

Information technology; a facilitator for improving dynamic capabilities through knowledge management utilization

Ali Akbar Ahmadi¹, Abolghasem Bagheri Sirayi², Mohammad Hossein Moghadasan³

¹Professors of public administration, Payame Noor University, Iran

^{2,3}M.A. in public administration, Payame Noor University, Iran

Corresponding author Email Address:aa.ahmadi@pnu.ir

ABSTRACT

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Dynamic capabilities refer to an organization's responding ways to the environmental rapid changes. It is necessary to study on the organizational dynamic capabilities for two reasons: studying the organization's activities in crisis times, and the concentration of the present management science on "knowledge management" as an important determining factor of vocational excellence and competitive advantage. Our motive to prepare this paper is to respond to the question that if knowledge management plays a role in improving the organization's dynamic capabilities and as a result, increasing vocational excellence and competitive advantage? In this research, the set of hypotheses were studied and examined based on regression model on a number of governmental companies and at the end, results showed that organizational internal and external knowledge management elevates dynamic capabilities by information technology markedly.

1. Introduction

Nowadays, competition between organizations is less based on traditional factors (such as assets, land, the number of workers, etc) and it seems that knowledge management supersedes them. Furthermore, knowledge is not only a source of competitive advantage but also it is the only source of it. By advancement of information technology, knowledge management could facilitate utilizing new methods and instruments like groupware, on-line database, intranet, etc. This progress has made it possible for firms to deliver their products and services with better quality and that achieve competitive advantage and more profit (Lynn et al, 2005).

"Dynamic capabilities" refers to an organization responding ways to the environmental rapid changes. When scientific capital and knowledge of an organization increase, we will be witness of improving dynamic capabilities and enhancement of the business produced value. In addition, effective management of the integrative learning mechanism of organizational internal knowledge has evaluated dynamic capabilities and as a result made competitive advantage (Madhok and Osegowistch, 2005). Recent studies on strategic management has increased attention to theoretic and empiric convergence of knowledge management and the viewpoint of dynamic capability in which it is a basic dimension. The role of software in coordinating knowledge and activities depends on the organization capability in feeding integrative learning mechanisms that can support two-sided flow between native knowledge and global knowledge and activities levels, these mechanisms are stabilized on creativity and dynamic capability maintenance.

Our research is related to the change of knowledge management and dynamic capability for making competitive advantages and moreover, information technology as an undeniable necessity in present activities of knowledge management. To sum up, this research question is "how much is dynamic capability elevated and improved by knowledge management (in presence of information technology)?"

2. Materials and methods

2.1. Knowledge definition

"Knowledge is an indeterminate combination of experiences, values, available information and systematic attitudes that give a framework for evaluation and exploitation of experiences and new information. Knowledge is created in the mind of scholar and is utilized. Knowledge in organizations is appeared not only in documents and knowledge savings but also in work processes, business processes, actions and norms. The definition specifies from the beginning that knowledge is not simple and obvious, it is a combination of different factors; it is indeterminate that has yet specific structures and finally is unclear and intuitive and so it cannot be expressed in words and presented as a logical description. Knowledge is inside the people and it is part of human unknowing intricacy. We traditionally consider assets visible and tangible but knowledge capital cannot be defined easily. Exactly same as an atom that can be a bit or a wave depends on how scientists follow it. Knowledge is intangible in shape of dynamic and also complex and static (Davenport and Prusak, 2006).

2.2. Different kinds of knowledge

Four kinds of knowledge have been distinguished:

- Human resource knowledge: knowledge that is inside the brain of organization members
- Mechanized knowledge: knowledge that consists of integrated particular tasks in machine's hardware
- Official knowledge: that is saved in shape of archives, book, document, ledger, orders and diagrams, etc
- Automatic knowledge: that is saved electronically and is accessible by computerized programs that support particular tasks.

On the other hand, knowledge is considered in two types of explicit and implicit:

Implicit knowledge: it is usually in the territory of personal, cognitive and empirical knowledge.

Explicit knowledge: it is more applied to a knowledge that has more objective, rational and technical aspect. (Data procedures, methods, software, documents and so on). Explicit knowledge generally is accessible and recordable.

Poulani said on distinguishing between two kinds of knowledge that it is difficult to explain implicit knowledge in words. It has been concentrated on utilizing explicit knowledge traditionally. Yet, organizations now found that in order to do their jobs effectively, they require integrating both kinds of knowledge, hence, they are tending to create methods for changing implicit knowledge to the explicit one that can be recorded and saved. The ultimate goal of knowledge management is to turn implicit knowledge to the explicit one and spreading it effectively. This powerful concept has aid making methods, instruments and utilization of knowledge management (Amanati, 2005).

2.3. definitions of knowledge management

One of the library and information definition of knowledge management is that a managerial action that use intellectual capital of an organization to make it able for fulfilling its mission.

In other definition, in management field, knowledge management has been considered a strategic effort that attempts to achieve superiority in competition through controlling and using intellectual assets that are with employees and supporter of the organization. Knowledge Acquiring, saving and sharing cause employees to work tactfully, reduce duplication and at the end, produce more creative products and services that meet customers' needs. Following points can be perceived from above definitions: first of all, knowledge management is something that occurs in the organization environment; secondly, its elements are organizational knowledge or intellectual capital or asset.

Of course in area of knowledge management, too many definitions have been presented that it will be sufficed to mention two of them. (Afshar Zanjani and Nozari , 2004)

2.4. the role of information technology in knowledge management

Information technology can act as a powerful instrument and provides effective and efficient instruments for all aspects of knowledge management including capturing, sharing and utilizing knowledge. The ability of information technology in searching, indexing, combination, archiving and exchanging information can make a change in gathering, organizing, ranking and disseminating information. Technologies such as related database management system, document management system, Internet, Intranet, search engines, work flow instruments, executive support system, data mining, data saving, electronic posts, video conference, bulletin board, news groups and discussion forums can play basic roles in facilitating knowledge management. However, information technology is not the heart of knowledge management automatically and no projects changes to knowledge management only because of using the last information technologies. Information technology only plays the supporting role in knowledge management. Information technology doesn't provide knowledge solitarily; information technology can help people in finding information but it is to people themselves to determine if information is related and proportionate to their needs or not. To turn the information to knowledge, people should analyze, interpret and perceive information and place it in a text.

