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Curriculum development of SCM master's degree program in Turkey
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ABSTRACT

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The purpose of this research aims to demonstrate how to develop SCM master's degree program in Turkey. The SCM and logistics master's degree programs through chosen case universities which are Atilim University in Turkey and Cranfield School of Management in the UK in which current level of SCM and logistics related contents in their curriculums will be analyzed in a comparative qualitative method. Through utilization of academic literature covers existing contents and subjects in case universities' curriculums and also educational development of these main concepts in the academic literature which will be discussed in order to provide an understanding of the main concepts and also possibilities for improvement suggestions with aggregated outcome of the empirical part of this thesis.

There are four major perspective in the literature in understanding and evaluating of logistics and SCM concepts. One of these four perspectives is “traditionalist view”. Based on traditionalist view, SCM is considered to be evolved from logistics as a discipline and believed as a part of logistics concept and even considered as a subset of the whole logistics discipline. Therefore logistics hires supply chain analyst to focus on cross functional, inter-organizational issues in that perspective. This statement is held to be true when assessing the current perspective in Turkey and also at Atilim University as well. Therefore SCM and its importance and functionality is generally neglected in curriculum at Atilim University and SCM –related courses are given in the basic level and therefore there is no intermediate and upper level of course content including emerging topics such as sustainability and concept of green in logistics and SCM, future estimations of supply chains, technology, total quality management, lean and agile supply chain systems, network designs and policy and strategies. Furthermore, the connection between logistics and SCM are neglected to be explained in the curriculum of Atilim University.

The findings of the empirical part of the thesis highlight that the main importance and priority should be given to the subject of SCM at Atilim University which is based on “unionist view” as it is explained as the main approach and vision of the Cranfield School of Management in this thesis. It also emphasizes that a holistic approach and wider context of SCM that cover logistics, procurement, warehousing, transportation and distribution subjects within should be developed and logistics as a discipline should be given under the umbrella of SCM in details in the curriculum of Atilim University.

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List of Symbols and Abbreviations

ABET	Accreditation board for engineering and technology
CILT	Chartered Institute of Logistics and Transport
GSCM	Green supply chain management
SCM	Supply chain management
OECD	Organization for Economic Co-operation and Development

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1 INTRODUCTION

New technological enhancements, innovations and advanced level of improvements in data exchanges, communications and information technologies, and automatization of intelligence-based manufacturing processes have changed the role and significance of traditional logistics substantially for organizations and companies. (Tong, 2011)

Ozment & Keller (2011) emphasized these changing dynamics in today's economy with globalization effect and explained that today as the organizations and companies move through a more challenging global economy than ever before, there is a substantial requirement for skilled, qualified and well-educated people to perform at executive and senior level of management in logistics and SCM area to deal with these challenges effectively.

William Copacino (1997) in his book named "supply chain management: basic and beyond" illustrated the importance of skilled, qualified and educated workforce in the field of logistics as a sign of improvement and he foreseen that having qualified human capital is going to be an essential component of success factors in the next era in the field of logistics and SCM. He also stressed that "logistics process is human centric" and added that with an increasing substantial enhancement in technology and communication, a huge amount of employees from mid-levels to top positions of the organizations in logistics and SCM need to make it sure that operations go smoothly. Therefore, organizations and companies must hire the most qualified, skilled and educated talents. Bowersox (2013) pointed out how logistics is human centric in his book by illustrating a sample of logistics function and stated that " Effective management of the logistics process is complicated by the fact that over 90% of all logistical work takes place outside of the vision of any supervisor. No other employees within the typical business enterprise are expected to do so much critical work without direct supervision as those that make logistics happen. "

Van-Hoek (2001) pointed out that the effect of globalization with its complexity, uncertainty and rapidly-changing dynamics affected praxis-oriented-science in the logistics field. He found out in his study that previous studies conducted on this topic proved that logistics and SCM educational programs have increased as parallel with increasing demand from industry and organizations and

have been grown enormously worldwide. Accordingly, over the last 20 years, SCM and logistics have evolved into a cross-functional and multi-layer disciplines with an increasing significant demand for education and professional skills and therefore these changing dynamics require an updated curriculums in logistics and SCM educational offers. However, following these rapid changes in traditional concept of logistics and SCM in practice and further enhancements in research and theory, it has become a challenge for academia to upgrade education systems, their programs and their curriculums. For example, Knemeyer & Murphy (2004) mentioned about these unsatisfactory logistics education programs in their study focused on analysis of universities and colleges' logistics and SCM curriculums in order to find out whether these curriculums meet with the requirement of industry or not and eventually they came with a conclusion and stated that "most of the universities and colleges in the US are not able to produce a proper amount of graduates who are well educated and qualified enough to meet the requirement of businesses and organizations in the US marketplace in the field of logistics and SCM".

Development and evolution of logistics education have been divided into three implications such as pedagogy, curriculum, and industry in the academic literature. Generally pedagogy defines the main principles and methods of appropriate instructions that are used to assist in order to produce qualified graduates. In industrial side the expectation is that, universities, colleges and related institutions in academia should provide a proper amount of graduates which can match with their human capital needs and requirements. Curriculum consist of creation of appropriate courses for degree structures in order to graduate an effective workforce. However concept of curriculum development both in theory or practice in academia have been stayed unclear and kept being discussed at educational institutions due to confliction and disagreements of the definitions and interpretations with barriers. And it can be said that, development of proper curriculum is seen as an important component or first initiative to be taken in order to form a qualified educational program and specifically a crucial element of general purpose of producing highly qualified graduates eventually irrespective of the academic programs and universities. (Fish, 2013). However, there is an inconstancy between the matter of how a curriculum is being formed and developed and how a curriculum is capable enough to match with the requirement of the industry and this inconstancy eventually creates a gap. Following that one can say that although the

matter of development of curriculum is considered as a crucial issue in higher education level irrespective of how it is defined and how significance of its scope, however, analysis of curriculum, its progress and modernization at educational institutions in higher education level have been neglected in academia globally. (Hyun, 2009).

