Shiraz Journal of System Management
Vol 3, No.1, Ser. 9 (2015), 067-086

Investigation the Effect of Knowledge Management on Organizational Agility

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Abstract. The purpose of the present article is to determine the effect of knowledge management on organizational agility through the use of structural equations modeling in auto-parts manufacturing companies. For this purpose, along with the review of concepts such as organizational agility and knowledge management, the dimensions and capabilities of knowledge management and organizational agility have been identified with regard to the research literature. The statistical population consists of all the managers of large and small auto-parts manufacturing companies of East Azerbaijan Province. The sample size of 132 persons has been obtained through the use of sampling formula in limited populations. In order to collect data, we have used a questionnaire, the validity of which has been confirmed by content validity and the reliability of which has been confirmed through the use of Cronbach's Alpha coefficient. Structural equations modeling has been applied in order to analyze the research data. The results indicate that knowledge management affects organizational agility as well as organizational agility capabilities.

Keywords: Knowledge Management, Organizational Agility, Structural Equations Model.

1. Introduction

In the present situation, agility means reacting effectively to the changing and unpredictable environment and using those changes as opportunities for organizational progress. Agile production is a concept that has come to general use and has been acknowledged as a successful strategy by the producers who are preparing themselves for a considerable increase in performance. Sharifi and Zhang (1991) view agility as the ability of any organization to sense, perceive, and predict the changes present in the work environment. Agile organizations are concerned about environmental incertitude and unpredictability in their business environment. Such organizations need a number of distinctive capabilities in order to attend to change, incertitude, and unpredictability. These capabilities include four main elements which are considered as the foundations for maintenance and development of agility (Narasimhan et al, 2006; McGaughey, 1999) as follows: Responsiveness, which refers to the ability to recognize changes, to react rapidly to them, and to take advantage of them; Competency, which refers to the ability to attain the organization's objectives and goals; Flexibility and adaptability, which means the ability to streamline the different processes and to attain various goals through the use of identical provisions and facilities; and speed, which can be considered as the ability to perform activities within the shortest limit of time. On the other hand, nowadays, due to the scientific and technological changes, the environment of organizations is becoming more unstable and more complicated day by day. In such conditions, success and prosperity come only to the organizations that can, along with gaining extensive knowledge and awareness about the environmental factors and maintaining their survival and endurance, improve and promote the grounds for the development, dynamism, and enhancement of the organization's performance. One way to realize this is the issue of knowledge management.

In the business environment, knowledge management is increasingly being recognized as an indispensable factor in gaining competitive advantage (Prahald & Hamel, 1990; Hedlund & Nonaka, 1993; Grant, 1996; Prusak, 1996; Wen, 2004). In order to achieve such a competitive

advantage, organizations must know how to manage the creation, sharing, and exploitation of organizational knowledge (Szulanski, 1996). Knowledge management is not a novel idea; rather, in the recent years, there has been greater use of this term in the field of management (Kakabadse et al, 2003; Liao, 2003). According to Hackett's study, certain kinds of knowledge management are used in at least eighty percent of the companies under study, twenty-five percent of which have one chief knowledge officer or one chief learning officer (Hackett, 2001). In another study carried out by Murray, it has been found that fifty percent of the five-hundred companies introduced by "Fortune" magazine every year as superior companies have programs for utilizing knowledge management system (Murray, 1994). At present, knowledge management plays a key role in the management and economy of the world. This has caused many of the knowledge management connoisseurs to attempt, with regard to the advances in the field of information technology, to develop their knowledge management capabilities in order to attain competitive success (Lin et al, 2007). Dove (1999) considers knowledge management as the main exponent of agility. In the knowledge management exponent, the organization has two pivots (basic pivots) ahead of it, namely the strategy and competency in knowledge management. For this purpose, after compiling the knowledge management strategy and determining the source and target of knowledge management, the organization contemplates the way of gaining, registering, transferring, creating and utilizing knowledge so that it can achieve organizational agility on all levels. In Dove's view, once knowledge management is performed desirably in an organization, the highest rate of agility will be achieved by that organization. Therefore, based on what went before, we aim to investigate in the present study the effect of knowledge management on the organizational agility in auto-parts manufacturing companies. The research hypotheses have been put forward as follows:

- Knowledge management affects the agility of auto-parts manufacturing companies.
- Knowledge management affects the responsiveness of auto-parts manufacturing companies.