2.4. dynamic capabilities

Investing to support dynamic capabilities has been one of the successful competitive resource in 21 countries. Dynamic capabilities refer to the concept of the organization's abilities for creating, developing, remaking internal and external abilities for rapidly changing environment. Although these abilities do not guarantee the promotion of organizational performance but it is an inseparable part of it. The main hypothesis of dynamic capability is based on the fact that market's rapid change force organizations to be innovator and react to changes very fast. One important point of the strategies of the organizations which are set in the environment with rapid change is to respond to ambiguous changes of the environment by timely behavior and adapt them to it. The strategic instrument of these organizations should emphasize on two points: dynamism and capabilities. "Dynamism" refers to the simultaneity of the organization's remaking and environmental change. Organizations should be innovator and flexible when market entrance and technology changes require reactive decisions and also when most of the competitors and market structure are hardly to predict. "Capabilities" that are needed for today's unstable world are ability of adaption, integration and restructuring of internal and external capabilities, resources and operations for facing changes (Schulz, 2007)

2.4.1. Different kinds of dynamic capabilities

In order to face new challenges three dynamic capabilities are needed: organizations and their staff should have the ability of 1) fast learning 2) making new strategic assets and 3) transfer of present strategic assets. New strategic assets such as capabilities, technologies and feedback from customers should develop all over the organization and present strategic assets

require being updated and re-structured.

2.4.1.1. Learning

As it was referred in the subject of knowledge management, learning requires asset of communication and coordinating in procedures. Organizational knowledge occurs after some new activities, chores or new logic in the organizations. Inside cooperation and participation also can be a source of organizational learning that helps the organization to recognize inefficient methods and avoid strategy's blind spots. Alliance with other organizations and using other methods of enterprise can make organizations to be able for entering strategic assets to the organization from external sources.

2.4.1.2. New strategic assets:

The efficiency and effectiveness and also coordinating and integrating level of the organization's new and present assets can predict its performance. The qualitative performance of an organization is directed by its particular procedures for gathering and analyzing information in field of relating customers' experiences to products design and also coordinating organizations with raw material producers that should add to the organizations as new assets through continuously environmental study.

2.4.1.3. Transfer of present strategies assets

Rapidly changing markets should be able to remake the organization's assets structure and perform the transfer operation of these assets inside and outside the organization. Since changes are costly, organizations should try to find less expensive ways for doing it. Additionally, the ability of changing depends on the ability of studying environment for evaluating markets to remake them rapidly and take the lead of competitors. This issue can be fortified by decentralization, self-regulation and strategic alliances.

2.5. Dynamic capability and support from competitive advantage

In order to perceive the role of dynamic capability, it is necessary to find out how special dynamic capabilities of an organization relates to management or organizational processes, market situation and past procedure of an organization. Organization capabilities are placed in its processes. Although dynamic capability depends on its details and methods at happening time but they have an important point in common: the best methods are all over the organization. This knowledge usually is connected to activities of business management. The resource of business activities and processes involves knowledge including sales objectives on products, markets and customers, learned knowledge in projects and efforts of product improvement, knowledge of information system utilization, competitive, intelligence, strategy and programming tasks or registering experiences of the company's new strategy. In general, present capabilities are connected to the old capabilities and resources (Grover and Davenport, 2007). Experiential findings are our way's light to understand dynamic capabilities at different dimensions of organizations with dynamic capabilities. Enterprise resource analysis is a kind of dynamic capabilities that requires broad learning and compatibility of execution and programming strategic process. Furthermore, dynamic capabilities as a competition resource, enables the organization to make on-time decision on production and improvement of new products or processes in responding to the market changes. At the end, power structures in business international interactions are impressed by issues like being predictable and also knowledge gaps in the market (Griffith and Harvey, 2005). To sum up dynamic capabilities that are particular and obvious set such as product development, strategic decision making and inter-organization contributions should be placed in the central part of strategy process. Reformation, aggregation and improvement processes of dynamic capabilities have proved knowledge management development for achieving superiority at business and competitive advantage.

2.6. Internal knowledge management and increase of dynamic capability

Knowledge management at organizations with turbulent environments seeks competitive advantage in three dimensions: 1) reduction of production cost 2) shortening the time between order and delivery 3) product differentiation. First of all, knowledge management reduces production costs in the organization and creates value for the customer by improving product quality (Ofek and Sarvary, 2001). Secondly, the organization shortens the time for product provision by present situation analysis and lets the previous knowledge to solve current situation problem. At the end, knowledge management can be considered as a central spot for innovation and promotion of product and process, decision making, remaking and organizational adaption (Duffy, 2006).

Knowledge management system should be able to run knowledge efficiently in the organization for improvement of productivity, quality, innovation and business superiority. In order for widely promotion and knowledge running, information technology researches have been concentrated on three subjects in the first step: 1-broadness of current IT structure in organization 2- knowledge structure and supporting it and 3- facilitating knowledge creation, search and distribution. The broadness of IT structure supports various objectives and cause using different tools for achieving various goals. A case study on knowledge management has introduced following instruments: employee competence database, on-line search system, expert network and case-based experiences. In addition, out of effective infra-structures on IT, cases such as communication structures, groupware, E-mail, document management, data warehousing, work flow software, decision support system, etc can be mentioned (Davenport and Prusak, 1998). Information technology needs related document management to project information, aggregation and searching them as it needs remaking and updating project information instructions. Available groupware in knowledge and management system helps to improve organizational efficiency. In the second place, knowledge structure and supporting it requires IT achievement in two goals at least: 1-reducing uncertainty of losing the knowledge arisen from differences in employees' situation and 2- reduction of attachment to some special employees (Bonora and

Revenge, 2001).

Remarkable level of knowledge may not exploit and use due to lack of targeted mechanism. Information technology doesn't matter to know how the effectiveness and efficiency of knowledge creation process is in an organization because knowledge management is useless for the competitive purposes, with no communication and applied systems that have been developed for influence on different dimensions of business tasks. Ultimately, creation, searching and distribution of knowledge have been improved by IT through increasing the speed of information transfer and responding. Moreover, IT facilitates knowledge storage and sharing however using high information technology has caused cost reduction in using it and at the end, a resource of competitive advantage. Tasks of knowledge management include new knowledge creation, current knowledge warehousing, distributing and using it. Therefore, efficient structure of IT can make maximum productivity of organizational knowledge through production, warehousing and sharing it continuously (Duffy, 2006).