In the last decades, with the rapid increase of foreign investment activities and as a result of its unique geographical position considered as a bridge between Asia and Europe, Turkey has emerged as an important player in the international trade area where the concepts of logistics, transportation and SCM activities are seen as the most important and supportive elements in this role and the therefore demand for educated, skilled and well-trained manpower to handle this both in international logistics and SCM sectors have grown rapidly (Deloitte, 2013). Since the requirement of education in logistics and SCM in order to have innovative, visionaries and skilled manpower have been started to given importance to cover qualified work force deficit in Turkey, universities have started to form such major and minor educational program both in bachelor's and master's degree level.

According to Ernst& Young IBS logistics survey conducted in 2002 in the field of logistics and SCM in Turkey, %47 of the total employees are blue collar workers, %43 of them are white collars and %10 of them are sub-contractor. In addition to that, the level of education of the total employees in terms of overall percentage distributions are given as; % 27 secondary school graduates, % 46 high school graduates, %22 community college or university graduates and only % 5 of them are master's degree graduates. Based on this reflection, it can be said that only %27 of the work force in Turkey has university level education in their background. It is obviously clear to see that Turkey is rather far away to reach the level of developed countries such as UK Comparing the level of educated work force in the field of logistics and SCM.

The analysis of higher educational programs in logistics and SCM are structured in three different levels in Turkey. First level refers to the college education that lasts two years and aims to educate people for providing basic manpower to the industry for practical applications in the field of logistics and SCM. Secondly, the bachelor's degree programs aim to educate and provide mid-level logistics and supply chain professionals for tactical levels. Lastly as the most important

and vital level that refers to master's degree programs that aim to educate and provide executives and business professionals who will be supposed to create policy and strategies, designing networks, determine the vision and will be in charge of performing at the most important administrative units for companies in the industry. Therefore there is a huge gap and necessity in this field in Turkey to be improved and re-formed. In order to close this gap in Turkey this topic is chosen as a research problem and basis of the results of a comparison of the educational curriculums between a developed country as UK and as an developing country Turkey, it aims to create ideas and provide some specific suggestions for improvement of current curriculum content at Atilim University and also it is aimed to be used as a guide to inspire and lead the educational structure to major in logistics and SCM at master's degree levels to be improved at universities in Turkey and enhance the level of educational quality in the logistics and SCM area as well.

Atilim University is one of the first private university in Turkey which is known well and which had formed the major of International Trade and Logistics master's degree program for the very first time in Turkey and based on an English ranking organization such as QUACQUARELLI SYMONDS it is ranked into 201-250 range among 300 universities in 2017. In addition to that it has managed to be qualified enough to get accredited by ABET and ranked as given below;

- Ranked in top 500 universities in the 2016-2017 THE WUR
- Ranked as 62nd in 2017 THE BRICS & Emerging Economies University Rankings

On the other hand, Cranfield School of Management has been ranked as the first university that is located out of the US and placed in 11th position globally in the SCM World and in University 100 annual survey conducted in 2016, and also ranked as 2nd in Europe, Middle East and Africa in the Top 20 SCM annual survey that was conducted in 2016. In addition to that, Cranfield School of Management has been ranked consistently 1st or 2nd in the UK and in top 10 in Europe in the Financial Times Executive Education Survey. Following that Logistics and SCM MSc program at Cranfield School of Management is accredited by The Chartered Institute of Logistics and Transport and The Chartered Institute of Purchasing and Supply.

This master's thesis will discuss the concept of curriculum development in logistics and SCM education programs. Thus, the focus will be on analysis and benchmarking of two curriculums of educational programs at higher educational levels in Turkey and in the UK. The aim of this master's thesis is to make a comparison of two curriculums major in logistics and SCM and define the differences between two curriculums in order to establish an understanding of how Atilim University should improve its logistics and SCM courses in its curriculum based on these differences.

The research will be carried out as a qualitative method including a comparative case study. One of the case university in this study will be Atilim University and the other case university will be Cranfield School of Management with its logistics and SCM programs at master's degree levels. Having one of the most-well known and advanced university which is globally accepted in the field of logistics and SCM as a case university in this study can provide a significant contribution for benchmarking and a source for improvement of curriculum content at Atilim University's logistics and SCM program.