- Knowledge management affects the competency of auto-parts manufacturing companies.
- Knowledge management affects the flexibility of auto-parts manufacturing companies.
- Knowledge management affects the speed of auto-parts manufacturing companies.

2. Literature Review

From the late 1980s to the mid 1990s, following the extensive economical and political changes worldwide, numerous efforts and attempts were made to recognize the origins and factors effective on the new system of global business. When the United States witnessed for the first time a considerable recess in this share of international business, especially in the field of production (as confronted with new competitors from Asia and Europe), it took the lead of the movement. In 1991 a group of industrial experts observed that the rate of increase in the changes of business environment is too fast for the traditional manufacturing organizations to keep up with. These organizations were unable to take advantage of the opportunities offered to them, and this inability to adapt themselves to the changing situations might, in the long run, lead to their bankruptcy and failure (Hormozi, 2001, 133). Therefore, for the first time, following the meeting of most of the scientific and executive experts in industry, a new paradigm was introduced and published by Iacocco Institute in a report entitled "Manufacturing Companies' Strategy in the Twenty-first Century: Industrial Experts, Viewpoint". Immediately afterward, the term "agile production", which accompanied the publication of the report, came into public use (Gunasekaran et al, 2001). Published literature on agility has become prevalent since the time some of the writings have been referring to agility as a new paradigm in production (Burgess, 1994; Yusuf et al, 1999; Zhang & Sharifi, 2000; Sanchez & Nagi, 2001; Brown & Bessant, 2003). In these writings, numerous definitions have been presented to agility, each of which has tried to further elucidate the concept of Organizational agility. By dictionary definition, the term "agile" means rapid movement, nimble, active, ability to move quickly and easily, and ability to think

quickly and in an intelligent way. However, in the current atmosphere, agility means the effective reaction to the changing and unpredictable environment as well as using those changes as opportunities for Organizational progress (Agrawal, Shankar & Tiwari, 2007). The concept of agility in Organizations refers to the productive performance and flexible production systems. Agile production can be considered as the outcome of the characteristics which represented production in the twentieth century, namely rationality, standardization, and elimination of incertitudes (White, Daniel & Mohdzain, 2005). Zain et al (2005) view agility as a response to the challenges imposed by the business environment which is surrounded by change and incertitude. According to Zhang and Sharifi (2000), an agile organization is one that can, with a vast insight into the new system of the business world and with a pack of merits and capabilities, absorb the environmental turbulences and capture the profitable sections of the market proactively. In Zhang and Sharifi's view, the concept of agility includes two main factors which can be interpreted as responding suitably and in due time to the changes as well as utilizing those changes and converting them to opportunities to benefit from. Arteta & Giachetti (2004) see agility as the ability of an organization to adapt to changes and take advantage of the changes resulting from those changes. Kidd (2000), in a comprehensive definition of organizational agility, views an agile organization as a rapid, flexible and intelligent business that possesses the required quick flexibility in responding to the changes and unforeseen events, to the opportunities of the market, and to the customer needs. In such a business are seen processes and structures that facilitate speed, flexibility and solidity and that have a harmonious and orderly organization capable of achieving the competitive performance in a completely dynamic and unpredictable business environment. Thus, agility can be defined conceptually as a management focusing around responding to turbulent and dynamic markets as well as to customer demands. In fact, not only does agility involve responding to customers, but also it is concerned with changes by using them and taking advantage of them as opportunities. According to Sharifi and Zhang (1999), the capabilities that agile organizations must possess in order to have the ability to react suitably and respond

to the environmental changes around their business are categorized into four main groups:

1. Responsiveness, which refers to the ability to recognize changes, to react quickly to them, and to take advantage of them. It includes the following:
   - Sensing, perceiving and predicting changes;
   - Quick reaction to the changes as soon as they affect the system;
   - Benefiting from and making improvements by means of the changes.