The first duty of knowledge management is knowledge creation. Recently, knowledge spiral framework has been suggested and applied because of its descriptive value in explaining knowledge socialization process, expressing, combination and internalization. In this framework, knowledge creation combine management and organizational procedures and is related to innovation intensively. For instance, knowledge management has been mooted as a center for innovation and improvement of product and process, execution of decision making and remaking and organizational adaption. In an environment with rapid changes, knowledge management can decrease the period of experiment response by utilizing new techniques specially the ones that are supported by IT (Lesser and Prusak, 2007).

Thus, knowledge creation or making can promote Dynamic capabilities and enables organizations to respond in an unstable, flexible environment.

The second performance of knowledge management (warehousing and storing mass of information) often excessively depends on infra-structures. There is a three stage model for knowledge flow:

- Acquiring new knowledge; intensify vertical flow of knowledge
- Knowledge classification; requires vertical and horizontal knowledge flow
- Putting new and old knowledge together that impresses horizontal flow in the main.

Furthermore, uncertainty about new knowledge connection is solved by knowledge vertical flow; he process in which new knowledge is compared with other various knowledge. The management of this knowledge flow is not possible without IT infrastructure support.

The third performance of knowledge management (knowledge sharing) make distribution of skill, experience and internal knowledge possible inside the organization. Knowledge sharing facilitates simple problems solving by presenting the models that save time and hence enables employees to react to rapid environmental changes with the least cost besides organizational learning improvement. Based on the mentioned studies our first hypothesis will be in this manner:

H1a: internal knowledge management elevates organizational dynamic capabilities.

H1b: internal knowledge management influences on dynamic capabilities in presence of different instruments of information technology.

2.7. External knowledge management and increase of dynamic capabilities

Basically, information technology is the main factor of achieving and combination of central part of knowledge, whether the organization choose "systematic knowledge management strategy" or "personal knowledge management strategy". Therefore, knowledge management emphasizes on the importance of integrated organizational knowledge by sufficient and appropriate technology structures both explicitly and in its strategies. At the time of creating IT instruments, knowledge management should be considered in external dimensions in addition to considering internal knowledge management (Zack, 2007). Putting organizational external knowledge and knowledge management system together is a vital necessity. For instance, knowledge management should combine management internal performance with supply chain performance to achieve systematic knowledge results. An experimental research on knowledge management has presented following necessary characteristics for knowledge management required IT (Bennet and Gabriel, 2007):

- Proportion with organization strategy
- Facilitating market knowledge analysis
- Facilitating supply chain knowledge analysis
- Facilitating achievement to market knowledge
- Facilitating achievement to supply chain knowledge

The mentioned research has mooted three main points on knowledge management; first, IT is an essential enabling for knowledge management, secondly, knowledge management plays a basic role in strategic management; that is to say all related activities to it should be in agreement with the organization strategy. At the end, external knowledge should be internalized and integrated in the foundation of organizational knowledge.

Dynamic capabilities can be elevated through effective management of external knowledge including customers, providers and competitors. First of all, about customers as determinant of market tendency, market supervision and competitive advantage are connected to each other intensively. In order for market intelligence, knowledge management systems use estimate of competitive dynamisms and market structures. Responding to market changes demonstrates the organization efficiency and influential use of related knowledge to the market causes prevention of surprise by market changes and as a result makes increase of dynamic capabilities. In the second place, supply chain management has been turned to a powerful tool in competition area and is considered as a factor for time and cost reduction. Moreover, organizations combine

innovations with providers' measures day to day to enrich their various innovations. The obtained knowledge from interactions with providers facilitates adaption of new technology and responding to two factors of engineering revolutionary and evolutionary changes. Finally, competitors are like knowledge resources that let the organization to exploit their methods. Competitive knowledge and managing it effectively are vital factors for modeling and pioneering. Based on this, the second hypothesis would be in his way:

H2a: external knowledge management elevates organizational dynamic capabilities.

H2b: external knowledge management influences on dynamic capabilities in presence of different instruments of information technology.

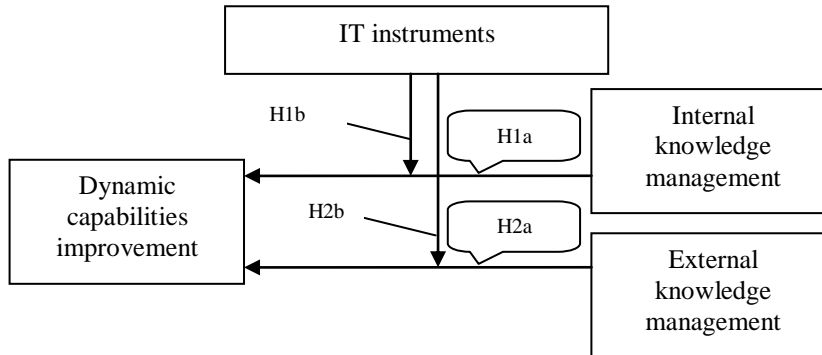


Figure 1: research conceptual model

2.8. Research method

Research conceptual model is shown in figure 1. In this model, dynamic capabilities elevation is considered as dependent variable and knowledge management is considered as independent variable. H1a and H2a refer to the impact of knowledge management and H1b and H2b refers to the impact of IT on organizational dynamic capabilities. This research is an applied research and a field one in terms of spatial and in viewpoint of method, it is a descriptive-survey research. The required data for the research has been gathered by a close questionnaire based on Likert five-choice scale from 1 (strongly agree) to 5 (strongly disagree). The questionnaire includes two parts. The first part was related to the demographic information including age, education and position and the second part consists of questions about considered variables in the research model and its components are as below: criteria of organizational internal knowledge management have been brought up in table 1, criteria of external knowledge management have been brought up in table 2 and criteria of organizational dynamic capabilities are shown in table 3. In addition, the previous related researches have been mentioned for each case. Also, in table 4, instruments of IT and their classification have been named. The questionnaire has been designed according to dependent and independent variables, all of its questions were extracted from related articles and then it was reviewed by some professors. In addition, it was tried to state questions understandable according to the scientific field of the respondents. As a result, both required concepts and validity have been considered in the questionnaire.

