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Impact of Dynamic Capabilities on Knowledge Management Processes

Farzad Yavari, Fereydoun Ohadi

***Abstract*—**Today, with the development and growth of technology and extreme environmental changes, organizations need to identify opportunities and create creativity and innovation in order to be able to maintain or improve their position in competition with others. In this regard, it is necessary that the resources and assets of the organization are coordinated and reviewed in accordance with the orientation of the strategy. One of the competitive advantages of the present age is knowledge management, which is to equip the organization with the knowledge of the day and disseminate among employees and use it in the development of products and services. Therefore, in the forthcoming research, the impact of dynamic capabilities components (sense, seize, and reconfiguration) has been investigated on knowledge management processes (acquisition, integration and knowledge utilization) in the MAPNA Engineering and Construction Company using a field survey and applied research method. For this purpose, a questionnaire was filled out in the form of 15 questions for dynamic components and 15 questions for measuring knowledge management components and distributed among 46 employees of the knowledge management organization. Validity of the questionnaire was evaluated through content validity and its reliability with Cronbach's coefficient. Pearson correlation test and structural equation technique were used to analyze the data. The results of the research indicate a positive significant correlation between the components of dynamic capabilities and knowledge management.

***Keywords*—**Dynamic capabilities, knowledge management, sense capability, seize capability, reconfigurable capability, knowledge acquisition, knowledge integrity, knowledge utilization.

I. Introduction

THE field of research related to competitive dynamics is a new subject and has been growing [4], [1]. Studies in the field of dynamic capabilities approach have identified the structures, processes, effects and contributions of dynamic capabilities in the strategy, and most researchers believe that dynamic capabilities promote competitive advantage [2]. Teece et al. use the term dynamic capabilities to describe the use of the firm's unique internal and external merits to define environmental change. This approach emphasizes the development of management capabilities and the difficulty of imitating and replicating organizational structures and technological and functional skills. This will be integrated with issues such as improved management, new product development, technology transformation and transfer, intellectual property management, production, organizational resources, and organizational learning [2]. 3In short, dynamic capabilities are defined as the sensibility, perception, and capability of refocusing internal and external resources of the firm. Internal resources include assets owned by the firm and created by it, and external resources include resources and assets that derive from collaboration with all other firms and organizations [5].

The main definition of the Teece dynamic capability is "the ability of the organization to integrate, build and reshape internal and external capabilities to face the rapid change of the environment [2]. Helfat suggests this definition of "the capacity of an organization to create, develop or modify substantive resources in a targeted manner" [6]. In this research, library and field studies have examined the impact of dynamic capabilities on knowledge management processes in the MAPNA Generator Engineering Company. Dynamic capabilities are the ability to integrate, create and rebuild internal and external competencies to confront changing environments [2]. Knowledge management is a central element in learning processes that involves acquiring, integrating, and applying knowledge. Scientists showed that dynamic capabilities (sense, seize, and configuration) affect innovation capabilities [3], [7]. They also found that companies that are strong in all three dynamic capabilities seek to combine their current capabilities in Market or technology with new capabilities in another (limited innovation or revolutionary innovation). On the other hand, their findings indicate the companies whose dynamic capabilities are weak or one-sided, that is, one of its dynamic capabilities is much stronger than the rest, combining new market capabilities with new technology capabilities. The main objective is to examine the impact of dynamic capabilities on knowledge management processes in the MAPNA engineering and construction company. The research objectives are as follows:

- Assessing the impact of sense capabilities on Knowledge Management Processes
- Assessing the impact of seize capabilities on knowledge management processes
- Assessing the impact of reconfiguration capabilities on knowledge management processes

II. Research Method

The current research is applied in terms of the goals it pursues. On the other hand, the present study is descriptive in terms of how to obtain the desired data. Since the data collected through community sampling are collected to examine the characteristics of the statistical community, this research is a survey type and it is done in an analytical

Farzad Yavari is with the MAPNA Co. Tehran (e-mail: yavari@ mapnagenerator.com).