1.1 RESEARCH QUESTIONS AND OBJECTIVES

In this study the main aim is to gain an understanding of how to improve contents in curriculum of logistics and SCM master's degree programs in Turkey. A university from Turkey which is Atilim University and another university from UK which is Cranfield School of Management along with comparison of their curriculums in their logistics and SCM master's degree programs will be used in the form of a case study in this thesis in order to find out the differences between two curriculums and provide suggestions for improvement of the curriculum at Atilim University in master's degree level. In addition to that, this study aims to generate necessary information for the improvement of curriculum contents and to be used as a guide for other universities and colleges in Turkey to update their curriculums and improve their course contents based on aggregated result of curriculum benchmarking conducted in this study in order to produce qualified and well educated graduates. By conducting a benchmarking study on logistics and SCM curriculums, this research has also aimed to deliver a detailed assessment of the existing curriculums major in logistics and SCM at higher education in Turkey and UK based on their

curriculum contents and compare them with the requirement of the industry. Therefore the result of this study can also be used as a guide for professional trainers in Turkey as they can utilize the data and suggestions provided in this study as an inspiration for developing programs for business executives in the field of logistics and SCM education. Following that it also increase the importance of the research since it will be the first study conducted in this field in Turkey. Considering the fact that, there is not any PhD program in logistics and SCM majors in Turkey, this study will be a guideline for the improvement and regulation of the current master degree programs at Turkish universities and also it is possibly aimed to be used as a guide to enlighten for future studies in Turkey.

In the light of these objectives, the main research question of the study is:

- How to improve logistics and SCM master's degree programs' curriculum in Turkey

This study is limited to cover only comparison of logistics and SCM- related courses in curriculums that are given at master's degree levels in higher education at Atılım University in Turkey and at Cranfield School of Management in the UK. The other courses which exist in logistics and SCM master's degree programs which however do not cover logistics and SCM related subjects within their content are not included in the benchmarking study neither in scope of this study. In addition to that this study is limited to only master's degree level of education at both universities. In addition to that, the unit of analysis for this research in benchmarking is limited to focus on not syllabuses but on curriculums including learning outcomes and learning aims.

The objective is not to provide such a conclusion which is generally well-known for logistics and SCM in higher education. However, the intention is to provide conclusion and suggestions that are based on theory performed through extensive literature review and existing case based on benchmarking of curriculums at two different universities which could possibly be used as a guide to go further in future research for development of logistics and SCM education in Turkey. Figure 1 represent the theoretical framework of this study, in which concepts of SCM and logistics are placed as the main concepts. To extent this concept, educational framework in this study is shown under logistics and SCM business concepts as the study has evolved from the theoretical perspective in conceptual descriptions of the logistics and SCM within a business

context to an educational context. Under this as it is explained through a detailed literature review in the theoretical part, the concept of education in logistics and SCM are divided into three parts as curriculum development and skills and required competencies. Lastly the case universities are presented as the core of this research.

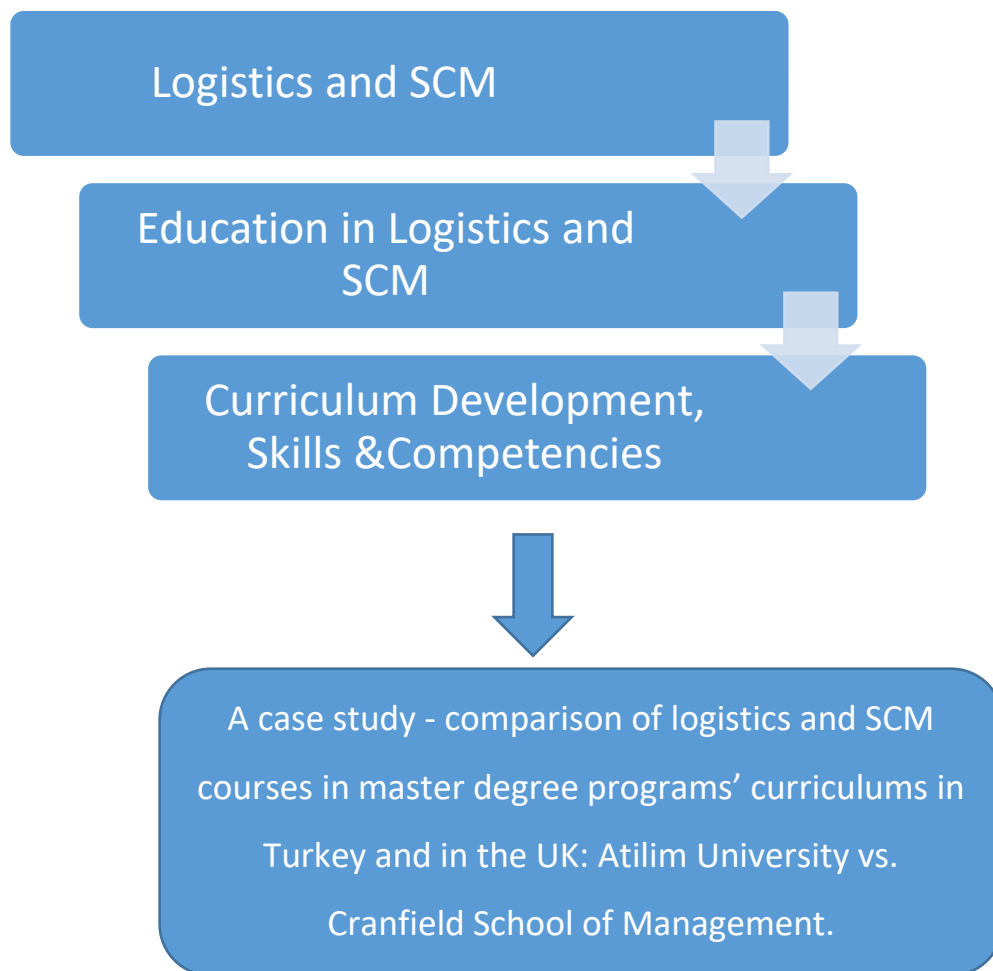


Figure 1. Theoretical framework of this study (developed by author)

1.2 METHODOLOGY AND DATA COLLECTION

This chapter has a particular significance in terms of the quality and credibility of the results and the quality of the research as well. Hence, in this part, research methods and research design will

be presented and following that a discussion related to the quality aspect of the study will be shown.

