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Case Report

**RELATIONSHIP BETWEEN KNOWLEDGE MANAGEMENT
AND INNOVATION TYPES
(CASE STUDY: IRAN ALLOY STEEL CO)**

(This article is taken from Meysam Amini master's thesis titled "Analysis of the effect of knowledge on innovation management process using structural equation modeling" by guidig Dr. Ahmad Jafarnejad Chaghoshi)

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Abstract:

Today, human believes that knowledge is the integral part of everybody's life. Therefore, the organizations must try in business, knowledge and implementation of appropriate national and international the interests of the organization. One of the achievements is innovation. The close relationship between the two allows organizations to use knowledge to achieve innovation advantage. The present study examines the relationship between knowledge management dimensions with all kinds of innovation. Accordingly, a questionnaires were distributed to managers and experts of Iran Alloy Steel's supply chain. The results of research by structural equation modeling in Amos software show that acquiring knowledge positively affects the innovation and marketing process and on the other hand knowledge sharing has a positive effect on product and organizational innovation.

Keywords: knowledge management, innovation, analysis, Iran Alloy Steel Co.

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INTRODUCTION:

The modern era has been called as knowledge-based economy. During this period more attention to issues such as knowledge management and innovation organizations focused on people seeking knowledge oriented towards action-oriented people are more important. Today, knowledge and intellectual capital of the organization is the primary competitive factor. If that knowledge in an organization is directed and correctly detected or if need be supplied from outside the organization, By sharing and using it correctly can be a good synergy in the organization which led to the organization agility. Knowledge not only in documents and scientific resources, but also in working practices, organizational processes, practices and norms embodied in [7].

In the literature, there is no single definition of knowledge management. Knowledge management includes all the ways in which organizations manage their knowledge assets and includes the collection, storage, transmission, use, update and create knowledge and information [19]. Systematic and organized process of acquiring specific knowledge management, organization and communication between explicit and tacit knowledge, so that employees effectively for more productive use of their duties. From the perspective of Knowledge, as an organization is considered a major asset. In today's world, most countries rely on innovation to increase efficiency and improve the economic situation and are one of the main reasons for increasing innovation, competition between developing countries. Practical innovation process to create new ideas that can be developed or updated technologies in production, creative design for existing products, introduction of commodity supply, creating new markets, new channels of distribution and new ways to provide services After-sales interpreted [8]. According to research, the positive impact on innovation, knowledge management is justified and it is concluded that maximize the success of knowledge management and innovation should be done in line with an organization's innovation management. The more relevant knowledge in various stages of the innovation process is, more efficient and more effective management of innovation will work. On the other hand, according to the present with features of post-industrial, scientific, creative and innovative, companies need to make profits, quality, timely delivery, and ensure as its main objective to create an account. Thus, they have to be creative and innovative for being survive. Innovation identifies problems and defines the organization actively apply new knowledge to

solve them. In this regard seems to identify the dimensions of knowledge management and innovation on the one hand and their relationship with each of the other as a necessity in the field of organizational research of industrial companies.

Knowledge management

In recent years, knowledge management has become a critical issue for all organizations. Commercial scientific communities believe that superior long-term and sustainable organizations with the power of knowledge can maintain itself in the competitive arena. This management as intangible assets during the past decades has attracted much attention. As prevent its loss, improve decision-making, flexibility and adaptability, property development, adding value to the product and contains [5]. To understand the concept of knowledge management, have a deep understanding of the concepts of data, information and knowledge was. Data, information and knowledge are concepts that can be used interchangeably. Relations between data, information and knowledge hierarchical and not absolute. The development of more knowledge of data and information, including both of them as well as the development of more data and include it as well [4]. The characteristics of today's business world, a dynamic, constantly changing markets and technology development. Organization for adapting to these changes must be flexible. To achieve this flexibility to expand the knowledge base by expanding their knowledge and to ultimately maintain stability and create competitive advantage given to them [1].