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manner. In addition, this research is based on the nature of solidarity and causation. In the present study, dynamic capabilities and its three dimensions include sensation, perception and re-configuration as independent variables and knowledge management processes and its three dimensions: knowledge acquisition, integration, and application as dependent variables. The statistical population of the company consists of directors and experts in the field of knowledge management in the engineering and construction company MAPNA Generator, whose number is 50 people. Since the present research is a survey and field survey, library and field methods are used to collect information. In order to ensure the content validity of the measurement tool, first, according to the subject literature and the background of the research and the opinion of the supervisor and interview with some of the managers of the organization, a questionnaire was selected and developed. In this research, its Cronbach's alpha was calculated using SPSS software.

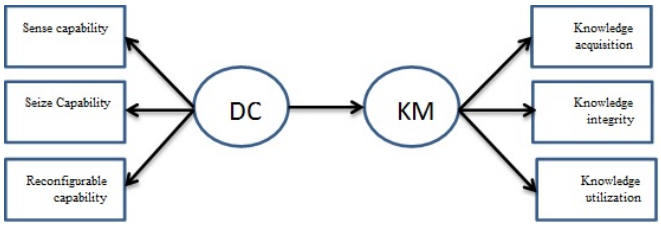

Fig. 1 Conceptual model of research

Since the present research is a survey and field survey, the following methods are used to collect information:

- Library method: Many of the concepts and information used in this research are derived from the study of books and specialized articles and dissertations related to the subject of the research. Also, the researcher for collecting information from Internet sites and articles and Persian books And the Latin ones they have used.
- Field method: A questionnaire was used to collect field information. A researcher-made questionnaire was used. The questionnaire consists of three main parts. In the first part, demographic information includes the gender; age and Responsive education is presented. The second part of the questionnaire examines the dynamic capabilities of the MAPNA Generator Engineering and Manufacturing Company. This part of the questionnaire has 3 parts and 15 questions that examine the components of dynamic capabilities in the company. The third part of the questionnaire examines knowledge management processes. This part of the questionnaire has three parts and 15 questions.

The response options are five point scales and are categorized from very low to very high. The ranking of options is as follows.

- Very low = 1,
- Low = 2,
- Average = 3,
- High = 4,
- Very High = 5

TABLE I
PROBABILITIES OF COMPONENTS OF DYNAMIC CAPABILITIES

No.	Variable	Number of questions	Cronbach's alpha coefficients
1	Sense	5	0.725
2	Seize	5	0.775
3	Reconfiguration	5	0.751
Number of all questions		15	0.871

TABLE II
PROBABILITIES OF COMPONENTS OF KNOWLEDGE MANAGEMENT

No.	Variable	Number of questions	Cronbach's alpha coefficients
1	Knowledge acquisition	5	0.717
2	Knowledge integrity	5	0.873
3	Knowledge utilization	5	0.720
Number of all questions		15	0.895

III. FINDINGS

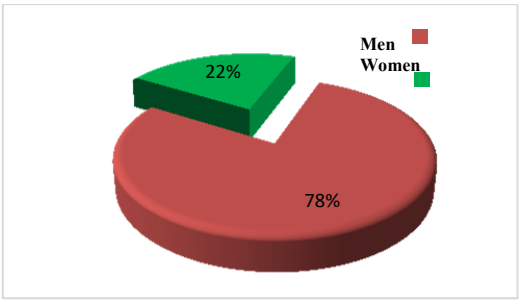

Fig. 2 Frequency of respondents' gender

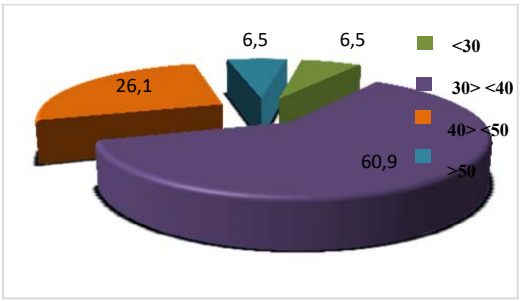

Fig. 3 Frequency of respondents' age

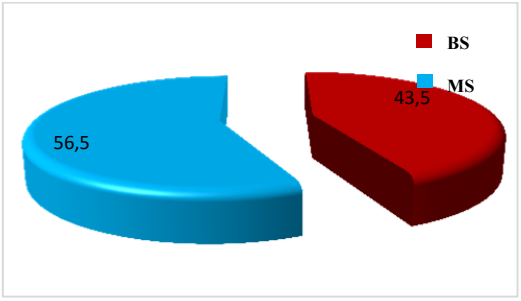

Fig. 4 Frequency of respondents' education

In this research, the Kolmogorov-Smirnov test was used to test the normality of the data.