Research method can be described as a technique which identifies and frames data collection that is required for academic researches. It includes various instruments range from surveys, questionnaires, interviews which may be utilized in various methods (Bryman and Bell, 2011). A big majority of the researches and studies on the topics of education in logistics were conducted through surveys, interviews and case studies (Poist et al., 2001). These methodologies intend to show a quantitative characteristics and findings since they aim to calculate and measure differences between syllabuses. However the field of curriculum development in logistics education via comparative case study based on differences between two curriculums aim to generate improvements and suggestions in a specific case is a relatively subjective theme and also a blind spot in literature and also vague on the research map, therefore this thesis is conducted as a qualitative case study. The reason to choose that method primarily is because of that qualitative research can assist by contributing insightful and detailed analysis regarding to the major topic and case study within and also it allows to implement the findings to a real case example (Metsamuuronen, 2006).

Qualitative research method refers to a strategy that is commonly utilized in researches in particular in the field of business-theme researches beside quantitative research method. It highlights words rather than quantification based on measurements and therefore researchers who adapt qualitative method do not prefer to utilize any application regarded to the measurement (Bryman & Bell, 2011). The major differentiation between qualitative and quantitative approach in researches mainly stem from their scopes. Qualitative research aims to gather and provide an insight in social relationships through utilization of interpretation of data collected via observations. Furthermore, qualitative research essentially demonstrates an inductive approach which is also known as inductive reasoning and which initiates through observations and utilization of theories (Goddard& Melville, 2004).

Atilim University and Cranfield School of Management were identified as case universities and the research process began with a request for syllabuses from both universities in order to gather list of courses and curriculums which are required to conduct a comparative case study. After

identification of main sources, an email requested sent to the administration offices and faculty members such as lecturers in both universities to asked for permission to access to their syllabuses, list of courses and current curriculums in their educational offers including undergraduate, graduate and executive programs specialized in logistics and SCM including operations and purchasing management within as well. The participants from Cranfield School of Management asked the researcher to refer the website of the university for accessing the related data. Therefore the curriculum of Cranfield School of Management was gathered via access to online sources available on internet and on their web-page. On the other hand the related data from Atilim University was collected via webpage and faculty member's personal web-pages. In addition to that collected data through web-pages was checked through phone interviews with administration office and through meetings with some of the lecturers at Atilim University.

These collected data were taken further to be used in descriptive analysis of the curriculums and learning outcomes. Content analysis is used as a major methodology for research in this thesis because it can provide a set of rules to allow researcher conclude with valid inference from the materials and systematic evaluation and benchmarking of the materials (Kolbe& Burnett, 1991). In particular this study utilized a qualitative analysis of the contents and learning outcomes of chosen subjects in both of the curriculums. Also in this study, a comprehensive literature review that was provided through a detailed structured search in academic databases was aimed to be used as one of the main approach in order to gather information related to the theoretical concept of logistics and SCM subjects and eventually evolved to educational development of these concepts existed in the literature. The literature utilized in the theoretical parts was formed and classified by means of a content analysis that involves specifically in curriculum development in order to give structure to the material which aim to promote the understanding of theoretical concepts applied to logistics and SCM education context via a comparative case study conducted between two universities.

According to Bryman & Bell (2011) utilization of existing literature in a research can contribute to build a structure and constitutes a base for significance of the research with its objectives. This chapter aims to handle the concept of logistics and SCM with education in both of these concepts in a broader theoretical perspective.

In the theoretical part of this thesis, literature review is primarily based upon academic articles and journals which are mentioned previously and also which are underpinned by many textbooks which are globally accepted and known in the field of logistics and SCM academia. In addition to that Academic library of LUT and some of the major academic databases such as LUT Finna, EBSCO, Scopus, Science Direct and Google Scholar have been utilized as major resources in order to reach these publications for this thesis.

1.3 RESEARCH STRUCTURE

Research structure of this thesis is designed as it is explained below. First an introduction chapter will be presented after that a comprehensive theoretical base of the main concepts which are logistics and SCM through a detailed and structured literature review will be given. This literature review include a wide overview of the development, definition and scope of the logistics management with its sub-components. Following that since logistics is considered as a part of greater SCM discipline in this study, detailed definitions and scope of SCM will be provided. In addition to that a literature review about the educational development and research in the field of logistics and SCM as the main objective of this thesis will cover the final chapter of the theoretical base of this research eventually.

Secondly, an empirical chapter will be presented after completion of the theoretical parts. First, the case universities and their logistics and SCM related curriculums in their master's degree programs will be introduced which will be followed by a benchmarking of these curriculums that aims to give a detailed analysis of contents and courses in these curriculums at both universities. After this, the results of the benchmarking study between two universities will be illustrated. Lastly, in order to address the main research question of this thesis which aim to provide solutions and suggestions for improvement of logistics and SCM related content in curriculum at Atilim University which is basis on the evaluation of the benchmarking outcomes between case universities and reviewed literature will be presented.

