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OVERVIEW OF INFORMATION TECHNOLOGY AND A THEORETICAL MODEL IN SUPPLY CHAIN MANAGEMENT FOR LOCAL SMES

Theoretical
article

Keywords

*Supply chain management (SCM),
Information technology (IT),
Small to Medium Size Enterprises (SMEs),*

JEL Classification

O31

Abstract

Most literature on supply chain management (SCM) focuses on large organizations with global operations employing high-level information technology. This creates a gap in the knowledge of how SMEs use and practice (SCM) moreover (SCM) is an area of increasing importance among enterprises and of growing academic interest. It is based on the concept of firms as part of multiple organizations oriented to the provision of goods and services for the final customer. the survival of Small to Medium Size Enterprises (SMEs) will be determined by their ability to produce more, at a lower cost, in less time, and with few defects. The use of information technology (IT) is considered a prerequisite for the effective control of today's complex supply chains. In our research report we first provide a broad overview of (SCM) in general for SMEs. We further discuss the evolution of the information technology (IT) in SCM and the performance parameters of the supply chain processes. In this research, the aim is to introduce a special (SCM)theoretical model in general SCM models which is appropriate for SMEs' structure due to their operation capacity, numerical condition and other features. In accordance with this aim, taking the conditions of this sector into consideration, a two-stage model which is appropriate for structure of SMEs in Romania is proposed. The first stage of the model consists of "supply and production centers" and second stage consists of "product and customer center"

Introduction

More than 99 percent of European enterprises are small and Medium Enterprises (SMEs), they provide jobs for two-thirds of the work force. In other words, SMEs are the backbone of the European economy and a major source of entrepreneurial innovation and skills. It is fact that SMEs in the last 10 years created five million jobs while big enterprises lost five million jobs. (Becker 1993).

Supply Chain Management (SCM) is a concept that is gaining in popularity and importance. From a practitioner point of view, an Accenture report (in co-operation with Stanford and Insead) states that SCM is critically important or very important to 89% of the surveyed executives. Furthermore, SCM is increasing in importance as 51% of the executives stated that their investments in SCM have increased significantly over the last three years. (Accenture 2012).

SCM is one of the most powerful executive paradigms for competitive advantage of production companies and service providers. (Gunasekaran 2004). Supply chain management (SCM) has increasingly become an important way to enhance competitive strength, and it is commonly argued that present day competition is between integrated supply chains rather than individual organisations. Studies of companies exploiting the benefits of SCM have indicated improvements in individual supply chain functions ranging from 10 to 80 percent. Reduced software costs, industry-wide learning of best practices and increased probability of having to compete against rivals enjoying the advantages of SCM are driving forces behind adoption of the SCM concept. The integration of key business processes among the partners in a supply

chain aims at adding value for the customers. This integration is achieved by connecting suppliers, through manufacturing and assembly companies, to distributors, retailers and end-customers to make the process more efficient and the product and services more differentiated. (Terje, 2007).

Today, Supply Chains Management (SCM) applications increase rapidly. Advantages in costs, flexibility, customer satisfaction, speed and economy of time which are provided by this system are among the reasons of why it becomes widespread. (Hilmola 2005) Besides, integration of more than one enterprise and flow of information, money and goods also make the system complicated. (Hatice 2007).

The information revolution has accelerated significantly in recent years. Astonishing gains in PC computing speed, e-commerce, and the power and flexibility of data management software have promoted a range of applications. Recent study explored that there is so many benefit brought about

by IT to the industries. Within the application of IT, industry can improve supply chain agility, reduce cycle time, achieve higher efficiency, and deliver products to customer in a timely manner. Besides, the implementation of IT in the SCM can enable a firm to develop and accumulate knowledge stores about its customers, suppliers and market demands, which in turn increases firm performance. (Tippins, 2003).

In this context, regarding the size, function and relationship of SMEs, the nature of SCM implementation is very different when compared to large firms. In other words, small firms do not implement SCM in the correct way that large firms do. (Hatice 2007). This inadequacy could be due to the way small firms find their position in the supply chain and the way they cooperate with the parties within the chain. Accordingly, in many cases, theoretical models are effective tools to illustrate the real trends in a virtual environment.