Fig 1: The relationship between data, information and knowledge

Knowledge management is known as the processes in an organization or company to make the save, exchange and application of knowledge is appropriate. These processes by increasing the organization's ability to gather knowledge of the environment and applying it in the respective organization or company achieved [9]. Since there is no agreed knowledge management model, It should be based on and consistent with the subject matter, they are used.

But what is seen in almost all these models emphasize the use and application of knowledge.

*Hising model (2000): creation, storage, distribution, application.

*Jashapara model (2004): creating, organizing, sharing, applying.

* model Newman and Conrad (1999): creation, maintenance, transformation and transmission, to deployment.

* knowledge management value chain model: This model is based on the classification of the value of knowledge management activities, including knowledge acquisition, knowledge sharing and use of knowledge. The model is considered in this research is knowledge management value chain model.

Innovation

Due to the growth of service industries topics as innovation in service or service science has been created [18]. In this age of many efforts in the field of structuring and cost reduction in order to achieve profitability by companies is done. In this regard, creation and production of new thoughts and ideas by managers and employees of an organization of great importance and high position in the organization is allocated. Today, organizations are able to constantly new thoughts and ideas are applied in the organization and creation of a favorable environment for creativity and innovation and deal with obstacles [11]. Innovation as the development and application of new ideas or behaviors defined. A new idea can include a product, service, market, operational and administrative structure and new processes and systems.

Orcutt & Alkadri in a study concluded that the biggest constraint to innovation, resistance to change and the most important empowerment are consistent with the needs of the user. Track and clear procedures, providing administrative support, the ability to innovate and to find champion innovation, motivation, showing the benefits of innovation, managing risk and change in other factors affecting innovation and to improve their innovation [1]. The innovation process is new knowledge to be able to go to the product, service or process that is new about customer demand [3]. Hashemi overall innovation process into three stages of idea generation, conceptualization and analysis division of the market [8]. Hu knows the result of innovation by measuring the effect of four factors: revenue growth, market share, profits, productivity. The result for the quality, sustainability and suitability can be demonstrated in the innovation system and in the innovation process

and results information technology plays a fundamental role [13]. In the Oslo Manual (2005) introduced four different categories of innovation, including:

*product innovation: product with new technology, creating value from the design, the ability to create and apply new forms of design, robust design of the product.

* the innovation process: the use of improved production or delivery methods that include changes in techniques, equipment or software.

* Marketing innovation: the implementation of new marketing methods include changes in product design or packaging, to create a task rather than a specific product, product promotion or pricing.

* organizational innovation including business practices for how to organize, new ways of working for corporate accountability and external communications. Innovation also has costs for the organization. Innovation expenditure includes all current expenditure and investment in innovation. Innovation expenditures in the costs of R & D, machinery and materials as well as external knowledge (patents, inventions and patents and licenses and not only). Current costs for product design and production logistics, staff training, capital, IT and skill building, test the market and introduce to the market [14].

The relationship between knowledge management and innovation

In the past decade, in response to the growth of service industries in particular, is said to be interested in what science and innovation services increased. Western companies, together with the installations, now need to build their future on the knowledge coupled with technology and innovation recognized. Maintaining a knowledge advantage, economic leadership by ensuring the emergence of ideas, innovations, new products and services appropriate to the target market explains [18]. Manufacturing companies today need to know with the aim of producing innovative products and control the production costs of products and also use in productive operations. Organizations not only have the knowledge and opportunity to foreign partners (customers and suppliers) for their next production, but should also be used for product innovation in the product cycle. Accordingly, it is necessary to be able to maximize successful knowledge management initiatives carried out in line with an organization's innovation management. The more relevant knowledge in various stages of the innovation process is, more efficient and more effective management of innovation will work. Because of the problems identified and defines

innovation and actively applies new knowledge to solve them [11]. The role of knowledge management in the innovation process can be stated as follows:

- * knowledge management to create tools to create, share and categorize organization which deals with the role of innovation there.
- * manage tacit knowledge to explicit convert.
- * facilitate cooperation in the innovation process.
- * the availability of both explicit and implicit guarantees in the innovation process.
- * flow of knowledge in the innovation process by providing guarantees associations and partnerships. Required knowledge easily across functional boundaries to provide and facilitate internal and external collaboration.
- * tools and processes for integrated knowledge base provides an organization.
- * help to identify gaps in knowledge and processes to fill these gaps to help provide innovation. *
- * provides the institutional framework for a body of knowledge in the organization.
- * to the continued growth of the knowledge base through data collection and capture of tacit knowledge and helps clear.
- * knowledge that helps to create a culture of innovation to fruition [11].