2 DEVELOPMENT, DEFINITION AND SCOPE OF LOGISTICS

The word “logistics” had been derived from the combination of two different words which had been originated from ancient Greek and Medieval Latin languages in the history. The word in both of these ancient languages means of “speech, reason, ratio, rationality reasoning, competent in calculation” (Wassenhove, 2006). In addition to that the first usage of logistics as a word in humankind history was believed to be “Logista” which referred to a military rank in the time of Roman and Byzantine Empires. Another oldest definition of logistics that extended the meaning from a military rank to a military concept was defined by French Institute in the beginning of 20th century and referred to an organization of transportation movement and relocation of troops and army forces from one location to another one in the battlefield (Farahani et al., 2009).

OECD (2002) has extended this definition of logistics from military concept to a more comprehensive framework and stated that logistics is a science in management, planning and maintenance and relocation of military forces and this overall definition in logistics concept includes the activities of military in the battlefield that is ranged from providing supply, designing of network, development and purchasing of materials.

Although the concept of logistics had been emerged as a term in military field and it had never been considered within the commercial business context for a very long time, however, as parallel with development of technology and as a result of increase in manufacturing volumes after-mid of 1950s, it evolved to an important concept in business world. After the industrial revolution and greater economic crises in the beginning of 1920s in USA, increasing manufacturing capacity, and production facilities had triggered the demand and necessity of transportation service for almost every business in the whole country. As a result of increased manufacturing capacity and related transportation demands, manufacturing companies and businesses have recognized the importance of physical distribution and purchasing activities and since then the importance of logistics had been increased systematically (Bowersox & Closs, 2002).

The concept of integration of physical distribution and material management and increased volume and capacity in logistics field have contributed to the development of logistics management. Until the 1960s the concept of logistics was analyzed into two separate concepts as

physical distribution and material management. In 1970s the first initiatives were taken towards institutionalization of logistics concept through private and public companies for the purpose of extending scope in logistics and enhancement of logistics functionality (Rushton et al., 2006). In 1980s the concept of logistics evolved a complex and multi-layers structure including not only transportation dimension but extended to include communication and sharing-information technologies within and as a result of this rapid development of logistics, the concept of integrated logistics has become an important subject in the business world. (Bowersox et al., 2002). In 1990s, organizations and enterprises started to seek opportunities in order to increase efficiency in their logistical performance and reducing their transportation costs and therefore they started to collaborate with third party organizations for the purpose of outsourcing (Ross, 1998). In 2000s, especially the rapid development of technology and increased volume of global trade capacity crossing borders triggered an acceleration in extension of scope in logistics activities from a traditional perspective consists of only transportation activities to a more comprehensive perspective. Organizations and firms have tended to consider logistics as a crucial element of their business in order to maximize their profits and decrease their costs and therefore new improvements has been emerged into logistics concepts during this period around the world such as e-logistics, 3PL and 4PL service providers, utilization of information technologies and SCM (Terzi& Bolukbas, 2016).

Logistics includes a number of different activities that ranges from providing raw material from suppliers to the manufacturing place that can be named as “point of production” and moving final goods to the final consumer that can be named as “point of consumption” including information and financial flow within. In the nineteenth century when it referred to all the means of carrying and transporting of materials and covered them under one word, today it becomes an umbrella term that collect all activities within that ranges in a large scale which can be summarized as all the necessary functions which are required to turn raw materials into a final product and deliver them to the final customers (Rodrigue et al., 2013).

Manjunath (2014) has explained that logistics is responsible of the control and movement of the material flow from extraction of raw materials to the delivery to last customer which can be an enterprise or an individual who demands the products and services. The resources that are controlled and managed by logistics include not only movement of physical materials and

information, but also time and energy. The logistics of physical materials covers a combination of various activities such as information flow, manufacturing, inventory, warehousing, distribution and packaging. In this respect, logistics can be used as a term related to activities of transportation, warehousing, packaging and also includes all the effort that is put to turn raw material to a final product through manufacturing system.

Japan Institute of Logistics Systems (2006) give a definition of logistics in order to emphasize its wide scope and final purpose and states that logistics can be defined as a management system that integrates and synchronizes supply, manufacturing, sales, distribution, and inventory management. And it aims to increase customer satisfaction, decrease inventory level and minimize cost of transportation of that overstock in the inventory (Japan Institute of Logistics Systems, 2006).

The Chartered Institute of Logistics and Transport (CILT) originated in the UK describes logistics as; “Getting the right product to the right place in the right quantity at the right time, in the desired condition and at an affordable cost”. (CILT, 2003) Based on this typical definition of logistics it can be said that there are still two different means of “right” that can possibly be added into this definition of logistics. One of them can be “right” customer to deliver. In many industrial region today, manufacturing facilities are being shared and functioned as co-located by many different companies simultaneously. Even on the same production line, there can be multiple different products that belongs to different sub-contractors. Hence, in this respect, the challenge is getting the right product to the “right customer” at this right place. In addition to that, there is an increasing awareness in environmental consideration in terms of manufacturing ways and way of transportation of the products without violating sustainability. Therefore getting the right product to right the customer in the “right way” is also becoming an important matter and so it can be extended this definition of CILT to getting the right product to the right place in the right quantity at the right time, at the right cost, for the right customer and in a right way.