2. Competency is a collection of abilities which bring about productivity, efficiency, and effectiveness of theactivities in line with the goals and objectives of the organization. It consists of the following:
   - Strategic perspective;
   - Suitable technology (software and hardware) or adequate technological ability;
   - The quality of products and services;
   - Effectiveness from the standpoint of costs;
   - High rate of propagating new products;
   - Management of changes;
   - Having knowledgeable, competent, and capable staff;
   - Efficiency and effectiveness of the operation (originality);
   - Internal and external cooperation;
   - Integrity and consistence.

3. Flexibility, which involves the ability to process various products as well as to reach different goals with the same provisions. The components of this category are as follows:
   - Flexibility in the volume of the product;
   - Flexibility of the pattern according to the corpus of the product;
   - Flexibility of the structure and controversial organizational discussions.

4. Speed, which is the ability to perform duties and operations within the shortest possible time. Following are the elements of this category:
    - Quick and in-time supply of the products to the market;
    - Rapidity of and time-limit for delivery or shipping of the products to the market;
    - Quick cycle of performing the operations.

Knowledge management is not a novel idea; rather, during the recent years, the application of this term has increased in the field of management. Knowledge management has been discussed extensively in many research studies (Kakabadse et al, 2003; Liao, 2003). In the study of knowledge management, a definition of knowledge seems to be a necessity. Without such definition, managers do not exactly understand what they are after in their management, or if they basically have such a knowledge at all for enforcing their management or not. Different definitions have been suggested for organizational knowledge. For some, organizational knowledge is wisdom resulting from learning and experience. For some others, organizational knowledge is either mere learning or mere experience, and yet for some others, organizational knowledge means information or data. Is knowledge something written or tangible that man has achieved, or is it a process in the human mind that, when fed with information, starts to ooze? Simple and obvious as it may seem at first, the answer to this question is not so easy. This matter becomes much more difficult when related to the organizational knowledge. The right to register inventions, trademarks, and copy right are considered part of the intellectual assets of the companies, but can they be viewed as organizational knowledge? How does information differ from data? Is either of them or both that create knowledge (Rodding, 1998)? Definitions of knowledge widely range from applied to conceptual and philosophical, and have a scope ranging from limited to broad (Beckman, 1999). According, to Davenport & Prusak's (1998) definition, knowledge is a fluid combination of experiences, values, background information, and expert knowledge which provides an integrated and consistent framework for the evaluation and achievement of experience and new information. This knowledge originates from people's minds and

is used by them. Inside the organization, this knowledge has its own place not only in the documentations and information banks of the organization but also in all the activities, processes, steps, and norms of it. Blackler (1995), in his definition of knowledge, has also stated that knowledge means a multi-layer, complicated, dynamic, and abstract subject which lies inherent in the human mind. Many of the thinkers divide knowledge into individual knowledge and organizational knowledge.

In a general classification, knowledge includes individual and organizational knowledge. Individual knowledge is the knowledge that lies within the individuals' minds. Organizational knowledge is the knowledge formed through the interaction among technology, skills, and individuals in the organization (Bhatt, 2001). In another classification, organizational knowledge is divided into overt knowledge and covert knowledge. Overt knowledge is formal and objective and it can be expressed without ambiguity in the form of words or numbers. Covert knowledge, however, is subjective and depends on the individual's experiences (Chau, 2002; Nonaka, 1994; Hunter et al, 2002). Knowledge management is associated with the creation and development of the knowledge assets of an organization with the outlook beyond the goal of the organization, and it involves all the activities related to identifying, sharing, and creating knowledge. This requires systems for the creation and maintenance of knowledge sources, nourishing and facilitating knowledge, and organizational learning. In this regard, only the organizations that view knowledge as an asset and develop the organizational values and norms supporting the creation and sharing of knowledge are successful. Knowledge management deals with creating, sharing, and cultivating knowledge in the thoughts, minds, and imagination of individuals and tries to assemble and manage the knowledge scattered among the individuals in the organization in such a way that it will lead to the creation of a new knowledge (Malhotra, 2000). Numerous definitions have been given concerning knowledge management, some of which are mentioned below. Knowledge management refers to a set of regular and systematic organizational activities performed to achieve higher value through the use of the available knowledge. Available knowledge includes all the experiences

