
**International Journal of Economic Research**

ISSN : 0972-9380

available at http: www.serialsjournal.com



**Volume 14 • Number 4 • 2017**

# Framework forx-engineering in supply chain management

**Shahryar Ghorbani Golzari Nezhad[1], Mohammad Mahdi Shaye Sani[2] and Seyed Abbas Mirhoseini[3]**

[1,2,3] *Phd student in Iaucec*

***Abstract:*** Universal extension, economy based on information technology, responding to customer's varied demands and competition are challenges that organizations and business firms face them. Organizations in order to response to the demands and create competitive benefits which are guarantor for their survival and development, should create basic changes throughout their processes. X-engineering is an approach that improves performance criteria such as cost, speed and quality. In supply chain reengineering, one can improve processes without using information technology. But, in x-engineering it is possible to improve processes radically just using new information and relationship technology. In this study, literature of re-engineering and x-engineering are stated. Then the role of x-engineering in supply chain and its improvement are expressed. Finally, x-engineering supply chain framework is explained.

***Keywords:*** process re-engineering, x-engineering, management supply chain, XSCF framework

## INTRODUCTION

Competition, change and customer have made many challenges for organizations nowadays. In order to solve these problems, it is essential to pay attention to supply chain carefully. Customers, distributors, generators and suppliers play important role in this chain. Relationship between them makes value added and creates competitive advantage for the organizations. Evaluation for beneficiaries of supply chain is obtained by paying attention to business processes. Process is a set of business activities that makes value added beneficiaries. Therefore, management philosophies have taken into account the processes and their improvements long time ago. Business processes Re-engineering is one of the approaches of axis process which improves the business processes radically and makes available the important performance criteria such as cost, time and quality. The above approaches (Re-engineering and supply chain) have the same concepts such as being axis process, attention to organizational strategies, decreasing time of doing process and using information technology as an influential factor (1). Davenport and Short define redesigning of

business process as designing and analyzing of workflows and inter-organizational processes (2). Some groups of researches have submitted methods for redesigning of supply chain (3, 4). Stevens introduces a hybrid model of supply chain (5). Berg and Abrahamson have emphasized on structural variations of chain and Towil has used dynamic system for modeling and simulating of Re-engineering supply chain (6.7). Chang and Shem have used matrix of process analysis for supply chain Re-engineering and improving its processes (8). In those researches, the importance of information technology has been discussed. Information technology plays an important role on unification of supply chain and decreasing its costs. In this case, we apply X-engineering based on information technology for optimization of Supply chain. This approach introduces information technology as nervous system for organization processes. Champy has not studied about a step by step method for applying this approach. In this paper, We introduce a step by step method for optimization of Supply chain using some principles and concepts. This paper is organized as follows: defines supply chain management, explains about x-engineering, reviews the history of principles and challenges of x-engineering, discusses about the role of X-engineering on supply chain and submits a step by step approach and so concludes.

## SUPPLY CHAIN MANAGEMENT

Supply chain management is a network of organizations in related processes and activities and creates value by submitting products and services to customers (9). In general, a supply chain includes two or

