International Journal of Economics and Management Sciences
Vol. 1, No. 7, 2012, pp. 26-35

MANAGEMENT JOURNALS
managementjournals.org

IT-based KM and Productivity Increase in SCM (Case study SIVECO company in Syria)

Mehdi Asgharpour[1], Mohammad H. Mobaraki[2] and Neda Masnavi[3]
[1] *Corresponding Author, Faculty of Entrepreneurship, The university of Tehran, Iran.*
. E-mail: asgharpour@ut.ac.ir
[2] *Assistant Professor, Faculty of Entrepreneurship, The university of Tehran, Iran.*
E-mail: mhmobaraki@ut.ac.ir
[3] *Research Assistant, Faculty of Entrepreneurship, The university of Tehran, Iran.*
E-mail: nmasnavi@ut.ac.ir

ABSTRACT

Knowledge Management (KM) is considered to be one of the management tools in the ever-changing competitive world.[1] The main purpose behind this study is to research the knowledge management impact on productivity increase by the help of information technology (IT) from the viewpoint of planning and supply chain management (SCM) in the Iranian Automobile making company in Syria (Siveco) as one of the siding companies of Saipa automobile making company in Iran. The findings of this paper gained from studying the literature and probing into the experience and search results recorded by the Iranian experts who attended in Siveco company for a period of two months in year 2008 in the early stages of starting up Pride automobile export in Syria which focused on the role of KM in cost reduction (CR), making wealth and value added by preventing and decreasing the stagnant inventory of the production warehouses, optimizing the packing designs, decreasing the amount of defected parts, wasting and operator mistakes, and supplying the ordered parts in time for developing the economic production in the primitive stages of Pride export to Syria throughout the facilities provided in the field of information technology.

Keywords: *Knowledge Management, Productivity, Siveco, Supply, IT.*

1. INTRODUCTION

1.1. Background

Focusing on the provocative role of knowledge has an increasing impact on the organizations and societies development. New economic growth originates from knowledge and information. Recent studies show that organizations which invested on KM[1] generally emphasize on IT[2] appropriate infrastructures to meet their goals. IT acts as a powerful factor supplying the effective and efficient tools for all aspects of KM from capturing and sharing to applying knowledge.

"KM helps organizations in providing more effective processes. The organizations profit by the available knowledge to develop the new knowledge resources, but they should consider that any system development throughout an organization requires its own prerequisites regarding its different circumstances. Therefore, in case of missing knowledge, it is not possible for an organization develop a successful system" [2].

This paper is prepared by studying the early stages of Pride automobile export project in 2008 monitored by the result of the practical experiences recorded and the environmental searches of the automobile industry experts in their two months mission in Siveco- the Iranian Saipa Automobile manufacturer siding company established in Syria.

[1] Knowledge Management
[2] Information Technology

1.2. Problem Statement

In this case, we tried to focus on the role of KM in CR[3], making wealth and value added by preventing and decreasing the level of stagnant parts of production warehouses inventory, Optimizing the packing designs, decreasing the amount of defected parts, wasting and operator mistakes, and supplying the ordered parts in time for developing the economic production by employing the facilities provided in the field of information technology. As a whole, it is intended to recognize and define the place of KM in the supply chain of automobile industry along with presenting its coverage areas through the experts' practical researches in increasing the productivity of the automobile parts export by the help of IT in this case regarding the paper writing limitations.

1.3. Purpose

"Knowledge Management is considered as a prominent issue in Management since it is not only a *tool* or a *resource*, but a social structure. It can be stated that the process is the result of information flow from one side, and the intelligence and reciprocal connections from the other." [3] The Knowledge-based organizations around the world indebt their success to a large extent to the fast growth of IT and deploying the facilities of this type since IT makes development in all of the plans and projects in perceiving and managing the required knowledge. KM is known as a necessary and helpful element in most of the decision making and management controlling situations. In line with the above realities, concisely the purpose of this paper is to appropriately evaluate the KM function in supply chain plans which may lead to the productive automobile export by using IT equipment and facilities.