LITERATURE REVIEW

1. Origin of supply chain management

The popularity of the supply chain concept has been stimulated from many directions including the quality revolution, (Dale 1994). notions of materials management and integrated logistics, a growing interest in industrial markets and networks, the notion of increased focus, (Porter (1987) and influential industry-specific studies. Thus, researchers find themselves inundated with a plethora of terminology including 'supply chains', 'demand pipelines' 'value streams' (Womack 1994), (Womack and Jones 1994), 'support chains', and many others

Part of the reason the start of supply chain management is difficult to pin down is because of its many antecedents. These include channels research in the 1960s on managing interorganisational operations, systems integration research in the 1960s, and information sharing in the 1980s. Forrester is commonly cited for introducing key ideas on industrial dynamics, physical distribution, and transportation in the late 1950s and early 1960s. In fact, Mentzer et al. (2001) start their paper with the following citation from 1958 that very much foreshadows supply chain management today: "Management is on the verge of a major breakthrough in understanding how industrial company success depends on the interactions between the flows of information, materials, money, manpower, and capital equipment. The way these five flow systems interlock to amplify one another and to cause change and fluctuation will form the basis for anticipating the effects of decisions, policies, organizational forms, and investment choices."

SCM is a concept that has originated and flourished in the manufacturing industry, according to. The first signs of SCM were perceptible in the JIT delivery system as part of the Toyota Production System see. (Shingo 1988) . This system aimed to regulate supplies to the Toyota motor factory just in the right - small - amount, just on the right time. The main goal was to decrease inventory drastically, and to regulate the suppliers' interaction with the production line more effectively. After its emergence in the Japanese automotive industry as part of a production system, the conceptual evolution of SCM has resulted in an autonomous status of the concept in industrial management theory, and a distinct subject of scientific research, as discussed in literature on SCM, see, (Cooper et al. 1997). Along with original SCM approaches, other management concepts (e.g., value chain, extended enterprise) have been influencing the conceptual evolution towards the present understanding of SCM. For Van der Veen et al.,

Actually, SCM is combining particular features from concepts including Total Quality Management (TQM), Business Process Redesign (BPR) and JIT.

In actuality, the literature is still very fragmented and although several studies purport to discuss supply chain issues, most of the existing research only examines one link of the chain, or most importantly only focuses on one ingredient in the supply chain performance mix. Six major movements can be observed in the evolution of supply chain management studies. Creation, Integration, Globalization, Specialization Phases One and Two, and SCM 2.0 These phases are given in Table 1. The six stage evolutionary era depicts that in a particular era which strategy was emphasized. For instance in the sixth era information Technology was given priority and IT enabled supply chain was the burning issue.(Kiran B. 2014).

1.1. Supply chain definition

To better understand the issues surrounding supply chains, this chapter gives a chronological overview of the most cited definitions concerning the concepts of a supply chain. The study of supply chains has been of substantial importance since the mid- 1980s. (Cooper 1997) but has recently seen increasing interest from practitioners and academic researchers.

In order to implement the supply chain concept in one's firm, the number of firms involved in the supply chain and structure, business processes and management. Houlihan is credited with first coining the term "supply chain," but it seems that researchers have varying interpretations of exactly what managing a supply chain means. The common thread in any definition is that supply chain

management seeks to integrate performance measures over multiple firms or processes, rather than taking the perspective of a single firm or process.(Houlihan 1985) their activities and functions have to be identified in advance. This leads to the three major components of the supply chain integration concept, (Arend, R.J et al 2005) namely the network.

The definition of "supply chains" seems to be more common across authors than the definition of "supply chain management" Lambert et al (1998), La Londe and Masters proposed that a supply chain is a set of firms that pass materials forward.