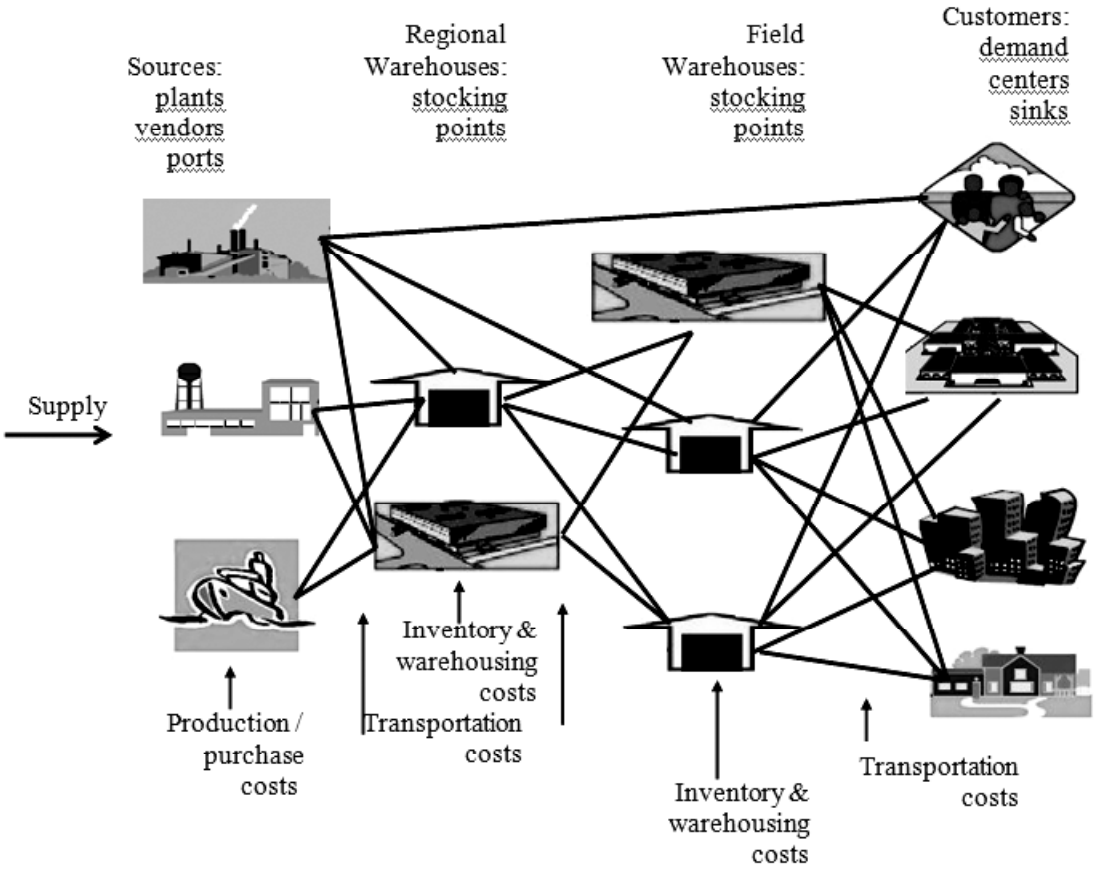


**Figure 1: Supply Chain Management**

more organizations which are separated from each other lawfully and related to each other through material flows, information and financial flows. This concept has come from war literature to management domain and developed to 25% of internal impure production in countries such as America (10). Supply Chain Management is primarily concerned with the efficient integration of suppliers, factories, warehouses and stores so that merchandise is produced and distributed in the right quantities, to the right locations and at the right time, and so as to minimize total system cost subject to satisfying service requirements as Figure (26).

In according with mentioned items, bellow factors explains expectations from each departments (26):

1) Purchasing: Stable volume requirements, flexible delivery time, little variation in mix and large quantities.

2) Manufacturing: Long run production, high quality, high productivity and low production cost.

3) Warehousing: Low inventory, reduced transportation costs, quick replenishment capability.

4) Customers: Short order lead time, high in stock, enormous variety of products and low prices.

Appearing information technology and electronic business models such as B2B, its performance domain has developed and its cost has decreased. Figure 2 shows the components of supply chain