and learning's of the members of an organization as well as all the documents and reports within that organization (Marwick, 2003). Knowledge management is the process of creating, sharing, transferring and preserving knowledge so that it can be used effectively in the organization (Hoffman et al, 2005). Knowledge management consists of providing knowledge, wisdom, and experiences holding the added value of the individuals within the organization so that it facilitates regaining and using that knowledge and protects it as the organization's property (Perez, 1999). Based on the definitions cited about knowledge and knowledge management, we can summarize the knowledge management cycle in the organization according to Bhatt's classification (Bhatt, 2001). Bhatt views knowledge management cycle as consisting of acquisition, documentation, transfer, creation, and application of knowledge in the organization. Acquisition of knowledge includes the set of activities performed to gain new knowledge from outside the organization. Activities such as the rate of the members' participation in scientific societies and the rate of participation in training courses, the organization's cooperation with universities and other educational centers, are purchasing new knowledge for the organization indicate the rate of endeavor to achieve new knowledge and to bring it to the organization. Registration and documentation of knowledge include the set of activities performed for the registration of the existing knowledge in the organization. Activities such as using data bases for the registration of organizational knowledge, documentation of successful and unsuccessful experiences are among the activities of knowledge registration in the organization. Knowledge transfer consists of the series of activities performed for the purpose of transferring knowledge among the members. Such activities as discussion and consulting sessions to present experiences and wok methods, members' willingness and contribution to cooperate with colleagues and help them improve their work styles, and using data bases and sharing the organizational knowledge with all the members show the rate of the organization's attempt to transfer organizational knowledge. Knowledge creation includes the set of activities through which the new knowledge is created and produced in the organization. Activities such as rewarding and encouraging the personnel's innovations and novel ideas, open discussion

about the organization's experiences and failures, and organizing learning groups in the organization are all among the activities that facilitate the creation of new knowledge in the organization. Knowledge application includes activities that indicate the fact that the organization has utilized its knowledge. For example, using the new ideas of the personnel in the organizational process or attention to the sale of organizational knowledge are among the knowledge application activities in the organization. On the whole, it is necessary to mention that interest in and attention to knowledge management is rapidly expanding in the industries of different countries as well as in the university researches and scientific circles, so much so that knowledge management has a key role in many organizations. Solutions presented by knowledge management causes the organizational knowledge to be spread and applied throughout the whole organization (Ngai & Chan, 2005, 884) and to guarantee organizational success.

The role of knowledge management has been shown in different investigations. Dove (1999) defines agility as the ability in management and the effective use of knowledge. In his view, the term "agile" is often used to describe cats; when the cat has rapid movement physically and chooses a suitable place for shelter, we tend to call it agile. In Dove's definition, the concepts of knowledge management and learning organizations are not novel subjects; however, what has become more salient than before is the correct and exact understanding and recognition of these approaches and the balance among them. Dove considers knowledge management and ability to change as the two main components of agility. In the knowledge management component, the organization has two basic pivots in front; namely, strategy and competency of knowledge management. Goldman et al (1995), in the systematic model of organizational agility, have specified 4 aspects of agility. These four aspects are as follows: 1) the organization's internal and external cooperations; 2) creative and flexible structural design; 3) creating a knowledge-oriented organization; and 4) customer satisfaction (Gunasekaran, Mcgaughey and Wolstencroft, 2001; Goldman, Nagel and Preiss, 1995). All the dimensions mentioned in Goldman et al.'s model refer to knowledge and its management. Turban (2003) believes that knowledge management is a procedure for thought value and