2. LITERATURE REVIEW

2.1. Knowledge Management Concept

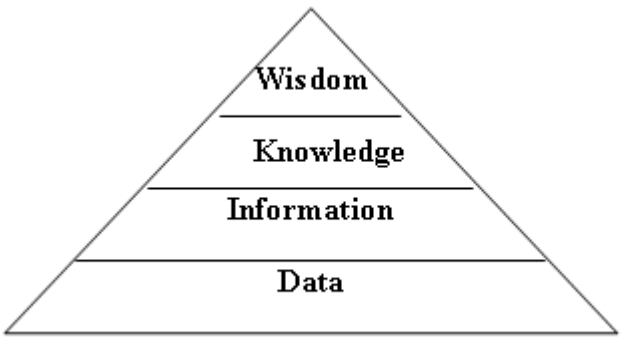
Although KM has been regarded practically and informally for a long time, there is no concrete definition of the concept of knowledge management. Moreover, the available definitions imply the diversity of attitudes towards this concept. In order to define it based on the subject of this paper, at first we need to perceive the elements which are somehow related to this issue.

2.1.1. Data, Information, and Knowledge

"Data is the reality of a situation or a state of an especial field disregarding its relation to other things. In fact, data is the pure fact and reality about the events, and adding any field or interpretation to them and connecting them together causes the formation of information whereas by adding perception and memory to information develops the natural deployment in mind after information." [1]. "Polanyi and Canter (1962, 1999) defined knowledge as the power for integration, and valuable decision making."[4] "When the people share their information together, they will increase their knowledge en masse, and new knowledge will be resulted from the combination of a person's knowledge with others. Wisdom is the ability to use this experience and knowledge. For clarifying the issue, one may imagine a person who knows the side affects of fat in diet on fatness, meanwhile doesn't prevent eating greasy food. He doesn't have wisdom since he has the knowledge, but the problem is that he doesn't use it! "[1]

"Knowledge Pyramid: Regarding the concepts and definitions above, the knowledge pyramid may delineate them as shown in the picture below. Data has taken a seat in the lowest level, and wisdom is the highest at last."[1]

Figure 2.1: The Knowledge Pyramid [1]



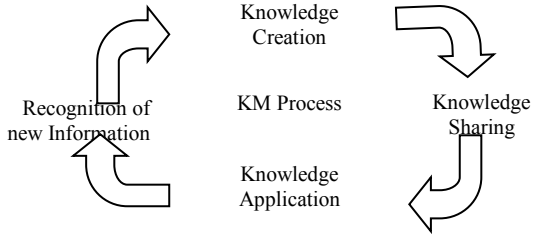
[3] Cost Reduction

Regarding the above descriptions, the closest definition of KM to this study is that "Knowledge Management is the set of tools, techniques, saving knowledge strategies, analyzing, organizing, optimizing, and sharing knowledge in an economic and business enterprise"[5] According to Wilson "Knowledge Management implies the recognition, selection, organization, summarization, and classification of required information for running a firm as to optimize the staff role, and the competitive advantage of an organization or a company"[6]

2.1.2. Knowledge Cycle

As the model indicates below, knowledge cycle implies sharing the saved knowledge attained in line with meeting the organizational goals shared by different departments of a company.

Figure 2.2: The Cycle of Knowledge in a creative enterprise [6]



2.2. KM, IT, and Productivity

Karl Erik Sveiby identified two approaches of classifying KM

"**IT-Track KM** that refers to management of information. Researchers and practitioners in this field tend to have their education in computer and/or information science. They are involved in construction of information management systems, AI, reengineering, group ware etc. To them Knowledge = Objects that can be identified and handled in information systems. This track is new and is growing very fast at the moment, assisted by new developments in IT.

People-Track KM that refers to management of people. Researchers and practitioners in this field tend to have their education in philosophy, psychology, sociology or business/management. They are primarily involved in assessing, changing and improving human individual skills and/or behavior. To them Knowledge = Processes, a complex set of dynamic skills, know-how etc, that is constantly changing. They are traditionally involved in learning and in managing these competencies individually - like psychologists - or on an organizational level – like philosophers, sociologists or organizational theorists. This track is very old, and is not growing so fast." [7]

Considering these two approaches we will continue the theoretical searching of the research background about KM with a focus on IT and productivity of organization and human resources.

