

**THE ROLE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
(ICT) IN SUPPLY CHAIN MANAGEMENT (SCM) IN DISTRIBUTOR
PERSPECTIVE - A STUDY OF DISTRIBUTOR COMPANY OF AUTOMOTIVE
PARTS IN KLANG AREA**

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ABSTRACT

An increasing number of researches have been made around Supply Chain Management (SCM) and the types of role Information and Communication Technology (ICT) plays towards SCM. SCM initiatives driven by the role of ICT brings along synchronized workflow of the SCM. However, practical insight to addressing the types of role of ICT play in the SCM in distributor perspective based on real world contemporary studies, are limited. This research aims to investigate the relationship between the role of ICT and SCM in distributor perspective. It aims to examine the types of role play in SCM and to identify the three important basic roles of ICT whether they have significant influence on SCM in distributor perspective. The three roles of ICT which are useful aid, competitive advantage and prerequisite are the independent variables. Each of the independent variables was tested to determine its relationship with SCM in distributor perspective. The questionnaires were sent to 103 respondents to fill it. The participating respondents represented a return rate of 100%. Three (3) hypotheses were developed and tested using Pearson Correlation and Regression Analysis. The findings indicate that each of the respondent in distributor companies of automotive parts in Klang, Selangor find that each role is important towards SCM. There is significant correlation between the three roles of ICT and SCM. They feel that when ICT play as a useful aid, competitive advantage and prerequisite in SCM, their company's SCM will be significantly influenced by the three roles of ICT. The implications of these findings are discussed and suggestions for future research are also identified and proposed.

Keywords: Supply Chain Management (SCM), Information and Communications Technology (ICT), Useful Aid, Competitive Advantage, Prerequisite, Distributor Perspective, Distributor Companies of Automotive Parts in Klang, Selangor.

ABSTRAK

Semakin banyak kajian telah dibuat sekitar Pengurusan Rantaian Bekalan (SCM) dan jenis peranan Teknologi Maklumat dan Komunikasi (ICT) memainkan peranan terhadap SCM. Inisiatif SCM didorong oleh peranan ICT membawa bersama aliran kerja serentak SCM. Walau bagaimanapun, gambaran praktikal untuk menangani jenis peranan ICT di dalam SCM dalam perspektif pengedar berdasarkan dunia sebenar kajian kontemporari, adalah terhad. Kajian ini bertujuan untuk mengkaji hubungan antara peranan ICT dan SCM dalam perspektif pengedar. Ia bertujuan untuk mengkaji jenis peranan dalam SCM dan untuk mengenal pasti tiga peranan asas penting dalam ICT sama ada ia mempunyai hubungan yang signifikan dengan SCM dalam perspektif pengedar. Tiga peranan ICT iaitu bantuan berguna, kelebihan daya saing dan prasyarat adalah pembolehubah bebas. Setiap satu daripada pembolehubah bebas telah diuji untuk menentukan hubungan dengan SCM dalam perspektif pengedar. Soal selidik telah dihantar kepada 103 responden. Responden yang mengambil bahagian mewakili kadar pulangan sebanyak 100%. Tiga (5) hipotesis telah dibina dan diuji menggunakan Korelasi Pearson dan Analisis Regresi . Dapatan kajian menunjukkan bahawa setiap responden dalam syarikat-syarikat pengedar alat ganti automotif di Klang, Selangor mendapati bahawa setiap peranan penting terhadap SCM. Terdapat hubungan yang signifikan antara ketiga-tiga peranan ICT dan SCM. Mereka merasakan bahawa apabila peranan ICT sebagai bantuan yang berguna , kelebihan daya saing dan pra-syarat di SCM , SCM syarikat mereka akan dipengaruhi dengan ketara oleh tiga peranan ICT. Implikasi dapatan ini dibincangkan dan cadangan untuk kajian yang akan datang juga dikenalpasti dan dicadangkan.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In nowadays global business has been influenced by information and communication technology (ICT) and the application of ICT among business has been developed widely such as the use of ICT in logistics and SCM is in a fast development. In addition, many organizations have applied ICT in their business operations for storing, processing, distributing and exchanging information both within companies and with customers and suppliers in the supply chain (SC).