information, so it is necessary that knowledge be shared among different individuals and groups, and even different organizations. After this cooperation, a value will be created for the organization that is called knowledge management. Wang and Ahmed (2003) have presented a flexible structure according to knowledge which has the ability to reorganize individuals as well as to respond suitably to demands. This flexible structure is part of knowledge management which leads to organizational agility. In the third dimension, the organization directly focuses on knowledge management, and finally, in the fourth dimension, the organization will pay special attention to the customer satisfaction, for the organization that recognizes customers and their needs based on the knowledge resulting from knowledge management will certainly have direct effect on customer satisfaction. In Yusuf et al.'s model, too, there has been great emphasis on knowledge management for the attainment of agility, so that it has been considered as one of the four main aspects of agility.

3. Method

The present research is applied from the viewpoint of objective, and from the viewpoint of nature and procedure, it is of descriptive-correlational type. The statistical population consists of all the managers of auto-parts manufacturing companies in East Azerbaijan Province. Based on the information obtained from the Society of Machines and Auto-parts Manufacturers in Tabriz, there are about 200 small and large companies in the province, 130 of which are members of the society and the rest are not. With regard to the small size of the population, by using the sampling formula for limited populations ($\alpha = 0.05$, N= 200, e=0.067 and variance was estimated by a sample of size 30), we will have:

$$n = \frac{N Z^2_{\alpha/2} \sigma^2}{\varepsilon^2 (N-1) + Z^2_{\alpha/2} \sigma^2} \Rightarrow n = 132$$

Therefore, the managers of 132 auto-parts manufacturing companies were chosen through using simple random sampling and the questionnaires were distributed among them. In order to collect data and

answer the research questions, we used two questionnaires. The first questionnaire is related to organizational knowledge management. To prepare it, we used Filius et al.'s (2000) questionnaire. The second questionnaire deals with organizational agility, which has been devised by Sharifi & Zhang (1999). The validity of both questionnaires has been determined by content validity. That is, the questionnaires were given to professors and experts in the field, who were asked to express their views after reading them. After the views were checked and the Persian translations of some of the questions were corrected, it was decided that the questionnaires had acceptable validity. To determine the reliability of the questionnaires, we used Cronbach's Alpha; i. e, we distributed the questionnaires among 25 members of the statistical population and calculated Cronbach's Alpha coefficient for them. The coefficient value for knowledge management questionnaires was 0.91, and for organizational agility questionnaire it was 0.89. This shows that the designed questionnaires were of high reliability. For data analysis in this research, the structural equations model has been used.

4. Findings

With regard to Bhatt's knowledge management cycle (2001), which views the dimensions of knowledge management as consisting of acquisition, registration, transfer, creation, and application of knowledge in the organization as well as considering the capabilities of agility presented by Sharifi and Zhang, including flexibility, speed, responsiveness and competency, we can compile the conceptual model of the research as shown in Figure 1.

In order to make sure of the existence or nonexistence of a causal relationship among the research variables and to examine the congruity of the observed data with the conceptual model of the research, we tested the research hypotheses by using structural equations model. Figure 2 shows the standardized path model and the goodness of fit indices (GFI).