Table 1: criteria of organizational internal knowledge management

Criteria	Related research
IT decrease knowledge probable wasting	5 ,15
IT decrease attachment to a special person	5 , 15
IT is used by organization members exhaustively	8 , 16
IT is gathered broadly in the organization	8
Top managers of the organization is able to use IT	8 , 18
Organization members utilize IT in order for searching and using present knowledge	8 , 16
Organization members utilize IT for creating new knowledge	8 , 16

Table 2: criteria of organizational external knowledge management

Criteria	Related research
IT facilitates achieving knowledge of supply chain	6, 18
IT facilitates getting marketing knowledge	6, 18
IT facilitates the process of supply chain	6, 18
IT facilitates the process of marketing knowledge	6, 18
Infra-structure of IT is compatible with enterprise strategy	8

Table 3: criteria of dynamic capabilities

criteria	Related research
Elevation of new knowledge effective learning	20
Elevation of decision-making quality	20
Elevation of coordinating and communication skill	20
Elevation of response improvement	20
Elevation of integration at product development	20
Knowledge warehousing improvement	20
Elevation of resources settlement ability	20
Customers relationship improvement	20
Elevation of trust in sellers	20
Inimitable strategy improvement	20

Table 4: used instruments in IT

Group name	No.	Instrument type
Human resource	1	Employee Competence database
	2	Exogenous professional database
Decision making	3	Groupware for discussion
	4	Decision support system
Knowledge implementation	5	Expert network
	6	Case-base experience database
	7	Documentation management
	8	Online knowledge searching
	9	Data warehousing
	10	Online learning
process	11	Workflow software
	12	Enterprise resource planning
	13	Supply chain management
communication	14	E-mail
	15	Enterprise portal site
	16	Teleconferencing
	17	CRM (Customer relationship management)

According to the problem definition and since the more concentration on knowledge management and IT is in governmental departments, the managers of governmental organizations were chosen to take into consideration, thus, statistical universe includes top managers of 60 governmental organizations at Khorasan Razavi province who have full viewpoint of knowledge management and the impact of IT on improvement and elevation of knowledge management in their organization. In this research, Morgan table has been used for sampling. According to the table, the required sample mass for a 60-people universe are 52 ones. All people in sample were male and have Bachelor of Science degree or higher. Besides, simple random sampling method has been used in this research.

3. Results and discussion

In present research, hypotheses and the model's fitting and validity were examined by structural equations method and Lisrel software and all hypotheses and the model's validity were confirmed. Lisrel or structural equation modeling (SEM) is a general and powerful multivariate analysis technique from multivariate regression family and in better words, it is an expansion of general linear model that makes it possible for the researcher to examine a set of regression equations simultaneously. Structural equations modeling is an exhaustive approach for examining hypotheses about the relationship between latent and observed variables that sometimes has been called covariance structural analysis, causal modeling and also Lisrel but the dominant expression in these days is structural equations modeling (Houman, 2005). Lisrel method, among estimating unknown coefficients of linear structural equations set has been designed for fitting models that consist of latent variables, measuring errors in each of dependent and independent variables, two-sided causality, mutual connection and simultaneity. However, this method can be viewed as particular cases for confirmatory factor analysis methods, multivariate regression analysis, path analysis, specific economic models of time-dependent, reversible and irreversible models for cross-sectional data, longitudinal covariance structure models and analysis of a sample (e.g. hypothesis testing, equality of covariance matrix, the correlation matrix equality, the equality of equations and functional structure, etc) are also used. Although variety of tests that generally are called fitting indices are in constant comparison, development and evolution but still there is not a unique agreement on an optimal test. The result is different articles have presented different indices and even popular version of SEM programs such as EQS, Amos and Lisrel software get too many numbers of fitting indices (Houman, 2005). These indices are classified in various ways that one of the main classifications is absolute, relative and

adjusted. Some of the indices that have been used in this research are:

A. GFI and AGFI indices

Goodness of fit index evaluates the relative value of variances and covariance in common through the model. The range of GFI changes is between 0 and 1 and the value of GFI should be equal to 0.9 or higher.

Another fit index is AGFI (adjusted goodness of fit index) or the adjusted value of GFI index for the degree of freedom, this characteristic is equal to utilization of mean square instead of sum of square in the numerator and denominator. The value of this index is between 0 and 1. GFI and AGFI indices do not depend on sample size.

A. RMSEA index

This index is the root of mean square approximation. Root mean square error of approximation for good models is equal to 0.05 or less.

3.1. Testing Hypotheses

Following tables show the result of hypotheses test through structural equations modeling. In the mentioned tables R is indicator of standard coefficient and t-value is significance coefficient of the suggested causal relationship between independent variable (internal knowledge management) and dependent variable (dynamic capabilities). In the bottom part of

each table, the model's fit indices have been inserted such as chi-square (χ^2), RMSEA, GFI, etc. if the value of χ^2 is low, the ratio of χ^2 to the degree of freedom (df) is less than 3, RMSEA is less than 0.05 and also GFI and AGFI is more than 90%, it can be concluded that the executed model has appropriate fitting.

The standard coefficient of existing relationship will be significant at 95% confidence level if t-value is more than 2 or less than -2.

The first hypothesis: internal knowledge management elevates organizational dynamic capabilities.

Table 5: statistical results of the first hypothesis examination

The first hypothesis	Standard coefficient (R)	t-value	result
Internal knowledge management → dynamic capability	0.97	2.45	accepted
df = 118 , RMSEA=0.223 , GFI =0.08 , AGFI = 90/0 , χ^2 =411.07			
t-value is significant at 95 % confidence level			

As it is observed, first of all, according to the significance of t-value, the first hypothesis is confirmed at 95 % confidence level and according to the value of RMSEA, GFI and AGFI, model's fitting is confirmed too.

Thus, H0 hypothesis is denied and H1 or the same first hypothesis is confirmed. So, it can be stated that internal knowledge management elevates organizational dynamic capabilities.