- H0: The distribution of variable data is normal.
- H1: Distribution of variable data is not normal.

Based on the results of the Kolmogorov-Smirnov test, the significance of the error level is greater than 0.05, so the zero assumption is approved and the distribution of the data is normal.

Correlation coefficient is used to test the research hypotheses. The tests defined for the research hypotheses regarding the correlation coefficient are as follows:

- H0: There are no correlations between the two variables
- H1: There are correlations between the two variables

If the value is smaller than the error level of 0.05, the zero assumption is rejected.

TABLE III
NORMALITY TEST (KOLMOGOROV-SMIRNOV)

KM	DC	
46	46	N
2.920	3.176	Mean
0.837	0.820	Standard Deviation
1.72	1.74	Kolmogorov-Smirnov
0.314	0.358	Meaningful

TABLE IV
PEARSON CORRELATION BETWEEN DYNAMIC CAPABILITIES VARIABLES AND KNOWLEDGE MANAGEMENT

DC & KM Correlation		Knowledge acquisition	Knowledge integrity	Knowledge utilization
Sense	Pearson correlation	0.542	0.682	0.689
	Two-way meaningful level	0.000	0.000	0.000
	N. of Data	46	46	46
Seize	Pearson correlation	0.580	0.525	0.664
	Two-way meaningful level	0.000	0.000	0.000
	N. of Data	46	46	46
Reconfigura-tion	Pearson correlation	0.666	0.666	0.756
	Two-way meaningful level	0.000	0.000	0.000
	N. of Data	46	46	46

The adequacy of the data was done before the factor analysis to ensure the results were adequately tested. In this regard, the Bartlett & Kisser test (KMO) is used. The value of the KMO test is numerically between 0 and 1. If the KMO value is less than 0.5, the results of the factor analysis are not citable and desirable, and if this value is between 0.5 and 0.69, data interpretation should be made with caution, but if the KMO value is larger or larger 0.7. The results of the factor analysis are cited and exploited.

TABLE V
KISSER AND BARTLETT TEST RESULTS FOR RESEARCH TOOLS

Is greater than 0.06, so data is appropriate for factor analysis	0.872	Test value of KMO
It is smaller than 0.05 therefore variables are suitable for factor analysis	0.000	The level of significance level of the Bartlett test

TABLE VI
THE ROLE OF DYNAMIC CAPABILITIES ON KNOWLEDGE MANAGEMENT IN THE MAPNA GENERATOR ENGINEERING COMPANY (TEST OF MAIN RESEARCH THESIS)

Confirmation of impact	Relative affinity index	Factor Loading rate	Impact of independent variable
Desirable effect	0.6<0.99	0.99	DC on KM

In the modeling of structural equations, the non-standard load factor is calculated as in Fig. 5. In this method, relations between hidden variables and visible variables are shown by the load factor.

According to Fig. 6 in the standard model, as shown, there is a correlation between dynamic variables and knowledge management of 0.99, which is greater than 0.6, and states that these two variables have a good relationship. Therefore, the first hypothesis is confirmed by the existence of a relationship between the components of dynamic capabilities and knowledge management and these two variables themselves.

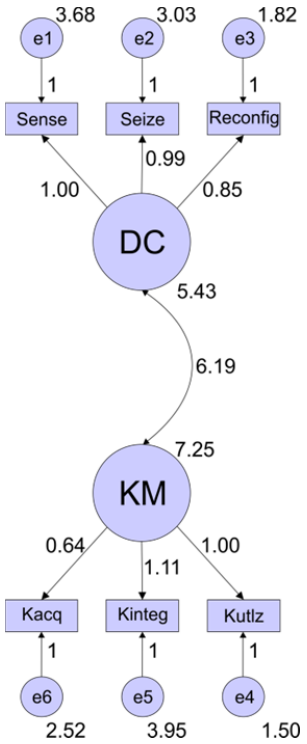

Fig. 5 Non-Standard model (factor load dynamic capabilities and knowledge management)

In the non-standard model, as shown in Fig. 5, the coefficients of dynamic variables and knowledge management are obtained. In this chart, the coefficient of significance is 6.19, which is greater than 1.96, indicating a significant correlation between the two variables.