5. Literature

Dehqan Najm has studied the state of knowledge management and organizational innovation in the industry in the automotive industry review. He said that the automobile industry proper implementation of knowledge management with knowledge management of each change are the mechanisms of innovation, innovation in the industry has a positive effect [2].

Curious single article examines the relationship between knowledge and practice of knowledge management and innovation in small and medium-sized food and beverage industry has been in the Gulf. In his view, knowledge acquisition and sharing of knowledge on innovation performance is more positive effects on innovation and knowledge acquisition and sharing of effective knowledge [6].

Adril in his article examines the relationship between knowledge acquisition, knowledge dissemination and application of knowledge and organizational innovation and innovation performance, in the city of Marmara industry, and concluded that the acquisition and dissemination and use of knowledge on innovation is effective.

The innovation performance has a direct relationship. He also explores three dimensions of knowledge management are confirmed [12]. Otero in his article examines three types of innovation, including product innovation, process innovation

and market innovation and its relationship with the performance in the small and medium industries of furniture in three countries Italy, Spain and Finland pays. He said that product innovation makes the organization achieved a niche in the market. Innovative marketing and sales organization will lead to greater market share also increases. Process innovation and productivity improvements in operational processes to follow [17]. Pantn and Mac logon in an article on the effects of knowledge sharing on innovation in the supply chain and its effect on the services provided in institutions. They have shown a positive relationship between knowledge sharing on supply chain innovation and between innovation and the subsequent positive effect on economic growth and improve supply chain financial service companies there [18]. Kantnr study the relationship between knowledge management and innovation, the success of the two categories of product innovation and process innovation in German companies examined. He stated that the implementation of knowledge management in general can result in product innovation and process innovation in German firms and on the other hand product innovation and process innovation innovative German companies successfully raise. As a result of the success of knowledge management innovation (innovative function) in German companies has increased [10]. Zhou, in an article on the effects of the acquisition, sharing and dissemination of knowledge on innovation in 500 companies in China and found that knowledge acquisition and dissemination of knowledge either directly can have a positive effect on product innovation in organizations [20].

The method of data collection, applied research is descriptive survey, which was conducted through a questionnaire. The population of this research is managers and senior experts of Iran Alloy Steel's supply chain and component supply, manufacturing and distribution and sales at the time of the study were 63 people. To determine the sample size, the preliminary questionnaire was distributed among 30 subjects who showed a standard deviation equal to 0.475. Then, based on the sample of sample size to accurately estimate the error level 0.005, 0.05, 54, respectively.

$$n = \frac{N \times Z_{\alpha/2}^2 \times \delta^2}{\varepsilon^2(N-1) + Z_{\alpha/2}^2 \times \delta^2} \rightarrow$$

$$n = \frac{63 \times (1.96)^2 \times 0.475^2}{0.05^2 \times (62) + 1.96^2 \times 0.475^2} = 53/44=54$$

Accordingly, the number of population due to the proximity of the sample questionnaire was

distributed among all the people that frequent follow-up research and due to the unavailability of several directors a total of 55 questionnaires were returned. Since the number of questionnaires collected is less than the size of the population and the same number of samples under the covers so the statistics used and the type of sampling is random. For the preparation of the questionnaire, according to the research on the subject, there is so much history there was a standard questionnaire, The questionnaire identifying effective components as well as with some other research and identify the main components of the report of the Oslo Manual and other literature were written questionnaire (as in this study, the overall situation is not comparable dimensions of knowledge management and innovation various levels of a type of questionnaires were distributed). This questionnaire has 74 questions (47 questions of knowledge management, innovation consists of 27 questions) to answer any questions with 5 point Likert scale from very favorable to very opposite is specified. It is worth noting that according to Cronbach's alpha reliability was equal to 9.0. Content validity of the questionnaire by the experts and construct validity were assessed through factor analysis. Based on this analysis, 26 questions from the 9 question of knowledge management and innovation due to low amounts of shares were deleted.