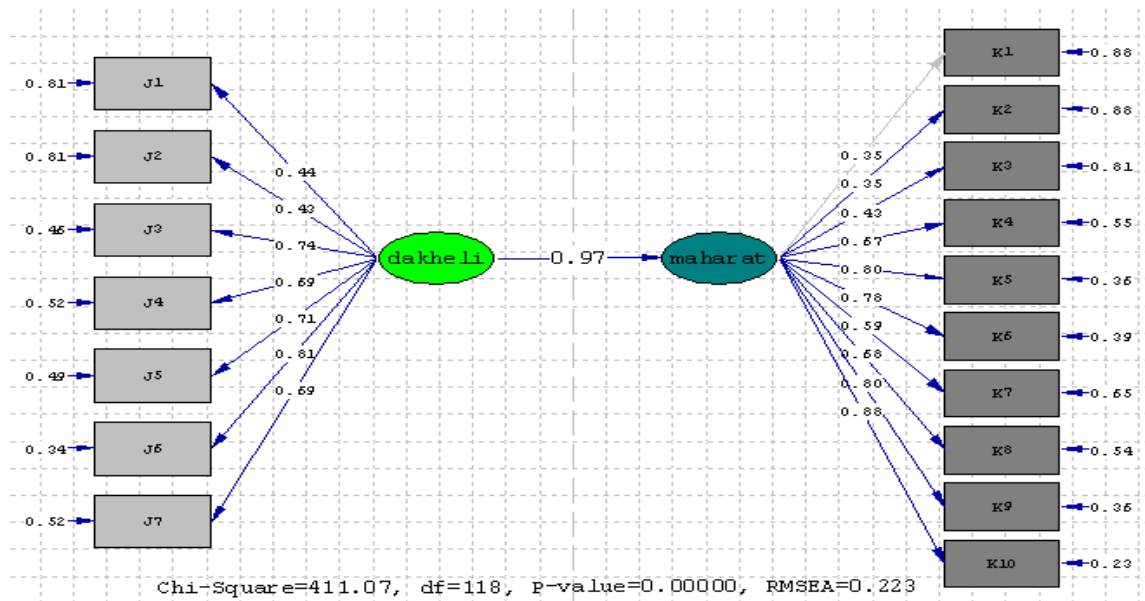


Figure 2: the output figure of causal relationship test between internal knowledge management and dynamic capabilities in standard state

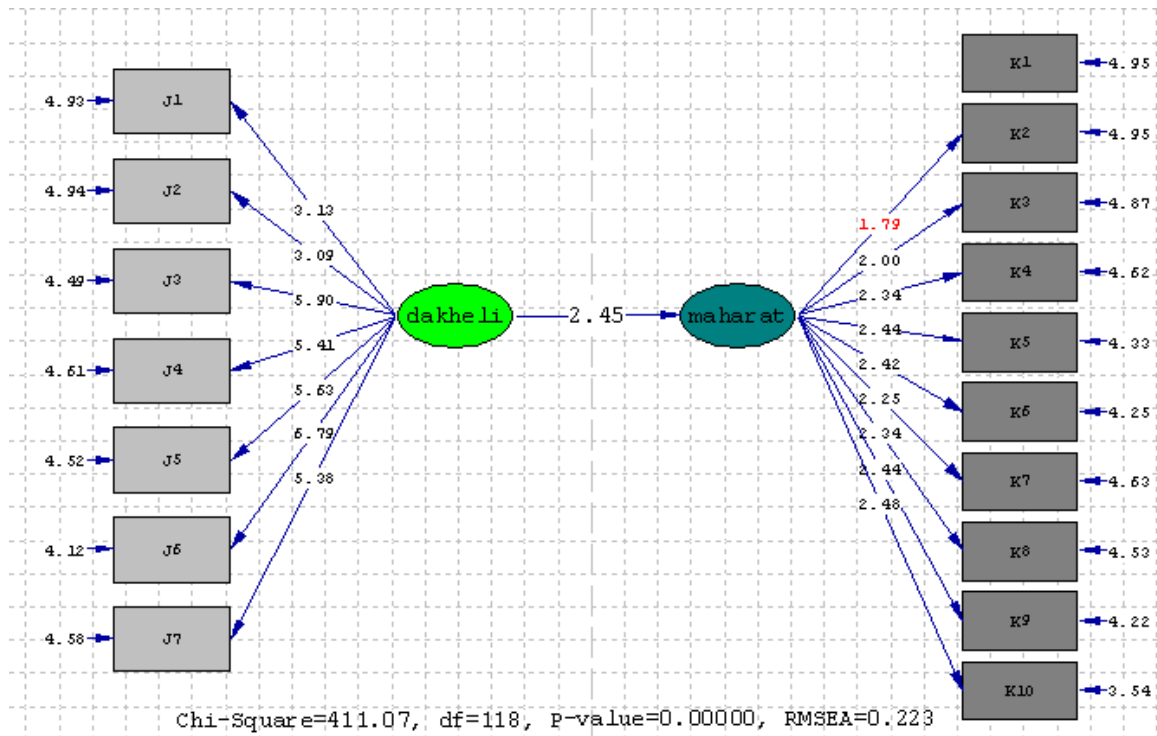


Figure3: the output figure of causal relationship test between internal knowledge management and dynamic capabilities in significance state

The second hypothesis: internal knowledge management influences on dynamic capabilities in presence of different instruments of information technology.

Table 6: statistical results of the second hypothesis examination

The second hypothesis	Standard coefficient (R)	t-value	result
Internal knowledge management → IT	0.76	2.05	accepted
IT → dynamic capabilities	1.86	2.52	accepted
df = 207 , RMSEA=0.05 , GFI =0.9 , AGFI = 90/0 , $\chi^2 =411.07$			
t-value is significant at 95 % confidence level			

As it is observed, in regard to the significance of the relationship between elements of internal knowledge management and IT, the second hypothesis is confirmed. Hence, there is a relationship between internal knowledge management and organizational dynamic capabilities in presence of IT instruments utilization. Besides, the model's fitting is confirmed too.