2.2.1 Evolutional movement of KM in the space of IT

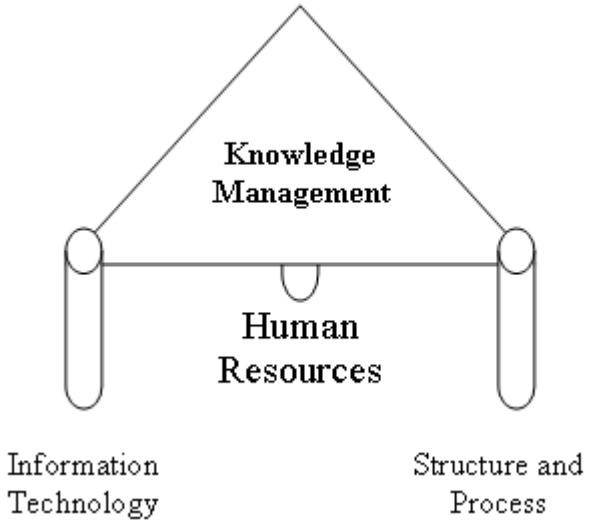
"Marshal (1965) interpreted knowledge as the main part of capital and the most powerful engine for production in the organizational structures that requires an increasing control and management. Kuhn (1970) emphasized that knowledge is the common wealth of a group. Habermas (1972) pointed out that knowledge should be considered as a product based on intentions instead of an abstract variable."[8] " Perer Drucker, Pole Strassman, and Peter Senge are among those pioneers of management who had a significant role in theoretical basics of management. Drucker and Strassman emphasized on the increasing significance of information and explicit knowledge as the vital organizational resources."[9] "In the middle of 1980s, the importance of knowledge identified as the competitive capital of the companies. In this decade, KM systems developed mainly by artificial intelligence, and expert systems that created concepts of knowledge attaining, knowledge engineering, and knowledge-based systems."[10] "In 1990s, most of the scientific and academic centers counted on KM as a new business activity since the competitive advantage some companies gained in the world was the result of their knowledge assets such as competencies, customer relations, and innovations."[11] "Afterwards KM plans expanded more due to the internet extension and deployment; International networks of KM integrated around the world, and various seminars held until now with a special attention towards KM for gaining the competitive advantage."[12]

The concept of IT in this paper refers to the collection of factors, and artificial intelligence tools, software and hardware equipments applied in producing and supplying numerous parts of automobiles including computer units, systems despite networks and groupware which facilitate group cooperation on a computer network, graphic and statistical software, global web, Internet and email facilities. "The impact of IT in the cycle of organizational knowledge as an integral part of supply chain results in better production line support, facilitating and expediting each of the supply processes in this field.

2.2.2. KM and Productivity

"Some believe that productivity is a combination of effectiveness and efficiency despite the ability to change in accordance with the various internal an external occasions."[13] Productivity in an organization is the outcome of aggregating the two concepts of effectiveness and efficiency whereas effectiveness indicates settling the appropriate goals, and efficiency deals with the ways of achieving the goals and organizational strategies." [5] What may result in competitive advantage in an organization is productivity which means applying and effectively combining the available organizational resources that emphasize on integrating knowledge and action. "One of the most basic problems for the managers in the field of human resource (HR) strategies is that how we can make KM and human resources of any organization more efficient. Productivity is among the policies that should constantly under consideration and control of an organization since productivity creates competitive advantage, and what may be the basis for productivity is learned and knowledge creating human resources who have the ability to convert ideas to products and services since the basis for organization productivity is productivity in thoughts and ideas."[4] "In fact, KM in the framework of productivity emphasizes on three main elements of human, structure, and information technology trying to meet the organizational goals by creating appropriate structures, processes, and technological infrastructures"[14]

Figure 2.3: Main pillars of Knowledge Management Model [14]