Normally, several independent firms are involved in manufacturing a product and placing it in the hands of the end user in a supply chain raw material and component producers, product assemblers, wholesalers, retailer merchants and transportation companies are all members of a supply chain. By the same token, Lambert, Stock, and Ellram define a supply chain as the alignment of firms that brings products or services to market. Note that these concepts of supply chain include the final consumer as part of the supply chain. (Mentzer, 2001)

1.2. Definitions of Supply Chain Management

The scope and definition of supply chain management has been ever changing. The meaning of the word supply chain management in industry parlance is not the same that it was 20 years ago.

The question of how supply chain management can be used to permanently boost effectiveness and efficiency of the organizational systems has become one of the key questions in today's era of globalization. In order to provide answers to this question, many researchers tackling the issue of supply chain management have offered their definitions or explications of the above mentioned problem.

Additionally, Seuring quoted a definition of SCM, "Supply chain management is the integration of these activities through improved supply chain relationships to achieve a sustainable competitive advantage". Cooper have defined SCM as, "an integrating philosophy to manage the total flow of a distribution channel from supplier to ultimate customer." Another definition is stated by Dag Naslund and Steven Williamson as, "...used to refer to the integrated management of a network of entities that starts with the suppliers' suppliers and ends with the customers' customers, for the production and delivery of goods and services to the final consumers".

Most recently, Stock and Boyer (2009) have developed a consensus definition of SCM by performing a qualitative analysis of 173 unique definitions of the field, collected from articles and books published on the subject from 1985 through 2008. Their definition, which is perhaps the most

comprehensive, since it is based on the qualitative analysis of an extensive literature review, is as follows.(Amer 2011)

“The management of a network of relationships within a firm and between interdependent organizations and business units consisting of material suppliers, purchasing, production facilities, logistics, marketing, and related systems that facilitate the forward and reverse flow of materials, services, finances and information from the original producer to final customer, with the benefits of adding value, maximizing profitability through efficiencies, and achieving customer satisfaction”. (Stock 2011). In other words supply chain is an integrated process where in raw material are manufactured into final products, then delivered to customers (via distribution, retail or both).

INFORMATION TECHNOLOGY AND SUPPLY CHAIN MANAGEMENT

Today companies are often not considered independent entities, but parts of multi-company, multi-echelon networks, i.e. supply chains, delivering goods and services to the final customer. Supply chain management (SCM) is a critical element in today's highly complex and competitive business environment. It has direct influence on key issues like cost to market, time to market, responsiveness to changing customer demands and market dynamics and the overall business. SCM has received attention since early 1980s.

Although the importance of IT for efficient SCM is widely acknowledged, empirical research assessing how IT is in practice used for the purposes of SCM is narrow. More specifically, majority of the prior research has focused either on modeling the benefits of inter-organizational information technologies and information sharing, or on assessing the impact of specific technologies on supply chain efficiency. Consequently, the actual uses of IT in supply chain management as well as the reasons for using IT in a specific way still remain unclear. (Christopher 1992).

Suhong include in their list of SCM practices concentration on core competencies, use of inter-organizational systems such as EDI. By moving from a paper-based exchange of business document to one that is electronic, businesses enjoy major benefits such as reduced cost, increased processing speed, reduced errors and improved relationships with business partners. Learn more about the benefits of EDI, and elimination of excess inventory levels by postponing customization toward the end of the supply chain, and joint planning and other mechanisms that facilitate the just in time (JIT) system and total quality management (TQM) in the company. Total quality management (TQM) and supply chain management

(SCM) have been identified as the two most important strategies for manufacturing, services and small-to-medium size enterprises (SMEs); and have become a prerequisite for success in the global market.

As for IT systems, when discussing the use of IT in SCM, we refer to the use of inter-organizational systems that are used for information sharing and/or processing across organizational boundaries. Thus, besides internal IT systems such as Enterprise Resource Planning systems, we also exclude identification technologies such as RFID from the scope of this study.