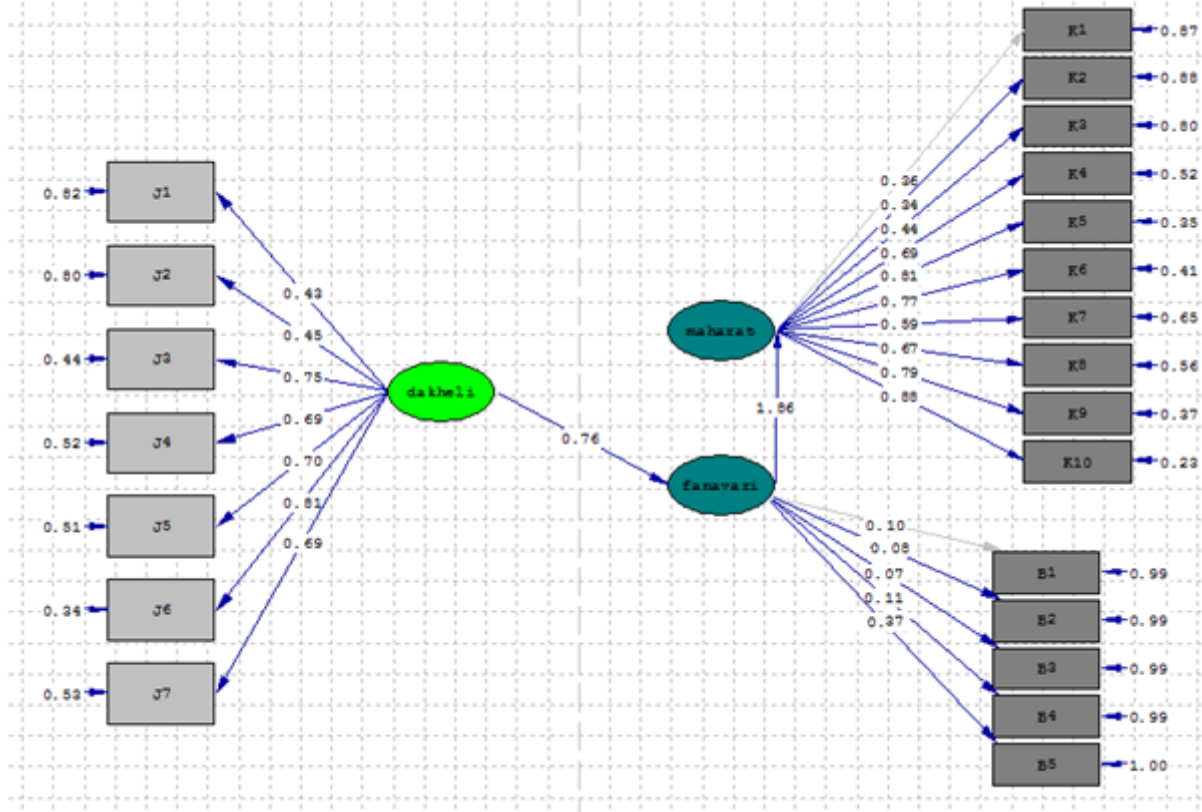


Figure 4: the output figure of causal relationship test between internal knowledge management and dynamic capabilities in presence of different IT instruments in standard state

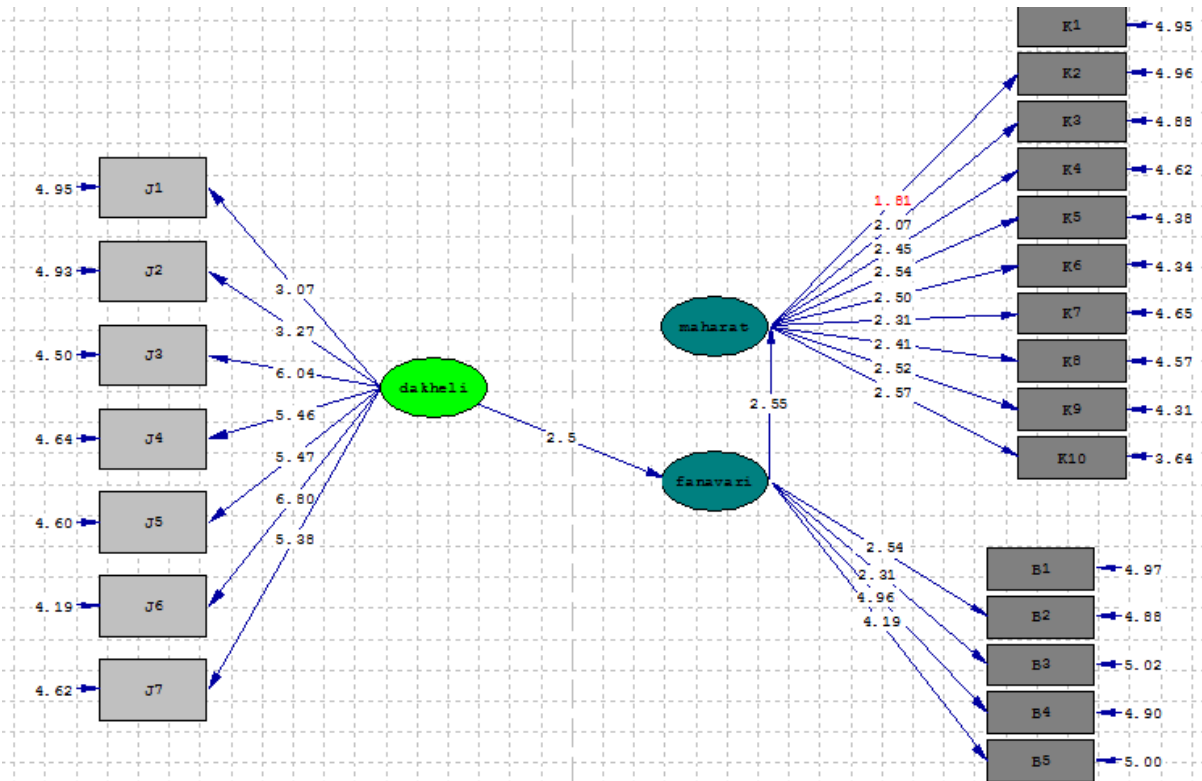


Figure 5: the output figure of causal relationship test between internal knowledge management and dynamic capabilities in presence of different IT instruments in significance state

The third hypothesis: external knowledge management elevates organizational dynamic capabilities.