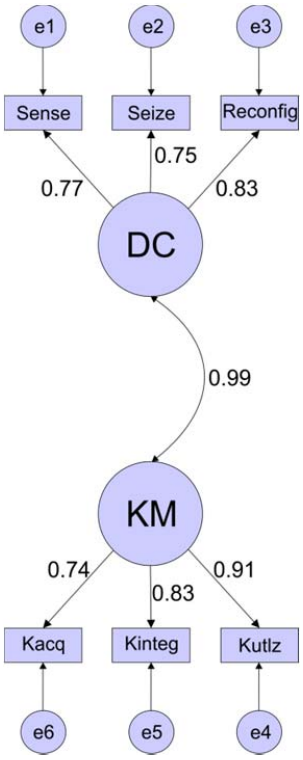

Fig. 6 Standard model (meaningful coefficients between dynamic variables and knowledge management)

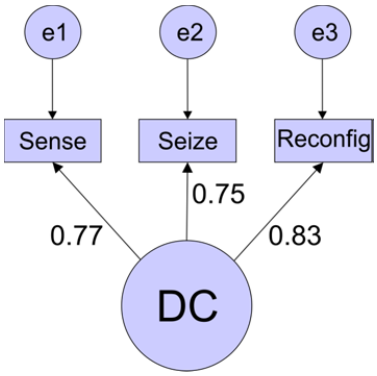

Fig. 7 The standard coefficients of dynamic capabilities components

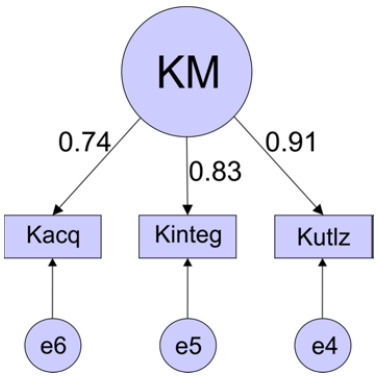

Fig. 8 Standard qualifications for knowledge management components

TABLE VII
NECESSARY INDICES OF THE FITTING OF THE RESEARCH MODEL

Confirmation	Indicator statistics	Acceptance criterion	Fit index
Confirmed	0.936	NFI>0.9	NFI
Confirmed	0.977	CFI>0.9	CFI
Confirmed	1.493	1<CMIN/DF<3	CMIN/DF
Confirmed	0.533	PRATIO<1	PRATIO

Fig. 7 shows the correlation of dynamic capabilities components. Among the components of dynamic capabilities, respectively, the re-configurations with a correlation coefficient of 0.83, sense with 0.77 and seize with 0.75 most depend on dynamic capabilities. Fig. 8 also shows the correlation of knowledge management components. In this diagram, the components of knowledge management were respectively, the use of knowledge 0.91, Integrity of Knowledge 0.83 and gaining knowledge 0.74, they have the most dependence on knowledge management.

Table VII shows the fitness fitting of the model. In examining the fit of the model it is necessary to consider all indicators and judging by the evaluation of one or two indicators cannot be judged about the rejection or confirmation of the model. In the present study, NFI, CFI, CMIN, PRATIO indices have been investigated. According to the mentioned values, the research model has a suitable fit. It is worth noting that verifying the model with the mentioned indexes does not represent the model's uniqueness.

IV. Discussion and Conclusion

In this research, the effect of dynamic capabilities on knowledge management processes in the MAPNA Generator Engineering Company was studied. In this regard, three components for the independent variable of dynamic capabilities (sense, seize, reconfigurations) and for the dependent variable of knowledge management were considered as three factors (acquisition of knowledge, knowledge integration and knowledge utilization) and their effects were measured. The results of structural equations showed that the coefficient of dynamic capabilities impact on knowledge management is positive and significant. Various factors contribute to improving the implementation of the knowledge management system. According to the results of this research, dynamic capabilities are one of the most important and effective factors. On the other hand, among the components of dynamic capabilities, recapturing plays the most roles in knowledge management processes, and especially the application of knowledge.

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