The information in a supply chain can be classified in different ways e.g. : strategic or tactical; logistical; or pertaining to consumers. Lee and Whang discuss various types of shared information and their potential benefits. Information sharing leads to high levels of supply chain integration by enabling organizations to make dependable delivery and introduce products to the market quickly. Quality information sharing contributes positively to customer satisfaction and partnership quality. Information sharing impacts the supply chain performance in terms of both total cost and service level. (Suhong, 2006). According to Lin et al, the higher level of information sharing is associated with the lower total cost, the higher order fulfillment rate and the shorter order cycle time. While information sharing is important, the significance of its impact on SCM depends on what information is shared, when and how it is shared, and with whom. Literature is replete with example of the dysfunctional effects of inaccurate/delayed information, as information moves along the supply chain. Divergent interests and opportunistic behavior of supply chain partners, and informational asymmetries across supply chain affect the quality of information.(Lee, 2000). It has been suggested that organizations will deliberately distort information that can potentially reach not only their competitors, but also their own suppliers and customers. It appears that there is a built in reluctance within organizations to give away more than minimal information since information disclosure is perceived as a loss of power. And companies fear that information may lead to potential rivals. Given these predispositions, ensuring the quality of the shared information becomes a critical aspect of effective SCM.(Zeinab 2014). Organizations need to view their information as a strategic asset and ensure that it flows with minimum delay and distortion and companies fear that information may lead to potential rivals.

1. Supply Chain Management (SCM) in SMEs

Small and Medium enterprises are defined in several ways, but most commonly as firm that have up to 250 employees. In other literature, SMEs describe

as an entity which deploys limited resources due to its small size, with less information and integration, and employs less trained workers with short-term goals (Persona, Majid, A. et al (2012)). As a group, these enterprises already provide wide-scale employment: jobs in small and medium enterprises account for more than half of all formal employment worldwide and 45% of formal employment in developing countries. SMEs are seen by many national governments and international development organizations as important engines of innovation, economic growth, employment and poverty reduction. (Waranpong 2014).

A differentiated analysis of the goals of SMEs shows that cooperating SMEs seldom possess one consistent strategy. Supply chain management in SMEs is an approach that helps the organization to function in a more agile and cost effective manner by integrating the processes of various partners at all three levels – strategic, tactical, and operational. Even though globalization has increased pressure on some SMEs to continually reduce their prices against their quality and services.

There are several reasons why SMEs should adapt strategy. First, a positive interdependence between the performance of a SME and strategy development has been proven and strategy development also reduces failure rates and enhances organizational learning. (Iman. 2015) Moreover, SMEs need to be firm in strategy development in order to be able to market themselves, which can ultimately result in a higher awareness of the importance of IT deployment, quality control and customer focus. (Park 2001). Strategy development also fortifies the position of a SME in an international context, which is inevitable in an era of globalization.

In the literature, strategy is also discussed in the light of SMEs' plans for growth. It is in the nature of SMEs that growth is an option in order to increase sales and market share. Strategy is described as a success factor for growth. In order to grow sustainably and achieve absolute growth rates a strategy should be developed. (Sharma 2007). SMEs should also have a long-term plan in place in order to reorganize the company structure during or after a growth phase; otherwise they might suffer from "growing pains", which causes that "employees are overburdened and not well led, work is lagging behind and management improvises rather than plans".

The profitability of the SMEs may have been critically determined by an ability to obtain supplies of the right quality on time and at the most favored price. (Thakkar 2005). SCM is perceived by SMEs differently. In other words, in several researches, it was seen that SMEs do not perceive their suppliers to be their partners, as big firms do; rather, they perceive them to be a process which

protects them against lack of production. (Thakkar 2005). Udomleartpresert proposed Vertical Chain Management Model to increase SMEs bargaining power and relationship with customer. The aim of this model is to maximize bilateral benefits with supplier in the chain and gaining bargaining power over supplier through establishment of a union by SMEs operating in the same sector. Vertical chain management (VCM) is a proposed model for SMEs to increase mutual benefit in dealing with business activities under supply chain management. The VCM is the coordination of SMEs in the same business (Figure 1). The objective is to have the bargaining power over the supplier and to be the world-class supply chain supplier under the limited cost. (Udomleartpresert 2003).

