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## A framework for the implementation of knowledge management in supply chain management

Hamed Shakerian<sup>a</sup>, Hasan Dehghan Dehnavi<sup>a,\*</sup>, Fatemeh Shateri<sup>b</sup>

<sup>a</sup>Department of industrial management, Yazd branch, Islamic azad university, Yazd, Iran

<sup>b</sup>Department of business management, Yazd branch, Islamic azad university, Yazd, Iran

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### Abstract

Knowledge management (KM) is one of the most important competitive resources in each organization so that many believe that companies who can get knowledge and applies it faster, they will be more successful in competitive market. On the other hand, the importance of competition between companies has been lost and the competition between supply chains to produce maximum values for customer has been emphasized. Supply chain management is assumed as operational strategic situation in service and product industries. Over the last 10 years the companies has implemented strongly supply chain management strategies in their organization. Knowledge management is major capability of supply chain management and vital element of intensive information and multi-cultural organizational environment. Understanding the importance of knowledge management in the supply chain is an attempt to provide a conceptual framework for the knowledge management in managing supply so a case study was conducted by French companies. This research was conducted based on questionnaire containing multiple- choice 66 items. Of among, these are a few questions about knowledge management, knowledge matrix Nonaka and knowledge management practices. Finally, a summary of findings and results of knowledge management of the supply chain was provided.

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### 1. Introduction

By beginning of the third millennium, knowledge management is considered as a strategic need for the institutions, organizations and service parts. Knowledge management is an approach that can be implemented by

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\*Corresponding author. Tel.: +989133589737; fax: +9835331872704.

E-mail address: [h.shakerian.h@gmail.com](mailto:h.shakerian.h@gmail.com)

the organizations management with little flexibility and bring out competitiveness in the future, being progressive to the new products and services, conquer new markets and create new markets and maintain knowledge capital. Topic knowledge management is one of the emerging issues in management and attention is highly attracted by scientists and most important element of knowledge management, implementation, and its effectiveness so that it is necessary to recognize knowledge management as spirit acting on organization to implement. Supply chain management is a key strategy situation that affect directly on organization success in a more competitive business environment. By developing supply chain management, its content has changed. Traditional supply chains has emphasized on cost and factors such as material and parts flow, information flow and financial flows(Calvo mora et al, 2015). Today the market needs to respond faster than past. Traditional factors management is not responsive to current needs of chains. The key to survive in today's world is to have competitive advantage to competitors. On the other hand it is necessary to improve performance for competition. Performance improvement is considered an important topic in today's world. Supply chain is also considered as one of the features of the world(Eidi et al, 201). There are different factors and tools to improve supply chain performance. Knowledge management is one of the most important tools. Nowadays supply chains in addition to resources and tangible assets, have focused on intangible assets such as knowledge. Intangible resources can produce competitive advantage. In general term intangible resources is applicable to cover wide range of factors such as reputation, supply chain configuration, knowledge of employers and organizational culture. Sharing knowledge is considered as a competitive advantage for supply chain(Sayadi et al, 2014). The managers found that only production of a quality product is not enough, in fact, preparation of products with needs of customers and quality and desired cost has created a new challenge. As a result of mentioned changes they founded that long-term changes are not enough for organization. They must involve in managing the network of all factories and companies which provided the inputs directly or indirectly into their organization, as well as companies associated with the delivery and after sale services to the customer. With such attitude, supply chain approaches and its management were formed. The aim of this project is to establish relationship between knowledge management and supply chain as well as provide strategies and solutions to improve knowledge management and supply chain(Khezli et al, 2014).