3. METHODOLOGY OF RESEARCH

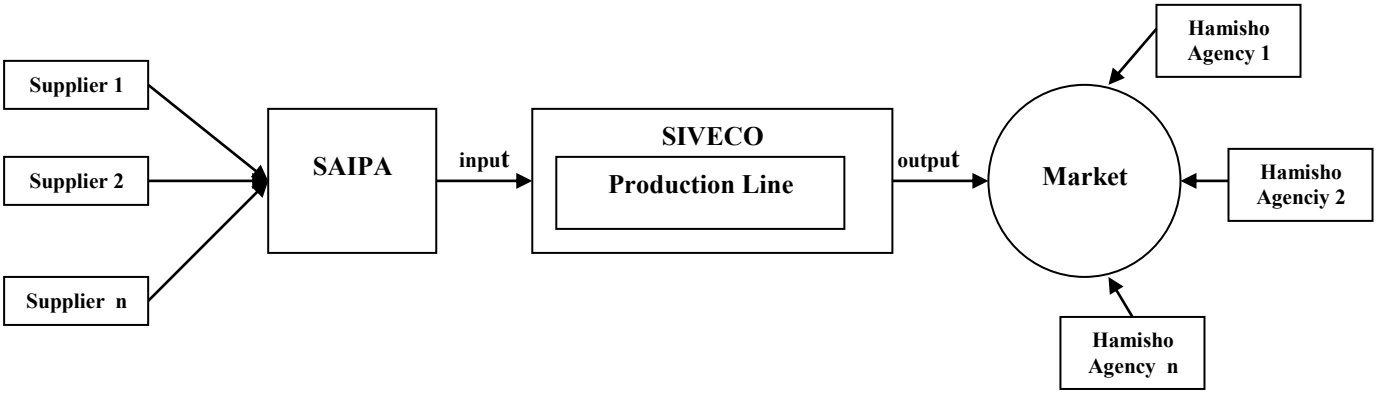
This research accomplished in order to review basics and necessities of applying KM and experiences exploited by the experts of automobile industry in increasing productivity along with presentation of theoretical issues which leads to surveying practical experiences at last in a developing approach in order to classify the information derived from theoretical and document studies of semi-structured experiences of the new environment searches done by the experts who attended in Siveco on a timely mission. The references for collecting information were the reports, analysis, recommendations, conclusions, approved policies, decisions, minutes of meetings, and diagrams provided through the searches accomplished during two month attendance of the Iranian Saipa auto-making company experts in Siveco- the main Saipa siding company in Syria in the primitive stages of different models of Pride automobile to Syria from May to July 2008.

4. FINDINGS IN SIVECO FROM THE ASPECT OF SUPPLY CHAIN

"Siveco[4] company was registered in May 2005 in Syria. %87.4 of its stock belongs to Saipa Iranian giant automobile manufacturer, and the remained %12.56 belongs to the Syrian Hamisho company with after sales services commitment. Siveco located in a land of 205000 meters in the manufacturing town of Hasia near the southern part of Homs city. This company started its production with an annual plan of 5000 units of vehicle production, and this rate exceeded 15000 units a year until today."[15]

[4] Syrian Iranian Vehicle Company International (SIVECO Int.)

Figure 4.1: Analysis of Siveco status in relation to Saipa



Following the sequence of the paper sections, we will discuss the KM related findings and observations in productivity promotion of production and automobile export optimized through the methods, techniques, and experiences of Saipa supply chain experts in Siveco by exploiting the developments from IT tools and facilities.

4.1. On time feedback procurement

Preparing and preserving information, on time notification and knowledge transfer has an undeniable prominent role as one of the main stages in production and supply planning process. Any delay in transferring information to the foreign suppliers (here Saipa) may lead to delay in receiving supplementary ideas related to the problems of needed parts and materials supply. In a survey among the reports texts in this two months period we could observe that five cases of these reports sent by delay in different times due to various problems such as Internet or email connection failing, Saipa or Siveco temporary server problems, low speed of Internet, and network problems which could lead to serious problems for the production line unless they switched to other temporary remedies such as using outside coffee nets, or sending emails after the work hour at night.

Table 4.1: Times of delay due to temporaty IT problems [16]

Row	Date	Internal Network Problems	Saipa/Siveco Server Connection Problems	Low Speed of Internet
1	April, 29	√		√
2	May, 14	√		√
3	May, 21		√	√
4	May, 24			√
5	Jun, 16		√	√

4.2. Extra parts or materials

Regarding the numerousness of the parts related to different models of automobiles, change in producing some of the assembled main parts from the suppliers, Engineering Changes announced by engineering departments through ECN[5] or ECR[6] sheets, or sometimes wrong dispatching parts which are related to other models or other sides (for example sending some parts related to Pride model 141 which was not produced at that time in Siveco instead of model X100, or double-sending of front right mirror that caused even shortage in front left mirror for the same quantity) in frequently dispatching consignments by the sub-supplier companies gradually could lead to an increasing stock of extra parts most of which would have no conformity to the products manufactured in the production line. Therefore, it was urgently needed to gather the related data in some planned reports which could monitor the number and variety of these parts along with following the reason of emerging each of them with the

[5] Engineering Change Notice
[6] Engineering Change Request

following correspondence in order to stop increasing them, and making the way smooth for the next step that was searching a way for making warehouse space free of these parts.