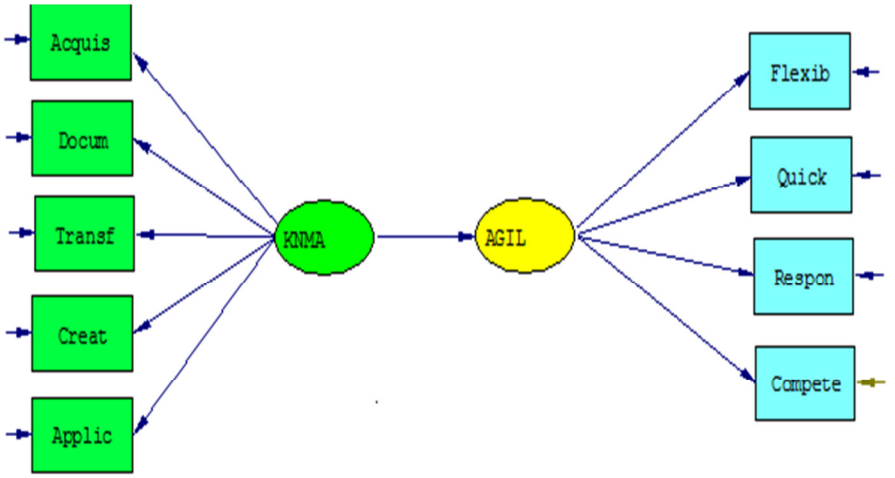

Figure 1: The conceptual model of the research

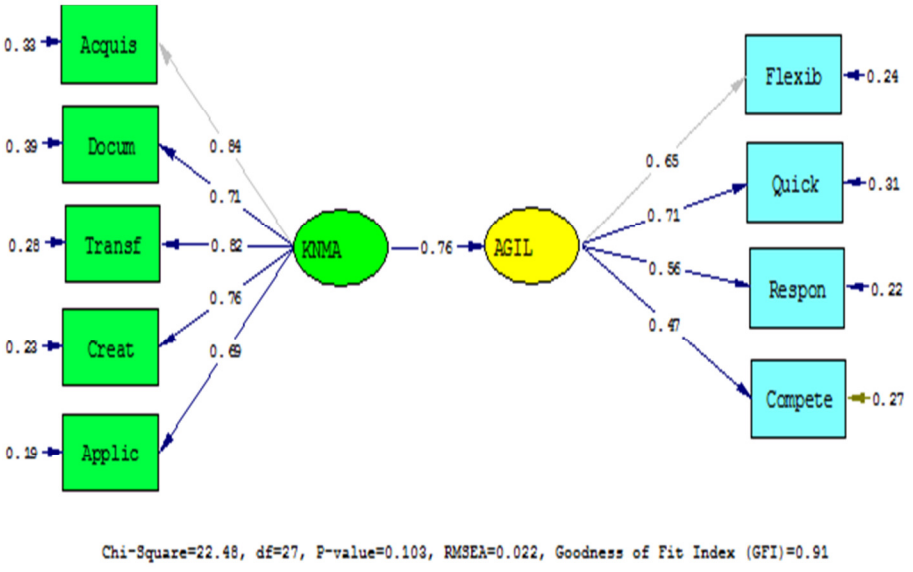

Figure 2: Standardized coefficients of path model for testing research hypothesis test

In executing the structural equations model for testing the main hypothesis, Lisrel's output software indicates the suitableness of model fitness. The Chi-Square value for the research model has been calculated 22.48 with the significance level of 0.102, which shows the good fitness of

the model with the use of the observed data. Also, the ratio of Chi-Square to the freedom degree of df, which is smaller than 1, shows the complete fitness of the model. Another index of the model fitness is the root mean square of approximation. When the value of this statistic is lower than 0.05, it will indicate the acceptability of the model fitness. The value of the statistic for the research model has been calculated 0.022, which indicated the good model fitness. Another statistic of the model fitness that has been chosen in this research for the purpose of investigating the evaluation of model fitness the goodness of fit index. The value of GFI should be between zero and one, and the value of 0.9 indicates the acceptable fitness of the model. The value of this statistic for the present research model has been calculated 0.91, which is the indicator of the good fitness of the model with the use of the research data. Figure 3 shows the results of the t-test for the standardized coefficients.