In the literature, there are many definition of logistics that have slightly different perspectives from each other. In this respect, however, the definitions can be divided into 3 parts to be categorized. Some authors describe logistics as a process, some define logistics as a function and some consider that logistics is a management. Christopher& Holweg (2011) defines logistics as a

management process that has a strategic importance for the business and it is responsible of movement and storage of materials that can be final products, semi-final products or raw materials with related information flow within a network of an organization and its distribution pipeline and marketing channels in an optimal way that aims to maximize profit and provide cost effective performance. Following that definition, Demir (2008) in his book called “price and cost calculations in logistics management” emphasizes the strategical importance of logistics and consider it as a process in an organization that aims to increase profits and serve for designing administrative tasks in order to strategically store, maintain flow, control of materials between specific points. Bowersox et.al., (2002) in their book named “supply chain and logistics management” define logistics as a process that deals with the management of effective and strategic usage of inventory which can assist to overall value creation and increasing of profit by visioning the integration of order management, transportation, distribution, materials handling, packaging with itself through a network. Coyle et al., (2011) in their book point out logistical efficiency from a manufacturing perspective and state that logistics is the combination of processes in managing, implementing and controlling of materials flow, semi-finished products, finished products and also service and information flow support them in an efficient way between two points that can start with point of gathering raw materials and end up by delivery of final product to the final user and also include reverse flows as well as reverse logistics that overall aims to reply customer expectations effectively. Broeke et al., (1989) defined it as managing, organizing, scheduling and leading transportation, warehousing and acquisition of purchased raw materials between suppliers and customers and with this perspectives in their definition, the scope of the definition is extended to include both the upstream supply chain and the downstream distribution chain (Broeke et al.,1989 cited in. Ho, 1997). (Kim-Keung Ho, 1997). Gleissner& Femerling (2013), in their book echoed a definition of logistics given by The European Committee for Standardization as: “logistics consists of controlling, managing and performing activities such as carrying of products, services or people and also includes all the complimentary functions concerning with the functions of carrying and placement in order to achieve a target based on a planned schedule”. Tilanus (1997) emphasized a couple of significant elements in his definition of logistics in order to refer logistics to an entire function and stated that; “Logistics refers to the whole function of movement of materials and goods within, across and out of the firm. Inbound logistics refers to movement and placement of materials that can be

gathered from suppliers. Materials management defines the movement of physical materials within a firm. On the other hand physical distribution describes the movement of products from point of manufacturing to the consumer”. According to Rushton et. al. (2006), logistics can be defined as a diversified and dynamic function which can be flexible and agile enough and can be changed according to the different variations of demands and conditions requested by customers or market conditions. Hence, there are a number of terms that can be given, often interchangeably in the literature and in the business context and also they consider logistics as a function that consists of aggregated combination of supply management, material management and distribution as well. Logistics is the function that is responsible to cover all activities in movement and storage of materials through a facility network from suppliers to the final customers (Waters, 2003). Kasilingam (1998) considers logistics as a function and pointed out that logistically –related activities are inter-connected with each other and as a function logistics has the greatest ability to influence the other departments within an organization such as financial department, marketing, information technology and even manufacturing.

Ghiani et al., (2004) defined logistics as a management because it deals with the management of physical material flows and information flows in terms of planning and controlling of these flow within an organization. In addition to that they also emphasize the aim of logistics with an extension as it is differed from the definition given by The Chartered Institute of Logistics and Transport (CILT) by adding effectiveness term in total operating cost in the overall definition which is getting the right materials to the right place at the right time while matching with the given performance measure as optimized as possible while not violating the given set of budget constraints. The crucial fact is to know how to manage the process of acquiring, moving and storing raw materials, semi-finished and finished goods on a planned time. Wassenhove (2006) extended the definition by adding financial dimension and refers logistics as a management of material, information and capital (financial) flow that each of them encompasses complex multi-layers dimensions within. Cavinato (2004), pointed out that logistics is a management of materials (that can be inbound or outbound materials), supply and finished products and also includes the overall management of inter-connected and integrated activities such as purchasing, transportation and inventory. And lastly Council of Logistics Management defines it as “ Logistics is the management of planning, implementation and control of the efficient, effective

forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customer requirements ”. A summary of logistics definitions which are used in this chapter that is categorized based on their scope in the literature and classified accordingly for this thesis is shown below in Table 1.

LOGISTICS IN THE LITERATURE	
CATEGORIZED	SCHOLAR
AS A PROCESS	Coyle et. al., (2006)
	Demir (2008)
	Bowersox (2002)
	Bardi (2006)
AS A FUNCTION	Baker (2006)
	Water (2003)
	Tilanus (1997)
	Kasilingam (1998)
AS A MANAGEMENT	Ghiani (2004)
	Wassenhove (2006)
	Cavinato (2004)

Table 1. Summary of logistics definitions based on their scope category

2.1 TYPES OF TRANSPORTATION

Transportation is one of the main and basic functional element of a logistics system. A transport system encompasses key elements of products that is transported (the purpose of transportation),

means of transport to be used (different transportation modes) and transport process. Transport services refers to act of movement of people or products from an origin to a desired destination to be reached. Transport services can be categorized as internal transport and external transport services. Internal transport service refers to transportation of goods within and across different sub-units and departments in a manufacturing facility that can be a fabric or a warehouse. On the other hand external transportation service takes place between suppliers or suppliers' supplier and final customer include many other unit in the entire supply chain network system (Gleissner& Femerling, 2013).

If transportation companies use their own assets in order to perform transportation services that refers to concept of "private haulage". However the main tendency in the sector is that third party logistics service providers perform and take commissions of the transportation service and this includes usage of different transportation modes such as road, air, rail, and water. The vehicles that have been used for this purpose of transportation are generally railway carriages, trucks and ocean vessels (Gleissner& Femerling, 2013).