In the early beginning of integration process, cost, time, quality and the customer demand are some of the business climate that brought them to focus more on the integrations between organizations and at that moment they integrate with single supplier. In the other words, these organizations focused on the integrations only to its suppliers. Besides, in general, SC is consisted of two or more organizations officially separated and they are related to each other. They are separated by information, financial flows and materials such as produces materials, components, final product or service in terms of distribution, storage, wholesale and retail. On the other hand, SC can be defined as the flow of goods into raw materials stage to the final state and the information flows associated with them. The concept of SC is the idea that many organizations used especially for supplier and customer and also represent for the integration of several organizations where SC is the network of organizations (suppliers and other outside organizations) and other

activities are involved in getting the product to the end user (customer). Besides, supply chain SC also is a network of facilities that involve raw materials, transforms them into products and by distribution in the SC network, the products are delivered to customer.

As companies seek to improve SC efficiency through increased integration, ICT is considered as a useful aid for SCM in supporting information-sharing. SCM works simultaneous along with and it is included in the supply chain SC information flow. Information between organizational units in the past decades was based on paper documents and this information in many cases was less accurate and comes with many errors. With the concept of raising the SC, SC members understand the importance of information and information technology (IT) was essential. Furthermore, with the accurate information available, the various activities leading to SC coordination and careful planning and efficient in different fields of application are needs such as planning, production, purchasing and planning material and transportation. Besides, information on the strategic planning goals in a SC, where development of the regions and new markets are included and new facilities are created for desired success in the market. Detailed information can be operational decision making and planning as much too high efficient but may obtain this information and installation cost information systems that providing this information is very heavy.

The success of any SCM depends on how well these system activities are managed. In recent years information has become a key player in determining the productivity of a SC of a company. The company's ability to process information and make rapid but with right decisions, growth can be achieved and the demand need to be forecasted and estimated, the sale locations of the raw materials need to be supplied and also the business structure need to be reorganized if necessary. As a results, the integration of both information and material flow and with the technology advanced need to be done by a system where ICT is important to organizations that act as a useful aid for the advantage of managing the information and activities between the network systems and such a system can aid decision making, provide access to information and execution.

Competitive advantage factor has occurred between organizations and changed from time to time and new idea and concepts have been developed. Due to the many participants of supply chain SC, an important issue in the problematic of SC is also involved its organization itself. Nowadays the competition is between rival supply chains and not just individual companies that compete with each other. The SC that added the most value for customers with the lowest cost in the chain will be make up the winning network of individual companies. Organizations have spread globally as business has become more complex and competition has increased and so, business organizations become desperate for quality information to stay competitive and improve bottom line. The ICT is not only used to provide information to run the SCM but also to continue sufficient support for strategic decisions. ICT is being used for the competitive advantage by the organizations in global. Nowadays, ICT is used as a tool to draw competitive advantage by Malaysians organizations. ICT has allowed the organizations to capture various data and information for the combination of separated valuable information and support strategic decisions.

The use of ICT by organizations and companies is considered as a prerequisite for the effective control of today SC and needed in order to establish organization of SC. Besides, ICT facilitates the management of information among all the management of different parts of SC.

Most of the companies had considerably invested in the development of probable integrated ICT infrastructure solutions for logistics and SCM in terms of computer hardware, software, and connectivity by means of EDI, Intranet, Extranet and Internet and ERP. Therefore, it shows the role of ICT in SCM as ICT is important towards SCM of all management of different parts in SC.

From this research study, the researches is hoping to present related research on the roles of ICT in SCM in distributor perspective and also outline the relationship between the types of role of ICT and SCM in distributor perspective based on the literature review in order for other Malaysian distributor companies or enterprises to take highly measurement about the role of ICT in SCM in order to provide effective and efficiency in their SCM.