Table 7: statistical results of the third hypothesis examination

The second hypothesis	Standard coefficient (R)	t-value	result
External knowledge management → dynamic capability	0.78	2.05	accepted
df = 89 , RMSEA=0.08 , GFI =0.9 , AGFI = 90/0 , $\chi^2 =411.07$			
t-value is significant at 95 % confidence level			

As it is observed, first of all, according to the significance of t-value, the third hypothesis is confirmed at 95 % confidence level. Besides, the model's fitting and validity is appropriate because the value of RMSEA is in its allowed limit and the value of GFI and AGFI is also 90%.

Thus, H0 hypothesis is denied and H1 or the same third hypothesis is confirmed. So, it can be stated that external knowledge management elevates organizational dynamic capabilities.

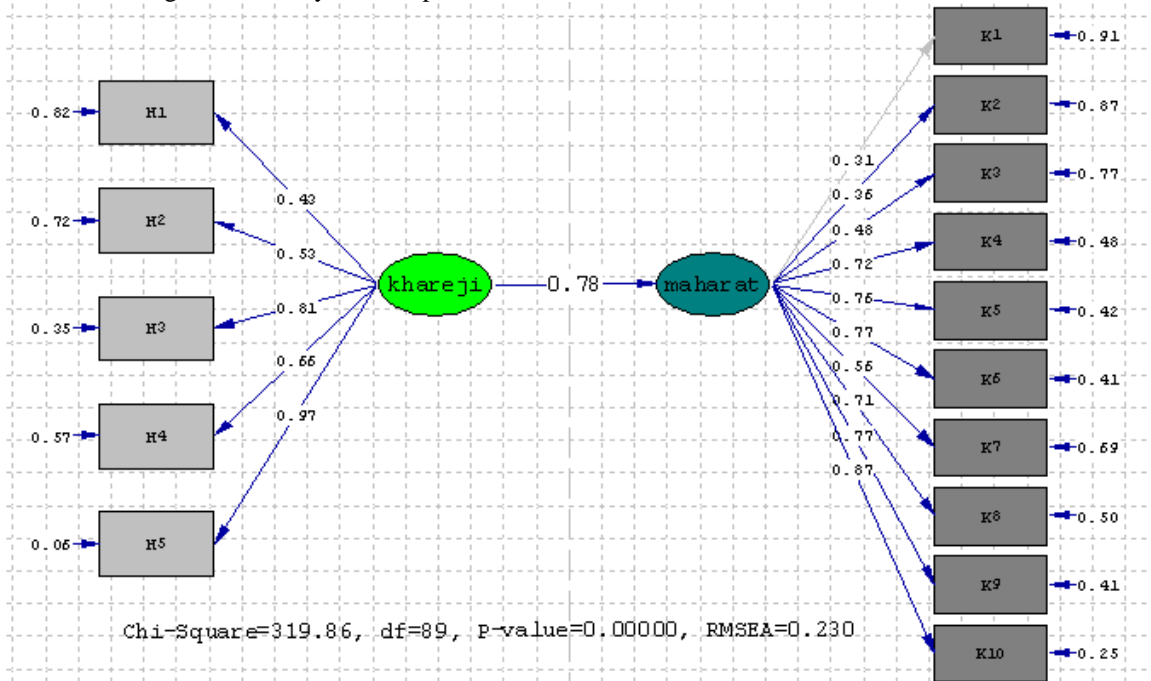


Figure 6: the output figure of causal relationship test between external knowledge management and dynamic capabilities in standard state

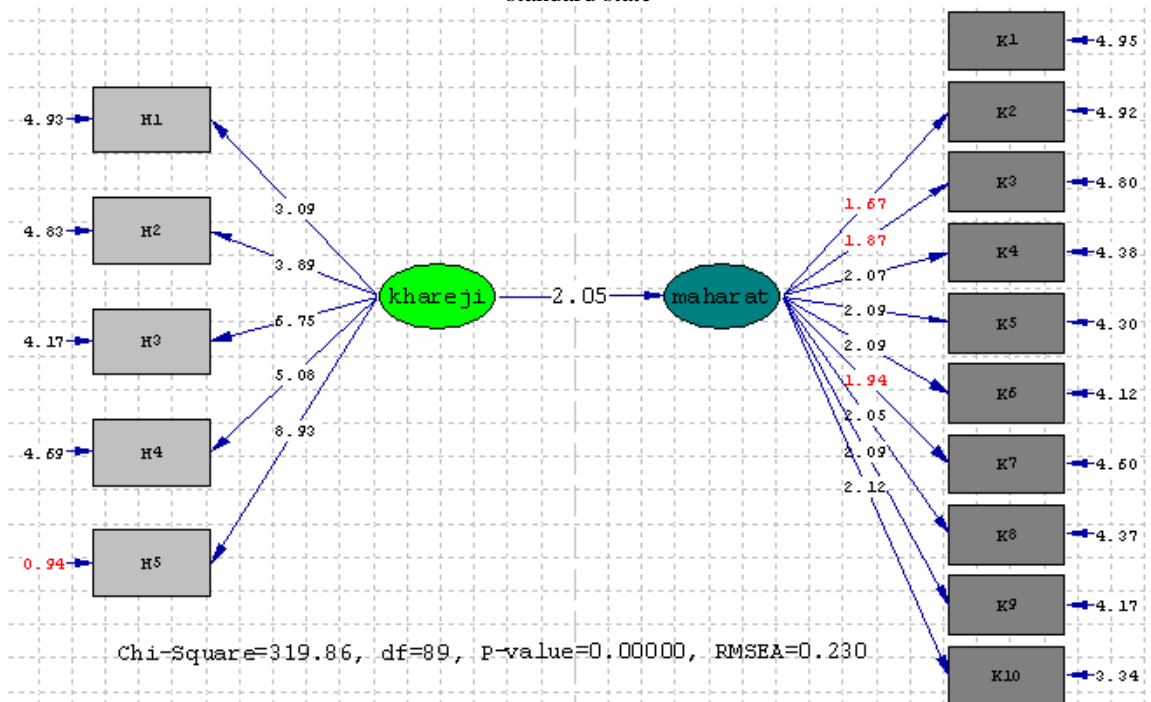


Figure7: the output figure of causal relationship test between external knowledge management and dynamic capabilities in significance state

The fourth hypothesis: external knowledge management influences on dynamic capabilities in presence of different instruments of information technology.