The type of transportation is considerably important in order to perform logistics operations successfully which aims to carry goods in order to match with a vision of "in the right quantity, at the right time, at the right place for the right price in the right condition, at the right quality to the right customers". In addition to that since transportation service costs constitute a major part of an overall logistics service costs, therefore it can be said that choosing right transportation modes and utilization of related network structure can contribute to reduce costs, prevents delay and mitigate transportation risks.

Road freight transport is one of the most commonly used transportation modes and also considered as a crucial mode of transport. In the European Union borders the total amount of motor traffic road is around 650,000 km and therefore it has become the densest and biggest network of transport mode today (Gleissner& Femerling, 2013) in the Europe.

Some of the advantages of road transport;

- It is flexible to be able to create different routes and networks to reach final destination and it is expected to reach on time as it is planned
- Availability through the usage of roads for door to door service
- Availability for providing safety for containers

Disadvantages of road transport;

- It can cost more than other transportation modes for long distances
- It can be easily affected from climate conditions
- Low productivity

In addition to that another drawback is that it has always been controversial because of causing environmental pollution, noise generation and traffic congestions (Gleissner& Femerling, 2013).

The history of usage of rail freight transportation has rooted in the beginning of industrial revolution and it became an indispensable contributor of industrialization and the development of raw material-base industry in the past. In this regard, the main advantages of using rail freight transport mode can be considered in bulk transportation for long distances. During the last century, since technological developments and transportation needs and concepts have changed so rapidly, therefore rail transportation scope has changed to meet different requirements. The volume of materials and products to be carried in bulk, and effect of their economic value in today's world have still been rapidly changing and therefore these conditions make rail freight transportation loose its position for traditional bulk transport. However since environmental awareness has risen and bottleneck which has emerged on road transport capacity around the world have triggered new improvements on rail freight transportation which can be considered as a transformation of traditional rail way carriage which aim to enhance the infrastructure and extend the rail road capacity to the ports which is known as multi-modal traffic nowadays. It is flexible and also suited for transportation of general cargos, bulk products and even containers between vehicles, trucks and trains in such a short period of time (Gleissner& Femerling, 2013).

Sea freight transportation is an important element of transportation modes in terms of becoming a complementary part of increasing volume in global trade, export and import activities and also it enables movement of global division of labor (Gleissner& Femerling, 2013). Shipment of materials and products through sea freight transportation is significantly cost-effective way of

transporting bulk products especially for long distances. Increasing volume of usage in containerization of bulk goods such as raw materials, dry cargo, low value added products, fuel and petroleum products in large sizes of consignments contributed to development of sea freight transportation for the last century. Usage of containerization has become a central activity in sea freight transportation and improved the quality of transportation by bringing implementation of standardization and also containerization enables utilization of other transport modes such as transporting products from ship to trucks in ports in such a short period of time with active usage of technological infrastructure within as it is called intermodal transportation. Baird (2000), describes the overall advantages and disadvantages of sea freight transport as it is given below;

Advantages of Sea Freight Transportation;

- It can be conceived as the safest mode of transportation for people
- It can be considered as the cost effective mode for low value added bulk goods and also heavy loads for big volumes of products between long distances
- In comparison with other modes of transport, sea freight transport and overall maritime industry is eco-friendly way of transportation that has less negative effect on environment.

The Disadvantages of Sea Freight Transportation:

- Longer delivery times and it requires a huge initial investment
- It can be affected by the weather conditions
- Customs and international trade laws and global implementations can be restrictive

Air freight transport is increasing because of its key role in international logistics network with a decentralized structure of goods and distribution. In addition to that, high value products such as engineering products, automobile and telecommunications and also electro-technical products such as computers are preferably carried in this type of transportation today. The characteristics of air freight services can be categorized into three parts;

- It is functioned to serve by airlines companies

- Regulations, controls and implementations in traffic based on legal considerations by authorities
- Services and related activities which are taken place and provided by airports

The supply of air transport service is shaped based on market requirements and productions' features in air traffic. There are some other dynamics that influence market conditions such as the oligopolistic effect determined by big multinational companies which have corporate identities in the marketplace and by domestics and international regulations and standards and by safety rules and procedures. In air freight transportation industry there are two organizations that are well-known as ICAO that include all member countries that have operations in air traffic and another organization called IATA that is in charge of managing the organization of all aviation companies. The main purpose of ICAO includes improvement and encouragement of civil aviation and civil aircrafts, setting rules for medium and big size airports and regulation of air traffic control systems (Gleissner& Femerling, 2013).

According to Bowersox, Closs & Cooper (2010) pipeline transport is a transportation mode that is considered as an independent mode that has no connection with other modes of transportation and can be only used for transportation of oil, gas, energy and chemical liquid products through a pipe infrastructure. Pipeline infrastructure is required a huge initial investment as a fixed cost to build up infrastructure and required to be equipped with advanced technological support however it has also lowest variable cost than any other modes of transport.

2.2 LOGISTICS OUTSOURCING

Today increasing level of competition and also the effect of increasing global trade volumes and rapid developments in technology force companies and organizations to be capable enough to respond to the increasing demand on time, effectively and efficiently and also oblige them to create new strategies in management to adapt fully and overcome these challenging market conditions. Therefore these difficulties and challenging conditions of the adaptation process into new conditions push companies to consider to change their traditional business functions to a new concept in which their focus should be on their core competences and capabilities and rest

of the activities should be transferred to a third party organization (Espino-Rodríguez & Padrón-Robaina, 2004).