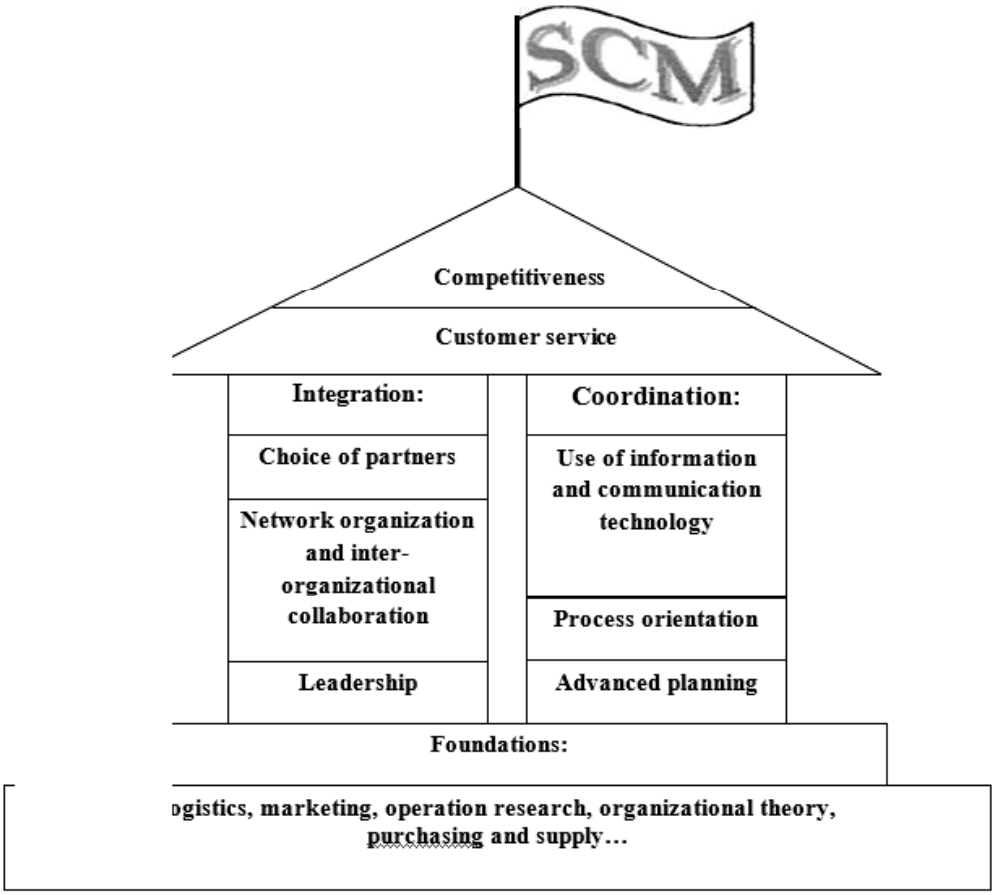


**Figure 2: Supply chain management house (9)**

management. The roof of this house shows final target or competitiveness. One can improve competitiveness using many methods, for example decreasing the costs, increasing flexibility and making high quality. The roof of the house is based on two columns which are two primary components of supply chain management integration the network of organizations and coordination of material flows, information and financial flows (23. 24). In integration, creating a supply chain depends on selecting suitable partners for timely collaboration. Inter-organizational collaboration is needed for a successful network of organization (23). Finally, leadership concept is important for aligning partner's strategies. It is possible to improve coordination of flows throughout supply chain using recent advances in information and relationship technology (22, 24). This tool automates the manual processes. Therefore, process orientation is possible by redesigning and standardizing the new processes. In order to supply customer's orders, materials, employees and machinery, planning should be prepared in advance. Logistic, marketing and ... constitute the base of this house.

Process orientation and attention to information technology are basic subjects of supply chain management. One cannot evaluate beneficiaries without any improvements in business processes. Nowadays, radically improvements of Supply chain domain are possible by using just new information and relationship tools. X-engineering is an approach includes the two categories.

## PROCESS RE-ENGINEERING

At the first of 90's decade, Hammer and Champy introduced Re-engineering. At that time. Davenport and Short expressed the subject of process retrospect in organizations and the influence of information technology on them in SMR journal. They believed that information technology supports original processes in organizations and for applying IT, One must use new processes. Information technology is named as an active factor in processes Re-engineering. Champy has examined Re-engineering in extra-organizational dimensions and stated internet role as an activator in radically improvements of business processes in his book (x-engineering). Knowledge management, data-driven techniques and neural networks have an important role on business processes analysis. Processes Re-engineering means creating a new design and restarting work. Management scientists have studied Re-engineering in different ways. For example, in Kaplan's idea, reengineering is a design of primary business process. Zaire introduces it as analyzing of structure and organization improvement. Other researchers such as Van Katraman, Talvar, Andale. Earl Johnson Astypr Brook and ... expressed other definitions of reengineering. Some of Re-engineering definitions areas below:

1) *Parker's definition:* Re-engineering applies advanced tools and methods and combines them with new technology in order to prepare an eruptive combination for creating severe distortions for organization and customer's satisfaction (16).

2) *Ardaligan and Famer's definition:* business Re-engineering that is a method based on processes is conducted by Superior management who expects good performance in organization by general changes (17).

3) *Moavice and Brandon's definition:* Re-engineering is a basic solution that searches how production-service processes attract the customer and satisfy them (18).

4) *Darker's definition:* Re-engineering is a new idea. This idea must be applied (19).

5) Hammer and Champy's definition: principal contemplation about processes and redesigning them in order to reach salient improvements in important criteria such as cost, quality, service and speed (19).

Hammer and Champy in their books in the titles of "companies redesigning" and" business revolution statement", expressed some characteristics of

Re-engineering which we face them in business redesigned processes (19):

1) Several works are combined and converted to one work.
2) Birokrasi is decreased.
3) Organizations are become plane.
4) Workers are making decisions.
5) Process stages are done naturally.
6) Functional structures are deleted.
7) Processes are become simpler.
8) More attention is paying to reach the targets.
9) Work is done where gives more meaning.
10) It applies information technology.
11) Controls and inspections are decreased.
12) Systematical theory is used.
13) Gradual improvements are avoided