This task has a special importance since it could decrease the extra production and extra shipment costs for Saipa in one hand, and decrease the storing costs of warehouse for Siveco. Therefore a special system was developed in Siveco that listed these parts by using data spread sheets and statistical software including Excel, Minitab, and SPSS for identifying and tracing the parts which had an extra inventory in Siveco production warehouses. Thus, the reason of not consuming them in production put into consideration by checking them locally and sending extracted data to the supply center (Saipa) for checking them with BOM[7] in their further studies and latter preventive or corrective actions in order to decrease sending extra parts as much as possible by notifying their suppliers of the results for a better decision making based on these reports for revising their packing list or process.

It is not worthless to remember that sometimes, it was not possible to recognize some of the wrong parts due to their similarity with the right parts. Therefore some extra photo reports prepared and attached to the main reports as to clarifying and documenting the main claim regarding the wrong parts or other raw materials received which needed a suitable Internet speed and bandage width for uploading and transferring their files immediately and completely.

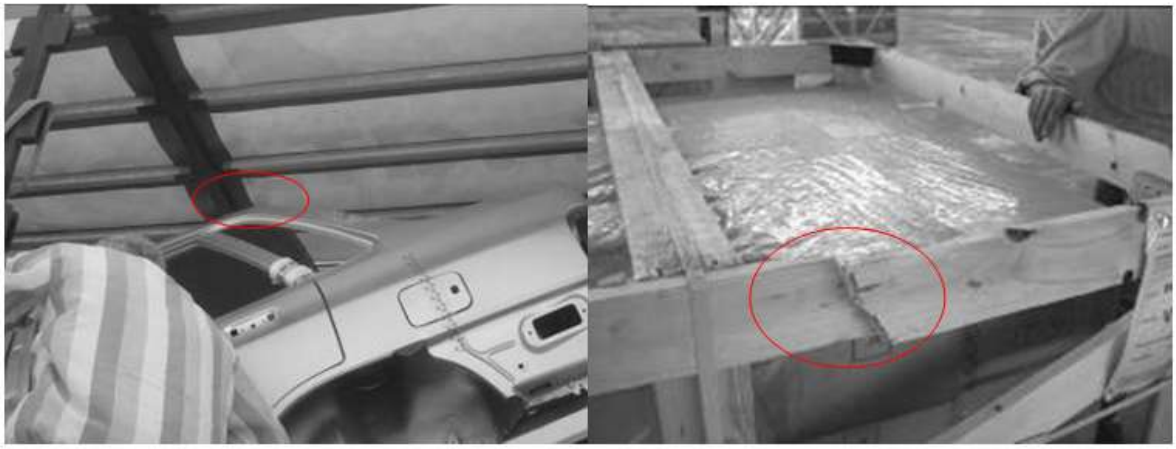
4.3. Defected Parts and Waste Materials

In spite of the above captioned items, defected parts observation concerned the experts so that they felt a lack of having confidence in the accuracy of supply methods from the time of producing parts and materials by the suppliers to the time of packing, dispatching, receiving and consuming them in Siveco. In fact many processes related to the raw material supply planning from production to consumption time needed to have a controlling system in order to reduce the defected parts and waste materials, the most important of which could be listed as below:

4.3.1. Packing designs controlling

Since there were no sea shipment between Iran and Syria, the parts were mainly dispatched by truck or railroad. Therefore, packing designs had to be continuously controlled and revised in order to get the most conformity to the standardized state in which no parts would be damaged or defected during truck or train shipment. For this reason, all the consignments including assemble, body, trim or chemical materials had to be checked completely, then, announced in the form of photo reports. Photos showed the damaged or weak areas with the cause root of the probable defections that might happen due to the shipment process. The seriousness of optimizing packing status of the parts gained more importance especially when some parts were damaged in a container or box.

Figure 4.2: An instance of the photos relating to packing weak points [16]



4.3.2. Assembling process controlling

Sometimes the parts are defected, but the root cause of defection is neither the suppliers nor the packing designers. In this case, the parts were "ok" from the quality point of view when they entered into the company.