This research has been done to identify the relationship between roles of ICT in terms of the three types of roles of ICT in SCM which are useful aid, competitive advantage and prerequisite in SCM in distributor of automotive parts company perspective in Malaysia.

1.2 PROBLEM BACKGROUND

Recent years, the development of the applications of ICT in SCM has been seen by many parties. The relationship between the two notions in term of the roles of ICT in SCM has been researched and conducted by many researchers and currently being conducted by various researchers. The questions on how ICT can be used to enhance SCM operations in companies and organizations are also included by among these researchers. Evangelista (2002) verified about the relationship between the two “the increase in requirements to offer global logistics service packages to better satisfy customer needs based on the view of SC of automotive industries and shipments and ICT play a key role in this process, assuring the linkage between chain participants as well as a more effective control of time, cost and quality of the services for the flow of the material” and “the introduction of information and communications technology ICT is not equally distributed in the industry”. Next researcher, Sweeney (2005) verifies on how SCM has been developed increasingly in recent years. SCM is an approach which is being viewed by organizations and companies in many sectors as a key source of competitive advantage and they define SCM and outline the role and also the effectiveness of ICT as a key enabler of the process.

In addition, flexibility and adaptability to customer requirements requires a new face of supply chain strategy that will help create both efficiency and value along the length of the chain, from raw materials stage to finished products. As a result, many companies are attempting to find ways to improve their flexibility and responsiveness and in turn competitiveness. ICT has the same terms with IT but in a specific view, information technology is based on hardware and computers usage and ICT has been developed with communications technology. Specific areas that IT affects on SC are evaluated by Fasanghari (2008) and since it is qualitative, the evaluation by Fasanghari (2008) was done and accepted. Today, SCM is viewed as a principle underlying the implementation of electronic business world. In fact, the need for ICT in the current business environment

cannot be underestimated. As a result of this underlying principle, Biniazi (2011) reviewed SCM issues and after expressing its concepts, IT was studied and also has clarified the main concepts of SCM position in the development of IT, especially electronic commerce (e-commerce).