## **2. Theoretical Framework and Review of Literature**

### *2.1. Knowledge Management*

In literature knowledge management, so far a wide range of factors affecting successful knowledge management was identified. The first category of key factors to success knowledge management was determined. To be knowledge management success, 7 key factors were identified. These factors include: strong relation to business, perspective and mandatory architecture, knowledge leadership, the culture of creating and sharing knowledge, continuous learning, developed technology infrastructure, systematic organizational knowledge process. Literature showed that all factors are not important for small-scale projects(Dominik et al, 2014). A study to examine factors affecting knowledge management in organization was conducted. Initially researchers extracted a set of factors from different literature. Then they searched and investigated more factors by doing Delphi method and international panel of colleagues and practitioners of knowledge management. They proposed three important factors i.e. management, resources and environment(Schneckenberg et al, 2015). Scientists attempted to identify a set of key factors to success organizations that designed and implemented knowledge management. They used a qualitative case study to collect data in order to achieve insight to the topic(Xu et al, 2015). Scientists introduced 16 concepts as the key factors. They used heuristic method on 31 projects in 24 companies. One of their aims was to determine the related factors and their effectiveness. In 18 projects, 8common factors were identified. They related knowledge management to clear purpose and language, standard and flexible structure, several channels for transferring knowledge, economic performance, industrial value, friendly-knowledge culture, organizational and technical infrastructure, change in motivational methods, top management support(Fidel et al, 2015). Scientists determined various successful factors to implement knowledge management in 5 domains of organizational performance: Strategy, human resources management, information technology, quality, and marketing. Their efficiency based on initial securities questionnaire of 100 companies was evaluated and available literature was examined to identify key factors to adopt knowledge management(Dharini et al, 2015). Scientists defined six Key factors to be successful knowledge management. They suggested the need to knowledge management strategy by supporting top leadership, knowledge expert or equivalent Ankoys in knowledge management structure, knowledge storage, knowledge

management systems and tools, the motivation to encourage sharing knowledge and supporting culture (Sanchez et al, 2015). Scientists examined the key successful factors to adopt knowledge management in medium and small-scale institutions. They developed a questionnaire with 11 factors and 66 elements and for collecting data, send it for medium and small organizations in England and group of teachers, consultants, experts in knowledge management to develop general attitude to successful factors (Kaufmann et al, 2015).

## *2.2. Processes of knowledge management in supply chain management:*

Creation and production of knowledge refer to level of development or formation knowledge resources by organizations during operational periods and required potential to product new applications of exiting knowledge and exploitation of potential new skills. They believe that creation and product of knowledge phases relate to planning and implementing organizational system life cycle and creation and learning knowledge need more specialized skills than knowledge application. In order to create knowledge in logistic, criteria for customers feedback include observe customers sites to better understand their needs, participate in sale activities, help to customers to solve the problems, cooperate employers of service unit to familiar with how to do some things, observe the leadership's equipments and facilities in industry, monitor suppliers to learn different aspects of work, attend in network formation meetings (e.g., economic and management college, research group and industries union), study law groups and government reports (Peng et al, 2016). For this process, criteria such as identification of customers' needs regularly and periodically, evaluation of service and products quality of chain annually, evaluation the effect of changes in supply chain were defined (Serna, 2015).

## *2.3. Knowledge Management in Supply Chain Management:*

Supply chain management has become the importance through global industry and competition and is likely to remain a major element in worldwide competition. The current economic crisis with more competitive environment is a real need to optimize the supply chain. When profit declines and the new costs increase, new exchanges occur and organizational models are required to develop in order to facilitate decision making and maintain the competitive advantage. For the past few years, companies implement supply chain management in order to make decision in higher levels of strategy related to entire organization including product development, customer communication, product, sale and preparation (Kandahari et al, 2015). Supply chain adjustments of companies in a network need to promote activities and capability of upstream and downstream e.g. from raw material to final use. Network adjustments are consisted of from heterogeneous groups who share their interest material but sometimes it deals with autonomic relations. The benefit of supply chain management is company's ability to use network of suppliers, salesman, buyers, and customers (Rostami et al, 2015).

## **3. Methodology**

The method in this project was a research study and some experts' opinions about supply chain and knowledge management were used and both concepts were incorporated into project. Since this research focuses on relations between memberships of supply chain, we propose a framework and use it to develop a questionnaire having all aspects of knowledge based on Nonako model. Particular focus of the study is on fixed element as determinant in process of creating knowledge especially defining motivation of supply chain partners to share knowledge in system. To test the question, we collected French companies attitudes about creating knowledge in their supply chain.