[7] Bill of Material

Therefore, the internal processes needed to be controlled at this time. One of the most important processes inside the company was assembling process. Sometimes, the assembling mistakes in the production line were the reason of defection increase for some special parts. Bad mishandling of some sensitive parts or using the wrong torque while turning some screws could be an instance of such line operator mistakes.

4.3.3. Storing standards controlling

Checking the storing and line feeding process was another necessity which could lead to a catastrophe if the storing standards such as FIFO [8]or LIFO [9] were neglected by warehouse people for sending the parts from warehouse to the production line, because the parts had a lead time for consuming, and they had to be chosen for production in accordance with the documents and strategies of storing to minimize the amount of defected parts. Moreover, the details of each part including part number, part name, part code, their station in the production line base on the engineering layouts, and the expire date of production shared and recorded on the computers of related departments including warehouse, logistics, supply planning, quality and engineering. Therefore, parts needed to be sent for line feeding before their life of production comes to the end unless the supplier could accept if the parts had any functional problems.

4.4. Shortage Parts

Regarding the parts claim agreement (PCA) between Saipa and Siveco, the parts not received in the consignments based on their packing lists, would be announced to Saipa (as the central supplier) in the form of shortage claim reports. According to the contracts between Saipa, its assemblers and suppliers, shortage claim parts divided into two types of KSH [10]and UKSH [11]claims. Therefore, considering the significance of this issue in preparing accurate reports in such cases from one hand, and getting feedback from the inventory controlling process could have a useful prominent effect on the flow of information, and making on time appropriate decisions to solve such problems which could lead to the line stoppage due to the lack of some essential parts, and make a huge loss for the company that might impose a high working pressure to all departments to compensate it for months at last.

Accordingly, it was perceived as a necessary action to identify and control the number of these parts in an appropriate flow of information from various sources including quality, engineering, production and supply planning departments of the two companies in Iran and Syria in advance which monitored in weekly continuous reporting documents to supply the needed parts on time.

4.5. Products audit reports

As Fisher (1997) highlighted "Some expectedness of demand for the product, the efficiency required and response from the market, such variables have to be taken into consideration before developing a supply chain."[17] Holweg and Pill (2001) also imply that "There has to be a close-knitted supplier production schedules into customer production schedules. The issue related to this integration could be geographical location of suppliers and customers."[18] Another important issue which attracted the attention of our experts and managers in Siveco was the active presence of the foreign competitors in this strategic market, and the importance of the customer satisfaction alongside the issues related to production process and supply challenges. That's why the manufactured products ought to be inspected from the aspect of quality to determine the percentage of their variance with the main standards and indexes defined for the qualitatively accepted automobiles. Therefore, despite the project of Pride export was at the primitive stages, quality and engineering experts with cooperating and training their Syrian colleagues started to inspect a wide range of assembled vehicles with the purpose of continuous progress in the quality of the products which led to sharing knowledge and experience between Saipa and Siveco in spite of increasing the quality of products by reflecting the results, and taking corrective measures in different steps from the suppliers to the assemblers consequently, the continuity of which to a large extent may help the organization to survive in the export competitive environment.