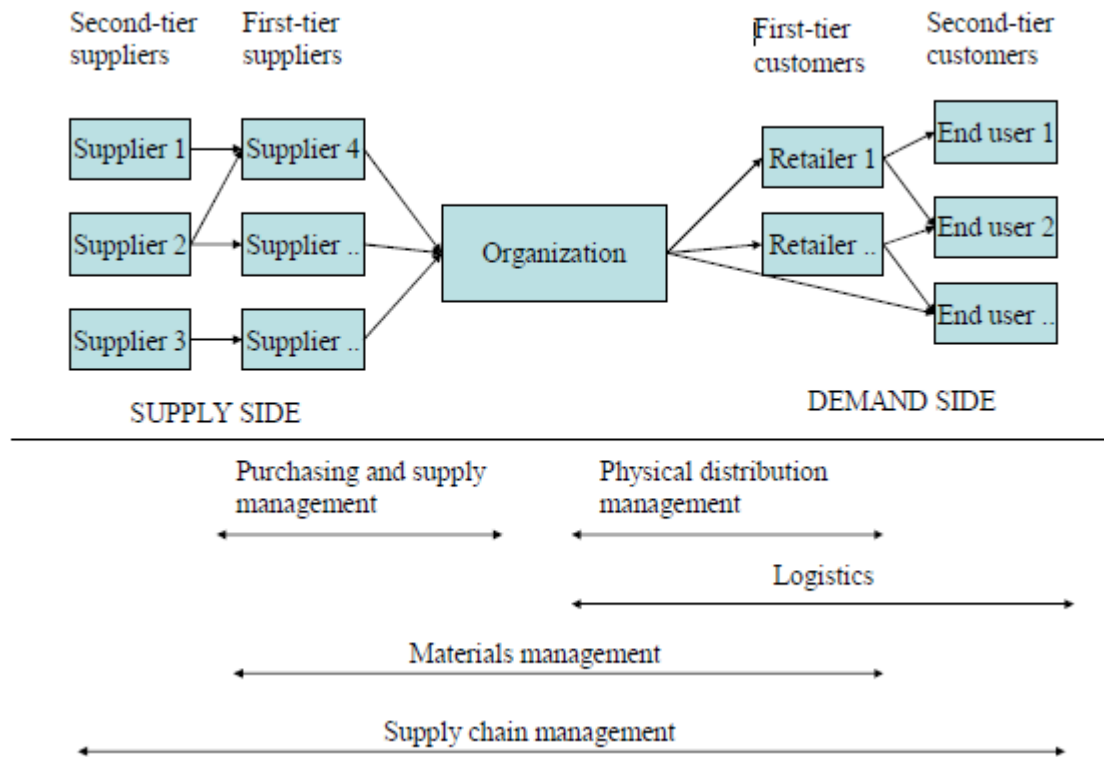


Figure 1.1: Terms used to describe the management of different parts of the SC

Source: Slack et al. (1995) and Kauffman (2002)

Figure 1.1 shows the management of different parts of SC. Purchasing and supply management is more focused on supply side of SC and physical distribution management is focused on demand side of SC. Logistics is an extension of physical distribution management and refers to management of materials and information flow from an organization down to the end customers. Materials management refers to management of the material and information flow through the immediate SC. According to Daft, (2000); Larson and Halldorsson (2002), SCM refers to managing all participants of SC such as the suppliers, distributors and manufacturers which are involved in the process of delivering

goods from supplier to end users. It is important to stress, that SC is not just a new names for logistics (Kauffman, 2002; Cooper et al., 1997; Slack et al., 1995; Lummus et al., 2001). SCM has emerged from all previous concepts for managing SC (Larson et al., 2007)

Nowadays in complex business environment it is very difficult for an organization to act independently on the market. Organizations could be above their competitors if they participating in one or more SC. In fact research has shown that, in recent times, companies are not competed again companies, but rather their SC are competing against other SC as stated by Christopher, M (2005). Therefore membership in one or more SC has become one most important in the global market in order to retain competitive advantage in modern business environment.

Advancement in modern ICT and Internet coupled with the interest for virtuality and virtual design of organizations has a great impact on many business areas. Therefore organization of supply chain (SC) could vary on a continuum from traditional to virtual organization. Besides, information and communications technology ICT is a base for virtual organization of SC and for linking dispersed supply chain SC participants. Shavazi (2009) discuss and has stated that “during the last decade how ICT and SCM have attracted much attention towards many experts”. However, the discussion of the relationship between ICT and SCM has been limited and fragmented. Shavazi (2009) has summarized the discussion of ICT components and SCM based on an extensive literature review are presented. Later, another Shavazi (2009) further discussed the interrelation between ICT and SCM from some major components and applications of ICT perspective and also has introduced e-SCM concept that has arise recently in management literature, in order to cover the whole topic and also look at all of the major components of electronic supply chain management SCM and demonstrate that the future holds tremendous opportunity for those firms that take advantage of all its possibilities. Nowadays with the development and enhancement of technology, ICT developments have strongly affected SCM and had a great impact on all SC processes.

ICT has played an important role for SCM since it has become beneficial to organizations with the SC systems. The relationship of the information and

communications technology ICT implemented by organizations Furthermore, implementations that could be done by the company of distributor of automotive parts to continuously improve SCM operations and to sustain the standards of its SCM are also included in this research project.