### *3.1. Data collection*

This research is based on a questionnaire containing multiple-choice 66 items (75 multiple choice items and 7 open –ended items). Of among, a few questions related to knowledge management process, knowledge matrix Nonako and knowledge management practices. Before the test on six professional, supply chain was conducted to improve questionnaire. This enables us to review specific questions and combine some of parts so that the study provides the knowledge management problems in supply chain appropriately. The questionnaire consists of five

sections: 1-the common fields related to concept Nonaka , 2-exchange information between colleagues in the social process, 3-Sharing knowledge related to external process,4-common exchanges and creation of common knowledge according to combination trend, 5-publish and transfer knowledge related to internal processes. Introduction section highlights framework and purposes of questionnaire. Interviewee was asked to refer to his regular and long-term relationship with a special partnership (strategic supplier or customer).The idea is to refer to a specific problem that he manages professionally. Data was collected during 4 months. SPSS software and Excel were used.

### 3.2. Data analysis

The data was collected using knowledge management in supply chain questionnaire and then analyzed to identify some of the successful factors for knowledge management in order to increase competition in the supply chain. Also we collected data on the impact of knowledge management in the supply chain. Many companies direct us to collect the empirical data of supply chain operation. This concept had validity in terms of variety and information redundancy. Creativity, independence and willingness to share information were evaluated. Also knowledge management of Nonaka model using empirical method and data analysis was evaluated.

### 3.3. Company Features

Industrial and service companies in international level were interviewed. The number of employees varied between 50 or more thousand. The trading volume varied from 1.7 million to 37 billion Euros. Average age of company is 65 years with mean 45 years. Most companies are mature, but supply chain services necessarily have existed for a very long time: 15 years. According to industry orientation, respondents mainly worked in production sector (Table 2).

Table1. Criteria for organization, maintain and store processes in supply chain

Ability of access to knowledge resources and results of projects
Record, update, and review the individual experiences continuously
Classify the information based on learning needs
The numbers of messages and saved documents in knowledge management system of organization
Integrated databases to store information
The employers responsible for updating and editing the available information in knowledge management system

Table2. Criteria for transfer, share and distribute processes in supply Chain

Presence of teams and inter-functional meetings to examine different trends in market and chain
Existence of suitable tools, communication network and information systems to facilitate and share information among chain members.
Establish informal groups and human network(quality loops)
Existence of strong culture and redirection of sharing information and accept consultation
Share specialized –technical information with suppliers and logistic members
Encourage and support by management to share information and knowledge
use and update databases and the different knowledge stores to improve process quality
Bidirectional organizational relations between top managers and members
Establish teams of chain supply with companies' members in supply chain to examine chain activities.

In fact, 80 percent of this section and the remaining companies were divided into services, manufacturing and distribution of electricity, gas and water industries. Trade, repair of motor vehicles and household goods, hotels and restaurants, transport and communications and work were considered as social and health category. According to our research i.e. the transfer of knowledge and cooperation between focal companies or suppliers, it is appropriate to focus on manufacturing company. Also, manufacturing companies offer a better range

of supply chain management and its competitiveness based on knowledge management process and effective implementation. Therefore, present research focuses on the manufacturing sector (Table 2).

### 3.4. Expert systems

This study aims to examine the relationship between knowledge management and supply chain management through the analysis of theoretical and empirical works, and help to the debate about the role of knowledge management in supply chain management. The study points out that effectiveness of sharing knowledge among supply chain partners have following features: agility, adaptability and alignment. This feature allows the best performance of the exports. This paper presents the results of review of the contents of knowledge management in supply chain management. Based on review of 58 articles, three materials are examined, (A)Are the field of supply chain management and knowledge management applied and how? (B)How can we use knowledge management in supply chain management and improve it? (C)How is knowledge management used to stimulate knowledge and share it among different supply chain partners

## 4. Results

### 4.1. Outsourcing

Features of outsourcing activities were evaluated in five articles. Bandy(2007), Blumnborg(2009), Nemi(2010) emphasized cooperation and confidence to promote knowledge management processes among businesses. Becker(2010) refers to lack of knowledge base and propose counter-balance actions such as establishment of communication structures to reduce dispersion of knowledge in long-term. Madsen(2008) highlights the importance of an approach to identify hidden knowledge process in outsourcing activities.