## X-ENGINEERING

Revolution of information and relationship technology and universal extension of economy in the last of 90's decade, have made a new stage for distortion of business. In this new Re-engineering all of the organization beneficiaries such as managers, employees, customers, suppliers and even partners should participate. X-engineeringshows the Way of processes development to out of the organization. Against, reengineering domain does not develop from organization framework. When companies can integrate their processes, they obtain the new ability. X-engineering includes knowledge of applying updated processes in jointing businesses, companies and customers in order to optimize and evaluate all beneficiaries. This concept is a new and extensive edition of processes Re-engineering that is proportional with updated axis technology. Re-engineering and X-engineering are aligned and improve organizations performance saliently. Both of them need to re-contemplating and rooted distortion of business activities. Re-engineering decreases costs, increases quality, speed and productivity. But, x-engineering improves inter-organizational actions, companies, suppliers, partners and customers. The result of this participation is innovations for organization and valuation for customers. Moreover optimization of company processes, x-engineering improves processes of covenanters well. This theory was submitted in Health Organization depended to Medicine Faculty of Havard University by Jimz Champy (2000). This organization for improving business processes

needed all of the beneficiaries to be participated. Information technology had a primary role on this participation and radically improvement. Many Merican companies such as Jeneral Electric, EBM and ... applied this theory.

l) *Components of x-engineering*: X-engineering optimizes business performance using information technology in redesigned processes and crosses organizational boundaries of companies. X-engineering responds to three questions of business: how should distortion be in companies? How much benefit and efficiency is required? And who will collaborate? For answering these questions, three aspects of x-engineering are taken into a account:

- Company processes actions in creating their productions. This subject is -related to all relationships with outer-organizational players.
- The rate of participation with others in applying common processes.
- Business suggestions to customers.

a) *Business processes:* Appearing information technology, process should be studies carefully. Champy in his book (x-engineering) states that independent process does not produce processes but they are combination of inter-and outer-organizational processes. Steadfastness of each company processes depends on other companies processes. In many important processes such as transportation and preparations, this dependence extends. In X-engineering, there are three samples of processes.

- Processes which are done by company. These are processes which create competitive advantage for organization and are not assigned.
- Processes that you do them with customers and suppliers.
- Processes such as the out sourcer are done by others.

b) *Suggestion to customer*: In fact, suggestions are the same worth that organization creates for its customers. This valuation can be innovation, cost, speed quality, service and variety. Customer can recognize the base of one's competitive score and compare with others.

c) *Participation:* For applying x-engineering, all of its beneficiaries should be participated. There are four levels of participation: in level 1, company redesigns its processes. In level 2, company redesigns its processes with other organization, customer of supplier. In level 3, it is turn to redesign company processes with other two companies, customers and suppliers. Company processes are coordinated with other three companies, customers, suppliers and partners in level 4.

## X-ENGINEERING SUPPLY CHAIN

As said before about the participation levels in x-engineering level 4 includes a supply chain and one can state that x-engineering in level 4 is process Re-engineering throughout the supply chain using information technology. Difference between Re-engineering and x-engineering approaches in supply chain is also in applying information technology. In Supply chain Re-engineering it is possible to create radically improvements without using information technology. But, in X-engineering information technology treats

as nervous system of organization. Information technology can be used before and after x-engineering and decrease costs and gives more value to customers (21). We will submit a step by step approach of X-engineering in Supply chain using 3P pattern. Some advantages of this approach are: being comprehensive, easily applying and being aligned with organization strategists.

1) *Codifying organization strategists:* By codifying organization philosophy in business and information technology domain axial targets and value are distinguished. Then interior and outer factors are examined and organization strategists are determined by their combination and classified.

   Based on organization strategists, improvement projects can be applied. The primary activities in this stage areas follows:

   - Codifying mission of organization.
   - Codifying outlook of organization.
   - Codifying work targets and axial worth.
   - Analyzing and evaluation of interior factors (forceful and weak points).
   - Evaluation of outer factors (opportunities and threats).
   - Creating SWOT matrix.
   - Determining business strategists.
   - Classifying strategists.

2) *Analyzing existent state:* By examining organizational strategists, improvements preferences are distinguished and processes which need improvement in supply chain are recognized. So, beneficiaries of process are recognized throughout the chain and their requirements are analyzed. Processes are modeling and important performance criteria are stated. The process is measured based on actual data and their weak points are analyzed. Some important activities in this stage areas follows:

   - Recognizing influential processes on organization strategists.
   - Recognizing beneficiaries of process (customers, employees, suppliers, stockholders).
   - Choosing suitable partners.
   - Examining beneficiaries' requirements and their classifications.
   - Constructing a team in supply chain domain.
   - Modeling process.
   - Recognizing bed information and relationship of supply chain.
   - Modeling bed information and relationship.
   - Determining important performance criteria for each process based on suggested worth.
   - Collecting influential data.
   - Measuring process performance.

- Recognizing bottleneckpoints.
- Drawing cause and effect diagram.