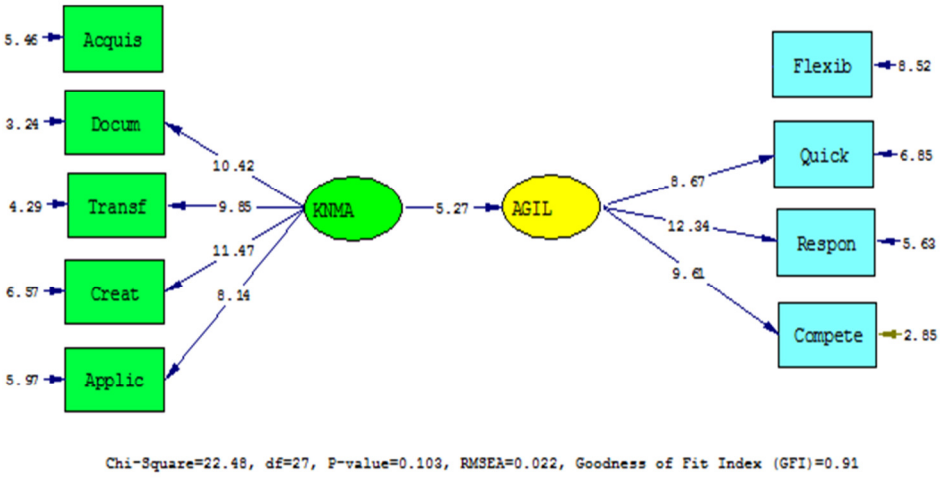

Figure 3: Results of t-test for the standardized coefficients of path model

In order to test whether a certain parameter in the statistical population is significantly different from zero, we use the value of t. When the value of t is between -1.96 and 1.96, it indicates that at the level of 0.05, the related parameter does not have a significant difference from zero. The value of t, as is shown in Figure 3, is larger than 1.96 for all the path coefficients, which shows the difference of the coefficients from zero.

Accordingly, the main hypothesis of the research concerning the effect of knowledge management on organizational agility is confirmed with 5.27 as the value of t and 0.76 as the standard coefficient (Figure 2). The results of testing other hypotheses are presented in Table (1).

Table 1: Path coefficient and the t value for other research hypotheses

Independent variable	Dependent variable	Standard coefficient	Standard Deviation	t-value	Result
knowledge management	Flexibility	0.465	0.069	7.173	Hypotheses confirmed
knowledge management	Speed	0.072	0.072	7.486	Hypotheses confirmed
knowledge management	Responsiveness	0.426	0.080	5.325	Hypotheses confirmed
knowledge management	Competency	0.357	0.061	5.868	Hypotheses confirmed

Based on the data of Table 1, it is confirmed that knowledge management positively affects the capabilities of organizational agility, and this effect is significant with regard to the t value at the significance level of 0.95 percent.

5. Discussion and Conclusion

The results obtained from testing the research hypotheses based on structural equation models indicate that:

- Knowledge management is effective on the agility of the auto-parts producing companies.
- Knowledge management is effective on the responsiveness of the auto-parts producing companies.
- Knowledge management is effective on the competency of the auto-parts producing companies.
- Knowledge management is effective on the flexibility of the auto-parts producing companies.
- Knowledge management is effective on the speed of the auto-parts producing companies.

The competitive conditions and atmosphere of the companies are becoming increasingly more complicated, changeable and developed, and they are changing so rapidly that the speed of the change is far too fast for most companies to respond and adapt to them. In other words, as soon as one change in the said conditions happens and the organization tries to respond and adapt to it, the next change happens. In such an atmosphere, opportunities and threats speedily confront organizations; any change in the competitive atmosphere creates an opportunity and probably eliminates another chance on the one hand, and, it creates a challenge or risk and probably eliminates another challenge or risk on the other. The constant changes in knowledge also create new instabilities for organizations. In such conditions, only those organizations that can maintain their competitive advantage will be able to survive. In scientists' view, sustaining competitive advantage and organizational survival is possible only with the help of knowledge in the organization. Theoreticians have given several definitions for knowledge on organizational level which includes the experiences of the organization's members, reports, information banks, and files. Organizations that intend to become agile should promote trained and motivated personnel with an accurate set of skills, experiences, and knowledge so that this is considered as the essential and integral part of the organization. The information and knowledge in such an organization will be at the disposal of the workforce; in short, it can be stated that thought, or knowledge which equals power, dominates such organizations. In these organizations the suitable management of knowledge is considered as the main component of attaining agility.

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