#### *Development of New Product*

New product development is another area where companies have to cooperate in order to share knowledge and developed knowledge management activities. Information about knowledge management in product innovation was described. Development of new product is a continuous learning process rather than a dispersed event and considered as one of the most promising areas in knowledge management. They considered the new product process as part of their research in automatic outsourcing. They used methods of knowledge management as a formal meeting, experimental workshops, and specialized interviews to ensure the new product development process(Eidi et al, 2013).

#### *Construction*

The features of a particular sector from construction industry have been shown in 3 articles. Briscoe(2001), Khalfan(2010),Tah(2010) referred to technical and relationship based skills. Requirements are considered as major factors in the construction supply chain. Tah(2010) explained a framework for risk management project in the construction supply chain. Khalfan(2010) also focused on the construction supply chain and emphasize the positive role of safety in improving the integration of the supply chain.

#### *Decision Support*

Decision support is a common area where knowledge of management initiatives is obtained by searching knowledge as a mean to fill the gap between what decision makers know and what they need to know. Need for strategic decision-making tools to help knowledge management causes knowledge management to define more useful structure in supply chain development(Khezli et al, 2014).

#### *Risk management*

Tah(2010) proposed a risk assessment method based on the language of operators.

## 5. Discussion

In knowledge management field, 58 articles about knowledge management programs in supply chain between 2000 and 2010 were collected. Some observations are as follows. Theoretical and methodological issues were analyzed to better understand to determine whether a particular theoretical perspective was explicit or not. When economic and strategic theories were used, they focused on theories about strategic management (resource-based and knowledge-based view of the firm). In terms of economic, costs transaction was used as model but in some cases the evidence is in conflict with prediction such as case of area supply network and shows that the confidence plays more important role than economic well-being in organization. From methodology perspective, qualitative methods have more applications as shown in table1 while a few articles were consistent with the quantity (Sanchez et al, 2015).

### 5.1. Observations and Recommendations

It has shown that knowledge management is considered as a tool to integrate supply chain. Despite the interest in studying information technology, solution to improve the sharing of knowledge, documentation and evidence of a positive relation between their use and success of supply chain integration is weak.

### 5.2. Proposed Model

The idea of knowledge creation between the various factors belonged to the same supply chain can be related to developed model law in cognitive psychology. This model has focused on the purchase and transferring contingent knowledge is one-way. However it helps to understand the relationship between implicit and explicit knowledge as shown in the framework. Social phase is originated in Hauns Gadamer's concept of "fusion of horizons". He developed this concept to examine methodology in order to interpret historical test. He argues that real understanding of a text will be fusion and combination of interpreter and author's horizons. In case of concept knowledge management, socialization can be considered as fusion of implicit knowledge of participants to common mental model. He explained that the first social example of Honda is to establish "brainstorming" camps to solve the difficult problems in development projects. In framework of the interaction, socialization means exchange trade information between collegians but there is not complexity in related organization culture.

Table3. Criteria for creation, acquire and production processes in supply chain

Continuous cooperation with internal and international customers to evaluate their needs
Continuous cooperation with companies to evaluate the changes among members of chain
Sensitive to change in market and evaluate these changes among competitors in industry
Participate in industrial, scientific-research conferences and continuously study the result of scientific researches related to industry to identify the best standards and patterns
Establish different groups for discussion to produce idea and innovation in product and production process
Provide decision-making opportunities by educational systems to improve and update individual skills.
Employ and maintain specialized and knowledge –based employers in each unit

This real dialogue with the external phase starts when the partners began to exchange explicit and clear information obtained by contingent knowledge. According to dialogue, recognition is a multi-perspective and relates to collective action in nature. The partners decided to come together to solve a problem thus it is necessary to convert contingent knowledge to explicit knowledge (Xu et al, 2015). The aim of the study is to understand this process by analyzing the methods and the used tools. When explicit knowledge was shared, new models and methods can be developed to create a new knowledge system. Persons combine and exchange knowledge through media such as documents, meetings, emails, telephone calls, or computer communication network. Reconfiguration of exciting information can lead to new knowledge contained in contingent knowledge. When company's experiences are implicit knowledge base in form of internal structure, technical knowledge and shared mental models, the internal phase can be compared to "learning and work", meaning that the ability of workers to improve



their efficiency is regular repeat of the same action. In the context of the supply chain, internal phase occurs when a company learns experiences of other companies (Dominik et al, 2014).