Since supply capacities of SMEs are limited, they do not have a wide selection of advantages and environment. Moreover, they avoid making cooperation with suppliers who are larger and more capable. (Vaart 2006)

This is a logic basis for SMEs to join a bigger community and enjoy the bargaining power of a bigger firm. Saving time, reducing costs, stable process and regular supply opportunities can only be achieved through such institutionalization. In the research conducted by Hatice Cahpmar (2007) on SME Supply Chain Management Model, it was concluded that SMEs Supply Chain divided into 2 stages. The first stage of the model takes place in supply and production centers and the second stage takes place in product and customer center in consideration of their features and qualification. In supply-production stage of the model there are supply center, customer center and production center. SME union, which is among these institutions, provides integration among institutions at the first stage. The second stage, which is product-customer center, consists of bulk supplier, retail dealer and customer center, there is information flow in the opposite direction.

1.1. Product and Customer Center Stage

In Supply-production stage of the model, there are supply center, customer center and production center and distribution Channels. In this stage, there is SME Union which provides integration among institutions at the first stage. Supply centers including supply policy is conducting to meet the supply needs for different sectors of SME. Because of supply capacity of SMEs is small. They tend to avoid making cooperation with bigger supplier. (Donk. 2005). Within this center, saving time, reducing cost, stable prices and regular supply opportunities, continuous supply, stable price and acceptable quality can be achieved by SMEs. (Vaaart et al. 2006)

Second institution in supply centers and supply policies, which constitute the first ring of SMEs' supply chains, include different practices. Since

supply capacity of SMEs is small they do not have a wide selection advantage and environment. Moreover, they avoid making cooperation with suppliers who are bigger and more powerful than they are. (Donk 2005). Because of these reasons, there is need for a common supply center which will meet supply needs for different sectors.

Production: In order to provide fluidity targeted by the system in the production stage in supply chains, basic factors such as demandable production, technology, elasticity in production and innovation should be targeted. (Narasimhan 2004). Moreover, market demand of production and performance conditions of markets in which products will be distributed researched and determined.

Distribution Channels: Another institution which takes place at supply centers production centers stage is distribution centers. Raw materials, semi-products and materials constitute distribution centers' operation fields and stages especially in accordance with their capacities. Besides singlestage distribution centers, multiple-stage distribution centers can also be preferred due to factors such as intensity, variety, distance to production and operation centers.

Last function of supply-production center stage is stocking and production activities. Under these circumstances classical stocking system such as significant cost of storage, labor, stock losses and profit loss of capital in stock are preferred to be implemented. (Oktav. 2004). Stocking and stocking policies of supply chains at supply and production center stage are important in terms both cost and capital need.

However, in order to provide fluidity targeted by the system in the production stage in supply chains, basic factors such as demandable production, technology, even elasticity in production and innovation should be targeted.

In Romanian SMEs, it is seen that production processes, technology, domestic and foreign demandable product performance is not at the desired level and especially SME groups and groups established by SMEs operating in the same field are weak to a large extent in innovation performances, product elasticity and open competitions. In order to provide product fluidity in supply chains, enterprises should develop in terms of low costs, quality and modern technologies and common units should be established on these issues when necessary. Important problems which Romanian SMEs face in products emerge due to these said reasons.

1.2. Product and Customer Center Stage

In the second stage which cover product and customer center. Production capacity, product and product fluidity in supply chains form the enterprises strategic policies for cost and capital

need. In this area, products which are elastic, demanded, innovative and aesthetic and cost less are very important in the system. (Monkhouse 1995).

In SMEs, qualified product targets which include main elements such as costs, technological level and price should be selected.

Bulk supplier, semi-bulk supplier and retail dealer institutions also take place at product and customer stage which takes place in economical and rational fluidity of supply chains. As was mentioned in supply and production center stage, there should be certain solidarity and integrations also at this stage among SMEs and these institutions. Selection and evaluation should be made at this stage of the system taking main rules such as stock, security, time values and costs in terms of intermediary institutions' number, qualifications and distribution opportunities into consideration. At the stages when sales costs of Romanian SMEs are high, organizations and programs, such as having desired amount of goods with desired quality at the time and place where and when economy is desired to be set. (Heriyanto 2014).