Table 1: Results of KMO and Bartlett test for knowledge management

KMO		0/905
Bartlett Test	sig	0/000

Table 2: KMO and Bartlett's test results for innovation

KMO		0/825
Bartlett Test	sig	0/000

Standard sampling adequacy (KMO) was to assess the adequacy of the data (sampling), and indicates the common variance in the variance of variables that may be a significant cause. If there is a strong linear correlation between the variables, $KMO \geq 0.9$ will be close to one. Kaiser in 1974 KMO value divided as follows: If KMO, that is, factor analysis

is very useful. If $0.05 \leq KMO < 0.9$, ie, factor analysis is good. If $KMO > 0.05$, it would be useful for factor analysis. Bartlett's test of variables relevant to the study to explore the structure. Small amounts (less than 05/0) to indicate a significant level of factor analysis of data would be useful. One of the methods of statistical data analysis, path analysis is carried out using multivariate regression. This test is known as structural equation. In this analysis, the effect of one variable on another variable can be determined and compared it with another, so that makes it possible to analyze the direct and indirect effects between the variables examined. The aim of this study was to investigate the relationship between knowledge management and innovation of this method is used.

Data

Before stating the results of confirmatory factor analysis is necessary to define a number of important indicators in the software model Amos pointed out [15]. Chi-square (χ^2) shows that the model reflecting the data or not. Usually easy on the degree of freedom chi-square value, and if the resulting split between the numbers 1 through 5 of the model is a good fit. Fitness fit index (GFI) The difference between the expected values and the observed values of the model measures. If this amount is more than 9.0 model is a good fit. Comparative Fit Index (CFI) The test refers to the average level of correlation in the data. If this amount is more than 9.0 model is a good fit. Root Mean Square Residual (RMR) shows that the average amount of residual variance is smaller than 0.08 model is a better fit. The root mean square error of estimate (RMSEA), the chi-square, degrees of freedom and approximation error estimates are generally lower than 0.08 model shows a good fit.

Confirmatory factor analysis of knowledge management

Factor analysis using AMOS software to examine the factor structure obtained from exploratory factor analysis was performed. Analysis tool for knowledge management dimensions were 21 items. Coefficients were obtained at a significance level of 99%.

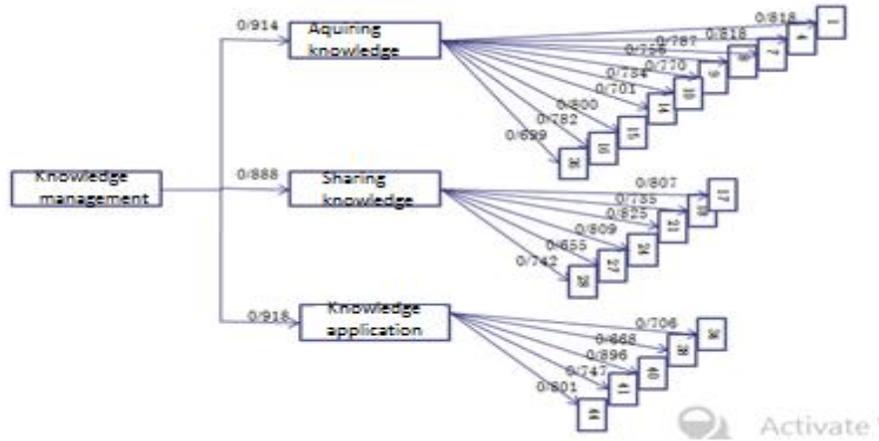


Fig 1: The results of confirmatory factor analysis of knowledge management

Table 3: Indicators of relevance for the confirmatory factor analysis of knowledge management

RMR	RMSEA	CFI	GFI	(d.f)	Chi-square (χ^2)	Model
0.029	0.062	0.975	0.981	8	17.073	The studied model

Confirmatory factor analysis of Innovation

Innovation in confirmatory factor analysis, 19 items were for a variety of innovations. Coefficients significant were obtained at the level of 99%. As

indicated in the tables for each category of items seen fit confirmatory factor analysis, all of the operating components are derived from exploratory analysis time.