## **6. Conclusion**

According to the proposed conceptual framework for knowledge management in the supply chain and experimental validity of the model, the following findings for research and application in practice may be useful: it is observed that when the conditions are described badly by qualified companies, only 38 percent shared collaborative tools and knowledge. When the common tools in the development process of knowledge creation could not be used, the research shows that learning can be provided across companies of supply chain through cooperation. Tools development allows knowledge to be achieved well. Such tool used by development partners is knowledge. Socialization and externalization are two steps having the good conditions in companies but combination step is reminded rarely. It means that there are some barriers to share knowledge and the nature of these obstacles should be discovered later. If the knowledge has value and validity for the company and would be source of competitive advantage, according to the theory of knowledge base, it is seemed that knowledge methods and practices in supply chain should be blocked through combination step. In initial stage of development of supply chain network, Knowledge management must focus on socialization so that it removes the barriers of network and develop trade relations between major company and its competitors in chain supply. During socialization, desire and satisfaction (interest to develop cooperation) redundancy and abundance and automation play an important role in the development of sharing informal information among powerful partners in the supply chain. Externalization is more important in knowledge management of supply chain because sharing the informal information among structural meetings and information sharing processes enable to support and collaborative progress in supply chain network. Important factors for externalization in supply chain management include structural change of documents, contract documents, structural meetings and formal process. The initialization and implementation of knowledge phases are considered as an internalization step that it transfers explicit to implicit knowledge across applications of knowledge management through learning, quick solutions and sharing internal information.

## **7. Suggestions**

Further studies can be conducted to examine available challenges in distributing organization to implement knowledge management, provide methodology to measure the individuals, provide methodology to evaluate organizational knowledge, study the ways of evaluating and improving based on employers knowledge, propose methodology to share knowledge in supply chain in terms of different nature of organizations belonged to chain, provide methodology to improve educational system of researchers based on the obtained knowledge, examine the holding methods and compensate services of knowledge –oriented employers. Given the obtained findings and the interview with experts, suggestions can be provided as follows: lack of competitive space for auto-industry in Iran caused knowledge management as competitive advantage should not be considered while competitive space plays more importable role in other industries of different countries. It can be said that if the industry enters competitive space, forced to exploit the effective and competitive culture for its improvement so it necessarily uses knowledge management models. Thus lack of government intervention in making policies and providing a private space and recomplete in the industry can increase the desire to use of such strategic tool. One of the most effective actions which government can do is to reduce the level of industrial tariff support. On the other hand the government should participate actively in determining the costs of research and development, acquire, distribute and apply knowledge to develop new product. Providing the integrated software systems to evaluate and analyze the performance of knowledge management and examine growth periods for knowledge management inside and among the members of supply chain, convince the top manager of active departments in auto-industry about long term profits, implement knowledge and reform their attitudes toward investing on set of knowledge management activities should be such a way that they find it should not be had operational, short –term and based on cost attitudes toward knowledge management. The key staff in each unit or department is selected and then records their experiences in monthly meetings. It means that documents organization tries to collect individuals' experiences and classify and distribute them through a periodically attractive program among experts of similar units of supply chain. Selection and employment of knowledge –based and specialized individuals in each aspect of organization and preparation of

competency matrices and formulation of exact professional programs are necessary to determine individual knowledge needs and create knowledge better. Also the use of innovation techniques, producing idea and creativity and the integrated system of suggestions among employers and organizations or members of supply chain are more important to create, distribute and apply more knowledge.

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