3) *Process Re-engineering:* By examining process, information and relationship domain, improvable points for Re-engineering are recognized and classified. In thisstage. Information technology plays important role. Information technology causes to delete reoperations, repeats, controls and physical limits. Important activities are as follows:
   - Taking a pattern from process and technology domain
   - Examining technology abilities in deleting or improving bottleneckpoints.
   - Creating corrective actions.
4) *Evaluation:* Improved processes are measured again and bottleneck points are evaluated. If these points are not deleted, corrective actions should be taken. Important activities areas follows:
   - Measuring process performance in new state throughout the Supply chain.
   - Re-examining the bottleneckpoints.
   - Creating corrective actions, only if needed.
5) *Continuous improvement:* Interior and environmental changes such as customer's demands, information and relationship technologies and ... occur in Supply chain. Also, process periodical performance is measured. This cycle can be repeated continuously.

## CONCLUSION

Although many studies have been done about process Re-engineering in supply chain, but, Jims Champy (2002) by introducing x-engineering and its role on Supply chain, has not stated a special method. In this paper, by examining different dimensions of X-engineering its difference with Re-engineering and information technology role on it, a method was submitted. This method was introduced in five steps: codifying organization strategist, analyzing existent state, process Re-engineering evaluation and continuous improvement with their primary activities. Some of these approach characteristics are as follows:

- Business processes are aligned with organizational strategists.
- Information technology plays a role on radically improvement of processes of supply chain beneficiaries.

## REFERENCES

Ahmadi Hossian Supply chain management.Publishing Center. Education and Industrial Research of Iran, 2005

Avishai, Bernard. "What Is Business's Social Compact? Harvard Business Review, 1994.

CP Holland. Cooperative supply chain management: the impact inter organizational information systems. Journal of Strategic Information systems, 1995.

Chmpy. James, X-Reengineering. Translation doctor Rezaenejad. publisherFara. 2005

D. Berry, M.M. Naim, DR Towill business process reengineering an electronic products supply chain, IEE Proceeding on Science Measurement Technology, 1995.

D. Simchi-Levi, P. Kaminsky & E. Simchi-Levi (199), Introduction to Supply Chain Management

DR Towill. The seamless supply chains the predator's strategic advantage. International Journal of Technology Management, 1997.

Farzi Reza. HasanZoghie, Re-engineering.Tadbir publication vol. 109 No. 5 2001

Feghhifarahmand, Nasser (2002), Active and dynamic management of organization, Tabriz Iran.Forouzesh

FeghhiFarahmand, Nasser (2003), Permanent Management of Organization, Tabriz Iran.Frouzesh.

Feghhifarahmand, Nasser (2004), Technology Management of Organization, Tabriz Iran.Frouzesh

Feghhifarahmand.Nasser (2005), Strategic Management of Organization, Tabriz Iran.Frouzesh

G. Stevens. Integrating the supply chain.International Journal of Physical Distribution and Material Management, 1989.

G.N. Evans, D.R. Towill. M.M. Naim. Business Process reengineering the supply chain,ESCRISTICA and Control. 1995.

Hall N.G. & Potts, C.N. (2003), Supply chain scheduling.Batching and delivery.Operations Research 51, 566-584 integration of supply chain information systems. A case study European

Johnson Lynwood A., Montgomery Douglas C., Operations Research in Production Planning.Scheduling, and Inventory Control. John Wiley and Sons, 1974, Journal of Operational Research 159 (2004)393-405

M. Abrahamsson, S. Brege, Structural change in supply chain, The International Journal of Logistics Management, 1997.

M. Attaran, Exploring The relationship between information technology and business process reengineering, Journal of Information & Management, 2004.

M. Hammer, and Champy. J. Reengineering the corporation: a manifesto for business revolution. Harper Business, NY, 1993.

MarinosThemistocleous a, ZahirIrania*, Peter E.D. Loveb Evaluating the

R. Booth. "Simple as ABC, What on Earth is Business Process Reengineering?", Management Accounting September 1994.

S. Wesley Changchien, Hsiao-Yun Shen. Supply chain reengineering using a core process analysis matrix and object-oriented simulation. The Journal of Information & Management, 2002.

Sedighian, Ali, Reengineering process, providing human resources, Journal of Information & Management, 2002.

Staedtler, Hartmoot. Kygir and christoof, Supply chain management advanced planning. The Journal of Information& Management.2003.

T. Davis, Effective Supply Chain Management. Slovan Management Review, TH. Davenport, J.E. Short. The new industrial engineering information technology andbusiness process redesign, Slovan Management Review, 1990. Vol. 34,No. 4,Summer, 1993.