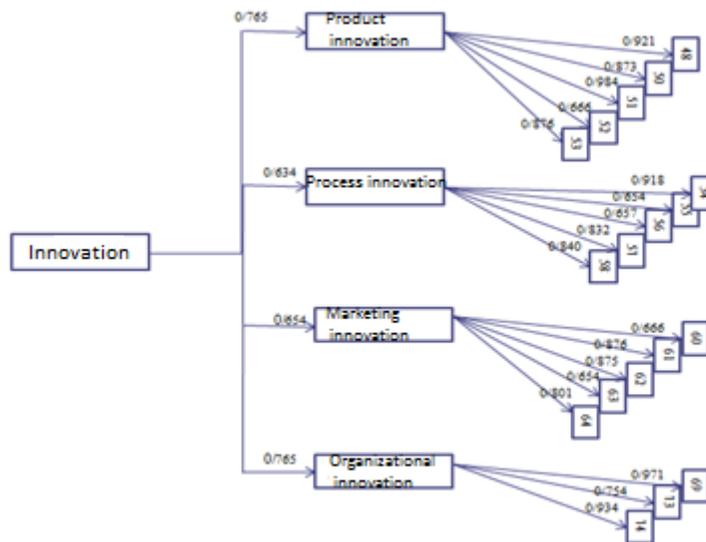


Fig 2: Results of confirmatory factor analysis of innovation

Table 4: Confirmatory factor analysis indicators fit for innovation

RMR	RMSEA	CFI	GFI	(d.f)	Chi-square (χ^2)	Model
0.015	0.053	0.980	0.956	8	15.873	The studied model

Analysis of the operating status of alloy steel company in detected agents

According to the hypotheses H0 and H1 defined for all factors, in Table 5. T-Test test results steels can be seen on the status of the company: The null hypothesis: the status of the company Ai-alloy steel

is not desirable. Opposite hypothesis: Ai operating status at the desired alloy.

Table 5: review of the operating status of each dimension in Iran Alloy Steel Co.

Results	Max.	Min.	(sig)	(t)	Mean	
Knowledge management						
H ₀ is rejected	0.5692	0.2333	0.000	4.753	3.4012	acquiring knowledge
H ₀ is rejected	0.4596	0.877	0.004	2.929	3.2737	sharing knowledge
H ₀ is rejected	0.5018	0.1607	0.000	3.866	3.333	Application of knowledge
Innovation						
H ₀ is rejected	0.3309	0.0197	0.028	2.242	3.1753	Product innovation
H ₀ is rejected	0.5478	0.1732	0.000	3.830	3.3605	Innovation process
H ₀ is confirmed	0.2796	0.0624	0.210	1.264	3.1086	Marketing innovation
H ₀ is rejected	0.4617	0.1391	0.000	3.706	3.3004	Organizational Innovation

Alloy Steel Enterprise survey shows that most desirable of knowledge management: acquisition, sharing and use of it. After alloy steel company in terms of knowledge management is desirable. On the other hand, the study of alloy steel company in terms of innovation, product innovation, process innovation and organizational innovation is desirable. But in terms of marketing innovation was not in good health.

The results of the application by Amos

Path analysis shows that each independent variable on the dependent variable is the extent to which direct or indirect influence. The first path analysis

model is confirmed then it should be considered coefficient. The model by removing non-significant relationship final form to be traced. Here for approval obtained from regression analysis model. Multi-path model for analysis by AMOS software has been used. The research model with two degrees of freedom than some 1.99 which is less than 2 fits. Multiple regression coefficients obtained by Amos software are as follows. H0: the relationship between the two variables is not significant. H1: There is a significant relationship between the two variables.