There are some issues that showed the role of ICT in SCM. Some of these issues are for the overview of the relationship of role of ICT and SCM in Malaysian organizations and the importance of the role of ICT in SCM. Since the increasing of Malaysian ICT investment, Malaysian businesses have been relatively slow in web adoption (Alam and Ahsas 2007). Tan (2006) argues that ICT in Malaysia is facing big challenges due to the slow adoption of technology by Malaysian enterprise. He also mentioned that organizations must learn to adopt technology to increase their global competitiveness. Most Malaysian organizations perceived the barriers of implementing ICT into their business operation as expensive initiatives, risk, complex, technical expatriate (Yeung et.al. 2003; Chong et. al. 2001; Pires and Aisbett, 2001). Moreover, Mohamed et.al. (2008) mentioned that e-commerce in Malaysia still at infancy stage although country has sufficient infrastructure and technological facilities. Despite various ICT and e-commerce initiatives by Malaysian government, e-commerce penetration among Malaysian firm still very low (Hussin and Noor 2005).

1.3 PROBLEM STATEMENT

After studying the role of ICT to integrate and enable the SCM and what are the relationship, although this is a relevant research subject but it is still a fragmented domain of academic research which has been a lot of writing about SCM, also in combination with organizations in many perspective such as supplier perspective, but no overview of the different factors and this study contributes to distributor perspective where a study on the distributor of automotive parts. Therefore, it would be very interesting to see information flows enabled by the used of ICT will results in a more efficient and effectiveness of SCM with relevant study on the relationship of ICT with the SCM based on the different types of role of ICT in SCM which are the useful aid, competitive advantage and prerequisite.

Based on the arguments above, there is a lack of concentrated knowledge about the innovative use of ICT in SC processes in Malaysian organizations. In related developments, many developed countries such as Germany, Italy, Japan and other countries have invested funds in research programs to study the role and the importance of ICT that can effects SCM in their business world and also they have been more advanced with the technologies in SCM and other activities related to the used of the technologies compared to Malaysia since their technologies is more advance. Furthermore, they have also use ICT in an efficient way with all the knowledge and idea about ICT to improve their SCM operations since nowadays, ICT plays as a prerequisite which means that ICT has become a central construct around which entire SC is built (Nedelko, Z., 2008). On the other words, ICT is assigned as a requirement for SC network. Therefore, these give a boost to their organizations into more optimized and maximize profits and benefits for their organizations performance in terms of their SCM.

It is timely the Malaysian organizations to adopt a serious effort in understanding the roles of ICT that can beneficial their SCM and move towards of implementing ICT in their integration systems as ICT is a requirements for the construction of SCM with outside organizations borders and the useful aids from ICT that may give advantage to their organizations performances such as the growth and the sustainability of their organizations in the network of business and as a competitive advantage towards global markets. For this study, distributor of automotive parts company in Malaysia is used as the subject for this research study as the distributor perspective of SCM.

1.4 CONCEPTUAL FRAMEWORK

Basically, conceptual framework is used to supports the research study by presenting relationships among variables and give limitation to the research study (Diane M. Dusick, 2011). Research can be guided by conceptual framework. Theoretical framework also used to determine what variables to measure and what relationships need to obtained. Besides, conceptual framework is develop for the preliminary information gathering, completing literature review related to the research study and defines the research problem.

In this research study, SCM in distributor perspective is the dependent variable. For the independent variable, it focuses on the role of ICT where three types of role of ICT which are the useful aid, competitive advantage and lastly prerequisite in SCM. Conceptual framework is developed to show the relationship between the two variables that required in this study. The terms of SCM and ICT have been used in previous studies. McKeown P.G. (2000) claimed SCM is the process of managing relationships, information and materials flow across enterprise borders where the enhanced customer service and economic value are delivered through management of the flow of physical goods and associated information from sourcing to consumption. Mohammadzadeh, A. (2009) stated that the strongest drivers among them are appeared to be meeting customer needs and the needs for better communications within and among partners in SC. It shows that there is an integration of information flows across the SC network where ICT play a key factor in SCM. Another researcher, Nedelko, Z. (2008) has developed the framework of the types of role of ICT regarding to the level of ICT usage in SC and another framework related to the three most significant roles of ICT in SC. In this study, distributor perspective towards the role of ICT in SCM are focused where ICT is as an advantage which is the useful aid in SCM, as a tool for the competitive advantage in SCM and as a requirement in terms of prerequisite in SCM based on distributor perspective. Conceptual framework as presented in Figure 1.2 is within the perspective of previous studies that related to the topic of this study.