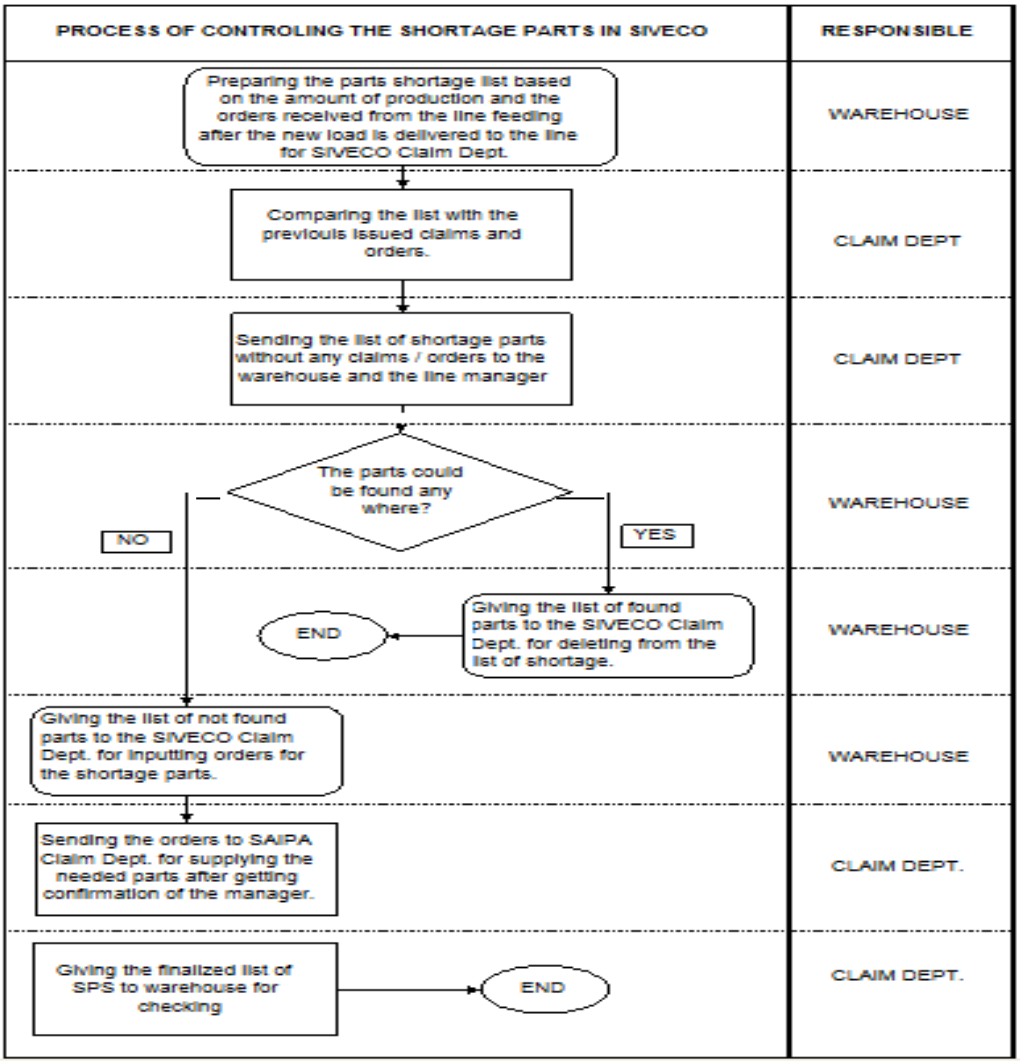
4.6. Documentation of the information related to the supply methods and prescriptions

The international production procedure in the world today has led the companies to search for some ways of achieving at least a reasonable portion of the market by revising the strategies, processes, techniques and the operations to get the most ability of responding to the market demands. The companies desire to optimize their indexes leads them to cooperate and build up the horizontal structures.

[8] Firs In First Out
[9] Last In First Out
[10] Known Shortage
[11] Unknown Shortage

In line with the above general purpose, the primitive measures taken to prepare, develop, and verify the methods and prescriptions of supply management in Siveco. Thereafter the results of the various meetings held by the engineering, quality, production and warehouse managements announced as the agreed methods in the company as it was fulfilled with the contribution of creative personnel and using their mental power as one of the productivity elements to develop the knowledge treasures and document the common organizational experiences in order to recognize the ways of better performing and role playing to increase the effectiveness and the efficiency of the organization.

Figure 4.3: Shortage claim process flow chart [16]



4.7. Summery of the scientific and empirical findings in Siveco

All of the information extracted from the above activities accumulated by using the common software programs at last. The resultant conclusions registered and classified after summarizing in the form of codified reports which frequently sent to Saipa for receiving the feedback in the earliest possible time by email that was the result of management decisions in Saipa as the main manufacturer company. The results of the above findings show that each of the improved supply processes has a worthy of note impact in rising efficiency and effectiveness of our vehicle production and export by the help of hardware and software facilities from digital cameras to computers, graphic and statistical computer software, worldwide web, email and other improvements observed in the field of IT.

Thus, we can conclude that supply chain is based on the productivity in the processes and responsiveness towards the customers by effective use of knowledge management. The success of supply chain lies in how technically a company unite productivity and responsiveness in all proportions with continued partnership with all actors on the both sides of demand and supply.

