\text{Indirect effect of T-Shaped Skills}) = 0.67X_6(-0.61X_1 + 0.07X_2 + 0.47X_3 + 0.52X_4 + 0.52X_5)$$

The variables and direct coefficient of SEM based on T-Value, estimate and standard solution tests of path diagram are shown in Table 3.

## CONCLUSION AND APPLICATIONS

Our findings confirm that KME is associated with cultural factors such as collaboration, trust, and learning in investigated population. Shaping cultural factors is crucial for a firm's ability to manage its knowledge effectively. A trust-based culture is the foundation for knowledge management initiative. An organization may face difficulties in building its knowledge creating environment due to the lack of adequate culture. IT support does not affect on KME in structural equation model of SME's of Mazandaran province in Iran. The lack of information technology foundations has been shown in this Province. Because IT is critical for codifying explicit knowledge; it provides fast feedback for explicit knowledge, but it is not using appropriately in Mazandaran's SMEs. Therefore, simply improving the IT infrastructure of SMEs in Iran will be providing an advantage for growing amount of KME.



**Table 3.** Variables and direct coefficient of structural equation model.

Observed Variables (OV)	KME's variables						
	Collaboration	Trust	Learning	Decentralizing	Informal	T-Shaped	IT support
Summery signs of OV	F4	F3	F22	F21	F13	F12	F11
Name of observed variables in SEM	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>
T-Value	15.40	14.05	3.51	3.30	3.78	7.68	15.40
Accept\Reject of hypothesis	Accept	Accept	Accept	Accept	Accept	Accept	Reject
Direct Standard Coefficient	0.90	0.79	0.23	0.24	0.24	0.45	--
Rank of effectively based on standard coefficient	5	6	3	1.2	1.2	4	--
Direct estimate coefficient	0.97	0.80	0.57	0.27	0.27	0.67	--
Accept\Reject of Model=Main Hypothesis	The generality of the proposed model are confirmed, because RMSEA = 0.031; GFI=0.96; AGFI=0.92; NFI=0.96 and NNFI=0.95.						

Then, for powering in this part knowledge management enabler for knowledge manager is important. The measure of informal and decentralization of structure of small and medium size firms has relation with KME as a latent variable.

This study is probably the first to establish this view of knowledge management in SMEs in Iran. This study shows that managers will be better able to find which enablers are critical for enhancement of KME. Because firms may not manage all dimensions of knowledge management enabler, then, they may need robust strategies that involve trade-offs. Appropriate knowledge management strategies may be able to facilitate these enablers. Finding these strategies may be of interest. Finally, we can say this study presents a local structural equation model for measuring of knowledge management enabler in SMEs of Mazandaran province in Iran. It helps managers of SME's to measure their firms KME.

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