As it is observed, in regard to the significance of the relationship between elements of internal knowledge management and IT, the fourth hypothesis is confirmed. Thus, there is a relationship between external knowledge management and organizational dynamic capabilities in presence of IT instruments.

Table 8: statistical results of the fourth hypothesis examination

The second hypothesis	Standard coefficient (R)	t-value	result
Internal knowledge management → IT	0.76	2.05	accepted
IT → dynamic capabilities	1.86	2.55	accepted

df = 168 , RMSEA=0.08 , GFI =0.9 , AGFI = 90.0 , χ^2 =458.99
 t-value is significant at 95 % confidence level

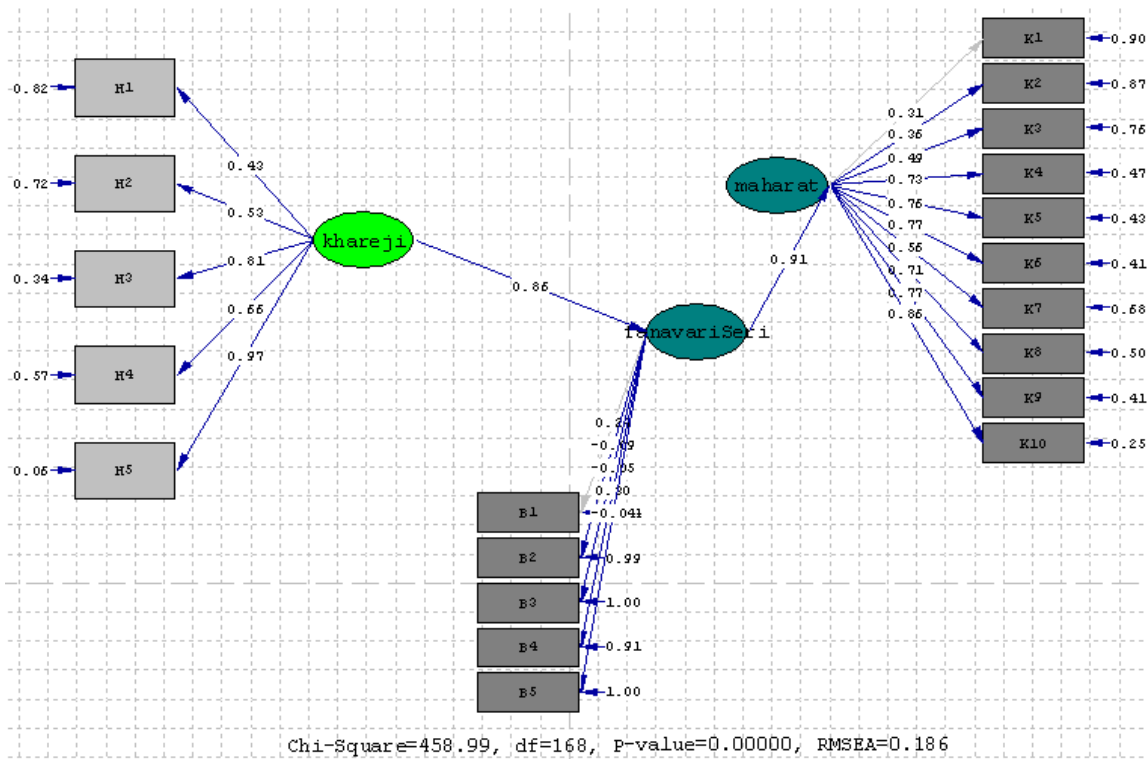


Figure8: the output figure of causal relationship test between external knowledge management and dynamic capabilities in presence of different IT instruments in standard state

3.2. Prioritizing use of each group of IT instruments

In order to investigate the impact level and ranking way of using each group of IT instrument, Friedman variance analysis has been used due to the questionnaire design based on Likert scale. The considered hypotheses are as below:

- H0) in viewpoint of respondents, the considered factors are in the same importance level
- H1) in viewpoint of respondents, the considered factors are not in the same importance level

As a result of calculations, χ^2 value for proving H0 hypothesis is equal to 140.975 with the degree of freedom 4 and 0.000 Sig. level. Since Sig. level of the first type error level is less than 0.05 then the hypothesis of similar importance level of factors is denied and consequently, the factors do not have a same importance. The obtained mean rank for variables is specified in following table:

Table 9: ranks of research variables

IT instrument group	Mean rank	Rank
Communication	4.41	1
Process	4.03	2
Knowledge implementation	2.79	3
Decision making	2.54	4
Human resource	1.22	5

4. Conclusions

The results of this research show that organizational internal and external knowledge management clearly impress organizational dynamic capabilities and act as a powerful resource for elevating quality and vocational excellence. These

results are compatible with other researches about knowledge sharing in vocational excellence and strategic advantages too. The resulted suggestions of present research are:

- 1) Organizations should have special attention to knowledge management for elevating organizational dynamic capabilities in order to achieve competitive advantage in present turbulent environment
- 2) Development of Internet technology and database facilitate utilization of IT instruments and therefore it helps us to be sure of our superiority and competition level.

By using these two factors, global business will be developed and new business models will be utilized for better servicing to customers. In direction of globalization, the product life cycle will be shortened and strong IT performances will be used and organizations would be able to work in a competitive environment.

Our research confirms previous perspectives that consider dynamic capabilities as a basic part of strategic management in universal competition. After IT, knowledge management is considered very important for elevating dynamic capabilities among other factors (such as organizational and behavioral dimensions of knowledge management); in this respect, knowledge management control by IT special instruments was proved.

Finally, our findings are coordinated with previous researches in field of management concepts that refer to knowledge management performance in development of dynamic capabilities for facing a continuous rapidly changing environment.

In addition, with regard to the performed ranking about IT instruments, it seems that the most influence of IT instruments on the relationship between knowledge management and organizational dynamic capabilities is used instruments in area of "communication"

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