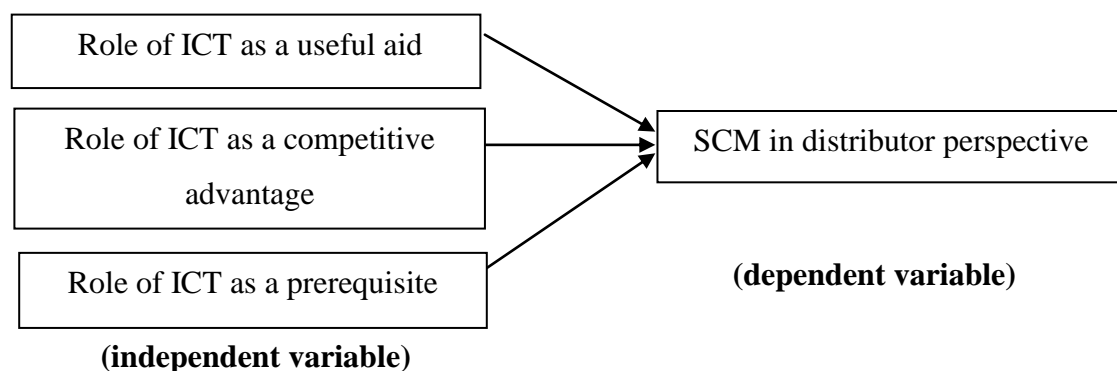


Figure 1.2: Conceptual framework for the relationship between three independent variables and dependent variable

1.5 RESEARCH OBJECTIVES

The objectives of this research study are:

- 1.4.1 To investigate the relationship between role of ICT as a useful aid and SCM in distributor perspective.
- 1.4.2 To investigate the relationship between ICT as a competitive advantage and SCM in distributor perspective.
- 1.4.3 To investigate the relationship between ICT as a prerequisite and SCM in distributor perspective.

1.6 RESEARCH QUESTIONS

The research questions of this research study are:

- 1.5.1 What is the relationship between ICT as a useful aid and SCM in distributor perspective?
- 1.5.2 What is the relationship between ICT as a competitive advantage and SCM in distributor perspective?
- 1.5.3 What is the relationship between ICT as a prerequisite and SCM in distributor perspective?

1.7 RESEARCH HYPOTHESIS

The aim of this study is to investigate the relationship between the independent variables which focus on the relationship between the types of role of ICT which is useful aid, competitive advantage and prerequisite and the dependent variable which is the SCM in distributor perspective. Besides, the hypothesis is constructed to determine whether the relationship between role of ICT as a useful aid, role of ICT as a competitive advantage and role of ICT as a prerequisite and SCM in distributor perspective is significant or not significant. The hypothesis of this research will be tested in this study based on the problem statement, research objectives, and also from research questions.

Hypothesis 1

H1: Relationship between role of ICT as a useful aid and SCM in distributor perspective.

H1: There is a significant relationship between role of ICT as a useful aid and SCM in distributor perspective.

The hypothesis is to test whether the SCM in distributor perspective has been significantly influenced by the role of ICT as a useful aid in SCM and hence will the hypothesis be accepted or rejected.

Hypothesis 2

H2: Relationship between role of ICT as a competitive advantage and SCM in distributor perspective.

H2: There is a significant relationship between role of ICT as a competitive advantage and SCM in distributor perspective.

The hypothesis is to test whether the SCM in distributor perspective has been significantly influenced by the role of ICT as a competitive advantage in SCM and hence will the hypothesis be accepted or rejected.

Hypothesis 3

H3: Relationship between role of ICT as a prerequisite and SCM in distributor perspective.

H3: There is a significant relationship between role of ICT as a prerequisite and SCM in distributor perspective.

The hypothesis is to test whether the SCM in distributor perspective has been significantly influenced by the role of ICT as a prerequisite in SCM and hence will the hypothesis be accepted or rejected.