Table 6: Structure of the analysis coefficients obtained by Amos software

Results	p-value	Non-standard beta	Standard beta	Paths		Row
H0 is rejected	0.000	0.814	0.735	sharing knowledge	← acquiring knowledge	1
H0 is confirmed	0.309	0.123	1.128	Organizational Innovation	← acquiring knowledge	2
H0 is rejected	0.000	0.474	0.548	Organizational Innovation	← sharing knowledge	3
H0 is rejected	0.000	0.526	0.472	Innovation process	← acquiring knowledge	4
H0 is rejected	0.002	0.312	0.306	Marketing innovation	← acquiring knowledge	5
H0 is rejected	0.000	0.472	0.445	Marketing innovation	← Organizational Innovation	6
H0 is rejected	0.000	0.452	0.390	Innovation process	← Organizational Innovation	7
H0 is confirmed	0.116	0.213	0.230	Product innovation	← acquiring knowledge	8
H0 is rejected	0.040	0.315	0.357	Product innovation	← sharing knowledge	9
H0 is confirmed	0.795	0.028	0.034	Product innovation	← Innovation process	10
H0 is confirmed	0.142	0.153	0.168	Product innovation	← Marketing innovation	11
H0 is confirmed	0.328	0.126	0.131	Product innovation	← Organizational Innovation	12
H0 is rejected	0.000	0.402	0.438	Application of knowledge	← sharing knowledge	13
H0 is rejected	0.000	0.520	0.513	Application of knowledge	← acquiring knowledge	14

As it can be seen in Table 6 assumptions, 2, 8, 10, 11, 12 due to the significant level (P-Value) under 0.05 were not favorable to them H0 is approved. This means that these relationships are not acceptable at a significant level. As it can be seen which of the related factors have a greater impact on relations. For example through knowledge and

innovation, two factors that have a significant effect on marketing innovation, institutional innovation with higher regression coefficient 0.445 is greater impact on marketing innovation. Model obtained in this research by eliminating the non-significant relationships are as follows.

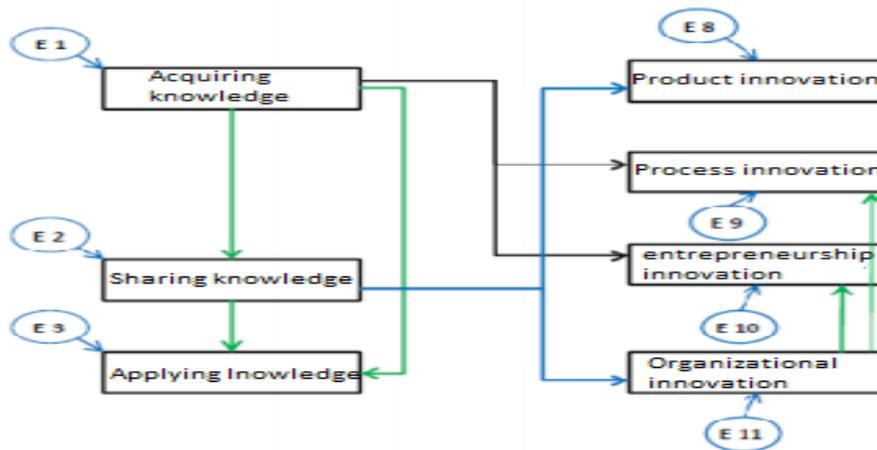


Fig 3: SEM using path analysis after the removal of unapproved correlations

CONCLUSION:

The results showed that among the three dimensions of knowledge management in Iran Alloy Steel Company, the impact of knowledge on process innovation and marketing innovation was significant and on the other hand the impact of knowledge sharing on product innovation and institutional innovation was significant. Also, because of the relationship between different aspects of knowledge management and innovation of each other in the model and the other was effective relationships and structures, considering the relationship of the two groups of variables were analyzed with the management of knowledge and of innovation. Results of the study show that the application of existing knowledge in order to gain and share knowledge, at a significance level desired, will be affected. On the other hand, the sharing of knowledge is affected. The results of the relationship between innovation types together show that none of the initiatives have a significant effect on product innovation. Significant effect on process innovation and organizational innovation and marketing innovation was confirmed in the Amos path analysis.

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