Table 4.2: The role of IT in effective management of the production processes [19]

Regarding the Attention Paid to IT	Production Without a Serious Attention to IT	Production Based on a Developed IT System
Connection Development	Connection Low Speed with Frequent Interruptions	Quick and Effective Connection Development
Bottom-up KM	Slowly Providing and Transferring Knowledge	Fast Providing and Transferring Knowledge
Top-down KM	Delay in Getting Feedback	Quick Feedback Sending
Executing Decisions	Accompanied by the Risk of Production Line Stoppage	Resulting in Preserving and Developing the Running Production Flow

5. CONCLUSION

Implying the strength in developing connection and integration between academic knowledge and auto-making industry in developing a new business as an organizational entrepreneurship enterprise, this paper tried to show the impact of close relation between these two issues by studying the empirical findings of the resident experts of Saipa company in the supply chain management in an industrial location. As shown, knowledge management in running an information flow derived from the mental power of the creative staff by using developed IT systems resulted in promoting efficiency and effectiveness of the processes in the two manufacturing companies of Saipa and Siveco. Thus, studying the empirical findings in the new auto-making environment showed a relation between knowledge management and productivity increase with more impact whereas this relation is in the role of an effective factor in expediting the KM processes based on using IT facilities.

We think there is still need to explore a lot of new avenues in relation to the subject discussed here in automotive industry. There are many industries where it can be applied, and industry may benefit from it. Thus, in order to supplement such projects in the next steps, it is recommended to consider searching as well for expanding the knowledge by discussing about:

- The relation between issues like the agility of supply chain management and KM as a propellant factor in escalating productivity of manufacturing
- Considering the role of IT as a facilitator and accelerator in offering various models of industrial products.
- The obstacles of developing KM as a competitive advantage for increasing productivity.
- The relation between organizational entrepreneurship and KM in productive companies.
- The effective ways of using IT equipment in improving flexibility, efficiency, effectiveness and KM in the international trading.

LIST OF REFERENCES

[1] Moradzadeh M., Behazin F., 2009, "*Ten KM Success in Organizations*", Tadbir, No.203, Tehran.
[2] Tavallayi R., 2010 "Necessities and Functions of KM in the Cultural Organizations"; Naja Organization journal, Tehran.
[3] Bojani H., 2009, "*KM in Learning Ortanizations*", Tadbir, No. 203.
[4] http://www.emodiran.com
[5] Adli F., 2007, "*Knowledge Management above knowledge*"Vol. 1, Farashenakhti Andishe, Tehran.
[6] Wilson, TD 2002, "*The Nonsense of Knowledge Management, Information Research* ", Vol 8, No. 1 http://InformationR.net/ir/8-144.html
[7] Ganesh, D., 2002, "*Knowledge Management: Management Strategies for Individual Knowledge, and Original Knowledge*", Vol. 6, No. 1.
[8] Khatamianfar P., 2006, "*Knowledge Management World Exploration*" Iranian Scientific Documents and Information Center, Tehran.
[9] Middleton, M., 2002, "*Information Management: A Consolidation of Operations, Analysis and Strategy*" Center for Information Studies.
[10] Ahmadi S., 2004, "*Informative: Knowledge Management Strategies*", Vol. 18, No. 3, Tehran.

[11] Tiwana, A., 2002 "*The Knowledge Management Toolkit: Orchestrating IT, Strategy and Knowledge Platforms*", 2nd ed.
[12] Iransha, M., 2002, "*Information Management: Knowledge Management in Organizations*" Center for Information Studies,No.2.
[13] Kazemi A., 2003, "*Productivity and Its Analysis within Organizations*" Samt, Tehran.
[14] Afrazeh A., 2006, "*Knowledge Management*" Amir Kabir Industrial University, Tehran.
[15] http://siveco-int.com/faDefault.aspx?page=fa/siveco.htm
[16] Collection of reports,common methods, priscriptions of Saipa and Siveco companies http://saipa.net
[17] Fisher, M. L. 1997, "*What is the right supply chain for your product?*" Harward Business Review, March-April, 1997, pp105-116.
[18] Holweg M., and Pil F., 2001, "*Successful Build-To-OrderStrategies: Start With Customer*", Sloan Management Review, Vol. 43, No.1, p. 74-83.
[19] Groof T, Jones T, 2003, "*Introduction to Knowledge Management*"; Butterworth Heinnman; Burlington.