1.8 RESEARCH SCOPE

The scope of this research is to determine the relationship of roles of ICT and SCM in distributor perspective. The study of this research will focus on automotive parts company that distributes automobile components and parts.

This study will gather important data for the types of role of ICT in SCM as such each role is significant towards the SCM in distributor perspective. The implementation of the technology as such the used of ICT in managing the SCM where the types of role of the technology in the SCM will be discussed and analyzed that contribute to the significantly influencing the SCM in distributor perspective. There are three types of role of ICT that will be discussed and analyzed which are the useful aid, competitive advantage and lastly, prerequisite. The study of this research limited itself to only distributor companies of automotive parts in Klang area and since this study is only towards distributor companies of automotive parts, only the responses from the respondents in the distributor companies of automotive parts will be studied and analyzed.

1.9 SIGNIFICANCE OF THE STUDY

The adoption of ICT within SCM has improved to almost all business processes of organizations in various sectors including the distributor sectors. Besides, implementation of ICT in SCM has impact the competitiveness between these organizations such as the productivity is increased and the costs are lowered along the integrated system of SC,

quality and the products are developed and improved to be more technological and modern, planning and the delivery scheduling or forecasting are more précised and more faster and eventually other related business processes. Therefore, this study is significant where it emphasizes the roles of ICT in SCM in distributor perspective.

While at present, ICT improves the sector's performance and profit in terms of labor productivity and economic growth and yet using ICT in SCM has many other challenges and factors such as competition from other organizations, challenges that must be faced when using ICT to manage their SCM for a better and efficient results and so on that these organizations in Malaysia need to undergo. Moreover, although Malaysia government has contribute and support ICT into many areas but still many organizations that using ICT in Malaysia still lacking of knowledge of ICT role and still need to enhance or improve as such the appropriate ICT services meet the role of the technology that will ensure on achieving their objectives with benefits. Example in general, for the distributor companies of automotive parts, using ICT will ensure them to achieve their objectives to improve the order management, improve the communication and collaboration with other business industries.

Integration of ICT may costly and time consuming but it is a key enabler for improving automotive ecosystems. In short, ICT applications have very large potential to enhance performance of the economy and society. However, in order to benefit totally from ICT solutions, ICT developments need to done and make the structural changes to their organizations.

The automotive parts companies have been the subject in this research. Automotive parts companies are of great economic importance to Malaysia, and hence this research project is significant. Besides, it also to ensure Malaysia automotive supply chain (SC) function efficiently through the enhancement of inter-organizational relationships which are built information sharing with the adaptation ICT into SC integration activities for a long period of time.

This study is relevant to address in the interest of other organizations and other relevant party in terms of the relationship between the different roles of ICT and SCM of as

information and ICT is believed being profitable on this day as technology has become more advanced and rapidly adopted by others in global market.

In addition, this study outlined different roles of information ICT in SCM, in order for companies and organizations to render and provide effective and efficient services and also the potential benefits may the study bring such as it present related work on the relationship of the types of role of ICT play in SCM to the future organizations and also explore more business opportunities for all the involved industries.

1.10 OPERATIONAL DEFINITION

1.10.1 Supply chain management (SCM)

SCM is the management of a network of all business processes and activities that involve the procurement of raw materials, distribution of finished goods and also manufacturing.

1.10.2 Supply chain (SC)

A SC is a term that consisted of all parties involved, directly or indirectly, in fulfilling a customer request and interdependent in serving the same consumer or customer. Moreover, SC not only includes the suppliers and manufacturers, but also includes warehouses, transporters, retailers, and customers. SC also is the comprises of vendors that supply raw materials, producers who convert the material into products which is the manufacturers, warehouses that store, distribution centers that deliver to the retailers, and retailers who bring the product to the high value of user.

1.10.3 Role

Role is a function or responsibility of an individual or the obligations and the expected behavior of an individual in a particular matter.

1.10.4 Perspective

Perspective is a particular way of looking at things.