Customer Centers: Orientation towards customer markets in SMEs' supply chains strategies can be discussed in three ways. There are local, domestic, and foreign customer center.

Local customer center, It is the process in which SMEs enter the market directly, in other words, face with the customer. In this process, the product is produced and then presented to the market and customer taking demand and order condition into consideration. Services such as introduction of the product to the customer and informing the customer are examined in this context. Certain service contracts and close dialogue between SMEs and the customers they face directly create a warm market environment. Presentation of products to customers is performed in this way in small enterprises which meet local demands.

Domestic customer center Access of SME products to markets via intermediary institutions. Distribution can usually be made to the outside of the locality. SMEs in such markets should orient towards and adopt targets such as brand establishment and competitive product marketing strategies. Moreover, SMEs need to orient towards innovative products in these competitive markets to a certain extent. SMEs face the need to orient towards establishing certain organizations and assure power unity in order to survive in these competitive markets.

Foreign customer center; Another important function of supply chains is export oriented marketing. Marketing goods to foreign markets should be examined in two aspects. First one is rational use of export channels and institutions. Second one is advertising in foreign markets and

presenting necessary information to customers.(Hatice 2014).

2. Information technology in Romanian SMEs

As the utilization and commercialization of IT becomes more widespread throughout the world, the adoption of novel IT can generate new business opportunities and various benefits. Nowadays, both large organizations and SMEs are seeking out ways to reinforce their competitive position and improve their productivity. (Daniel 2014).

Information technology (IT) has indeed changed the dynamics of running businesses. The proper application of information technology and the use of information systems may offer opportunities for SMEs to overcome some of the aforementioned barriers and to improve their survivability in a competitive environment(Nisipeanu 2013), accordingly, there is an increasing consciousness of the necessity to derive profit through investing in IT within SMEs. IT tools significantly assist SMEs through supplying required infrastructure necessary for providing appropriate types of information at the right time. IT can also provide SMEs with competitiveness through integration between supply chain partners and inter-organizational functions, as well as by providing critical information. Found in their study that smaller firms should definitely harness IT capabilities to compete in the global market. Researchers have also raised the possibility of developing strategic alliances or networks through IT to overcome the disadvantage of size, allowing SMEs to compete with larger corporations while remaining small and flexible. (Michelle, 2011).

IT in Romania has deep roots in the past. Before 1989 Romania was the first country from Easter Europe who develop computers and minicomputers (CIFA-1957, DACICC- 1962) Lack of investments conduct to an obsolete technologies and a high potential market after 1990. All world major ICT companies have arrived in Romania attracted by market conditions and well prepared human resources.

Today there are more than 8000 software and IT services companies in Romania. Many multinationals companies from USA and West Europe started to create in our country large R&D, production or service facilities. Regarding the spread of ITC, are given in Table 2

Romania is behind other countries in Central and Eastern Europe. There is, however, a rapidly growing presence of mobile phones, use of the Internet (including broadband), use of computers connected to the Internet by firms and of investments and expenditures on equipment. Related to IT market it is obvious the quickly increase from 2006 until 2012. If computer hardware segment tended to become saturated in the last 2 years, the computer software and IT

services continued their growing with high rate of 22-32%. Investments and expenditures for products and

services of information technology registered during 2012, a significant increase. Also, investment and expenditure on goods and services of communication have increased in 2012 compared with 2011 by 15%.

CONCLUSION

For SMEs, cyberspace can be a real pad for launch or re-launch, as they enjoy a simple organizational structure and not too bureaucratic. Although in terms of resources (financial, technological and human), SMEs are disadvantaged compared with large firms, organizational and behavioral flexibility is a considerable asset in the fight to conquer the virtual market. IT is a powerful technology for giving information and communication in Supply chain in Small Medium Entreprises. Within IT in SMEs supply chain management would be increasing SMEs performance by increasing eciency in their supply and production center-product and customer center. On the other hand, SMEs have been showing more concern for information technologies day by day. Despite using IT in basic level, they should improve their businesses by investing on new technologies such as IT infrastructure. IT infrastructure of SMEs is an important factor determining the usage levels of internet, webpage and software. By having better SCM, the SMEs can perform better as important engine of innovation, economic growth, employment and poverty reduction. In conclusion, Romanian SMEs should develop and implement supply chains system, which continuously integrates all institutions and channels from supply resources to customer centers, in accordance with their structural features in order to maintain their existence in regional, national and international competition markets.

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Tables

Table 1 Era in the Evolution of Supply Chain Management

01	Creation Era	The term supply chain management was first coined by an American industry consultant in the early 1980s. However the concept of supply chain in management, was of great importance long before in the early 20th century, especially by the creation of the assembly line.
02	Integration Era	This era of supply chain management studies was highlighted with the development of Electronic Data Interchange (EDI) systems in the 1960s and developed through the 1990s by the introduction of Enterprise Resource Planning (ERP) systems.
03	Globalization Era	This era is characterized by the globalization of supply chain management in organizations with the goal of increasing competitive advantage, creating more value-added, and reducing costs through global sourcing
04	Specialization(Phase one)	In the 1990s industries began to focus on “core competencies” and adopted a specialization model. Companies abandoned vertical integration, sold off non-core operations, and outsourced those functions to other companies.
05	Specialization Era(Phase two)	Specialization within the supply chain began in the 1980s with the Phase Two – Supply inception of transportation brokerages, warehouse management, and non asset based carriers and has matured beyond transportation and logistics into aspects of supply planning, collaboration, execution and performance
06	Supply Chain(SCM 2. 0)	Web 2. 0 is defined as a trend in the use of the World Wide Web that is meant to increase creativity, information sharing, and collaboration among users.

Note. Kiran B. (2014)

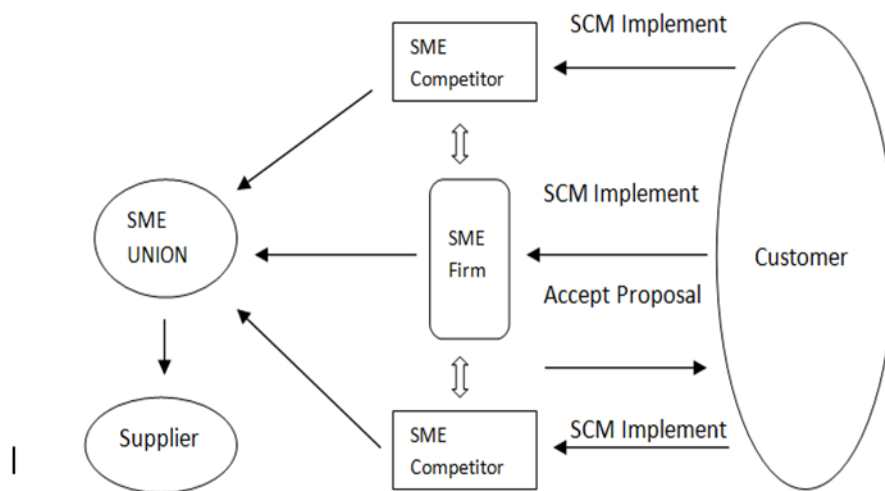
Table 2

Indicator	2006	2012
GDP (billion USD)	57.2	90.8
ICT Spending (billion USD)	1,333	2,412
IT Spending/ GDP(%)	0.8	0.5
PC Penetration (%)	17	22
Mobile Phone Penetration (%)	25	60
Investment in hardware (million RON)	712.3	1539.6
Investment and expenditure for IT products(million RON)	1658.9	7198.2

Source: MCTI, ING, INS, Eurostat (2016) <http://www.insse.ro/cms>

Figures

Figure 1 Vertical Chain Management Model



Source: Udomleartprasert, P., Jungthirapanich, C. ve Sommechai, C.; “Supply Chain Management–SMEs Approach”, IEEE, 3, 2003.