The concept of outsourcing has been used in the literature for the first time in 1982 as a transfer of operation of a specific management function from an organization's department to another unit outside of the organization (Zhu et al., 2001). The difference between a conventional purchasing activity and outsourcing activity is stem from the degree of the relationship. Outsourcing activity refers to a relationship based on strategic collaboration evolved into alliances that aims to have a long-term vision based on a mutual "win-win" strategy. Even if a firm is capable of executing all the operations and performing tasks within the organization without getting a collaborative relationship with a third party organization, than the firm will not be capable of performing every single tasks effectively and efficiently therefore the firm has to consider to focus on only core skills and competences. Core competences and skills are the main characteristics and features of the sustainable activities that a firm can be specialized in which the firm is distinguished itself from other competitors in the marketplace (Koban& Keser, 2007). These core competences and skills are the activities which have direct effect on the company's position in the marketplace by creating competitive advantage and also contribute to grow strategies constantly (Kakabadse & Kakabadse, 2005). Outsourcing which refers to transferring of existing function or process which does not constitute major concern of a firm's core competences and skills to a third party can provide many benefits for the organizations such as contribution to leveraging profits and increasing the technological advantage gained by third party service provider and also reducing their costs and risks, assisting in order to turn fix costs to variable costs, increase the penetration level to the market and utilization of the logistics service providers' capability (Win, 2008). The outsourcing of logistics activities can be categorized depend on their purpose and importance in SCM. The level of outsourcing in logistics activities are shown below in Figure 1.

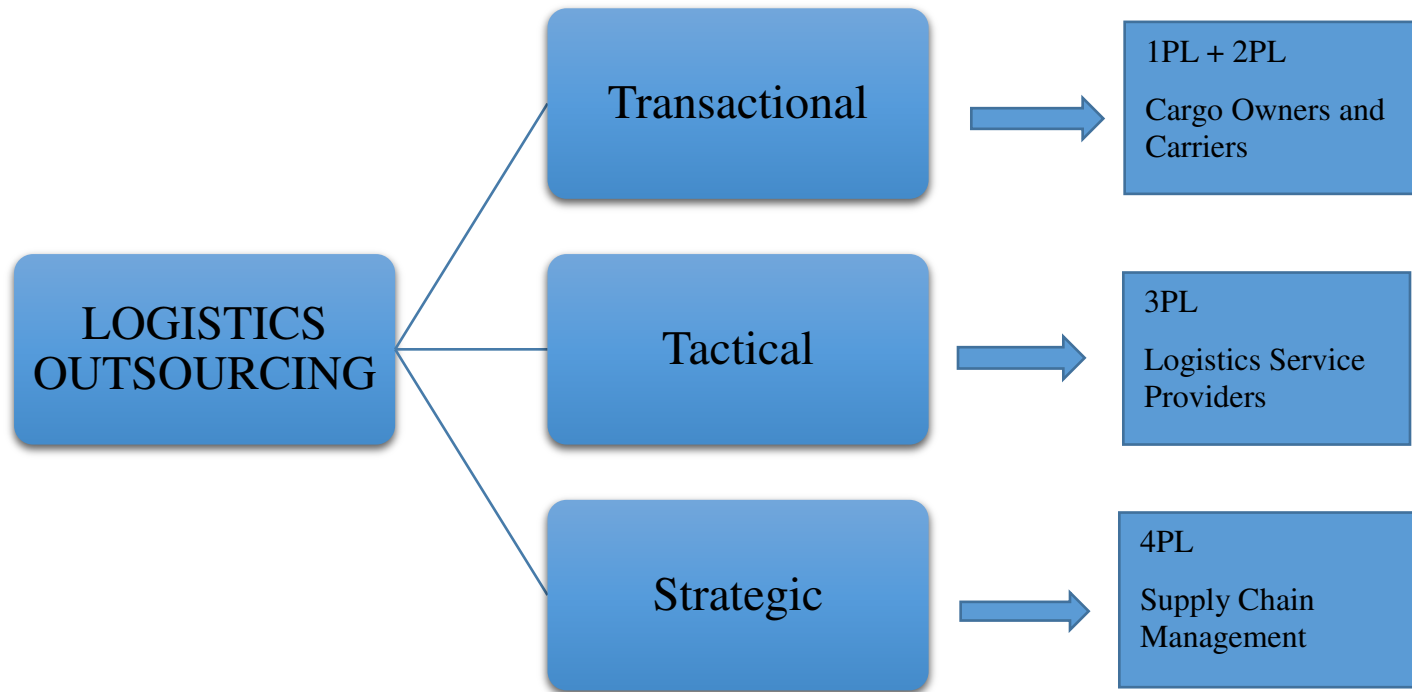


Figure 2 Level of outsourcing in logistics activities and a detailed illustration of logistics activities in all levels of outsourcing (developed by Author)

Transactional outsourcing that is also known as 2PL involved in logistics transactional processes based on a short-term contract collaboration that does not require to share a long-term vision or establish bonds between service transferring company and outsourced service provider in logistics. This type of logistics provider is often considered as an asset-based carrier and it functions in a traditional logistics concepts that includes usage of warehouse and transportation systems. Therefore it only provides a few functional service in the whole supply chain. Today most of the 2PLs have evolved into a three party logistics service provider by gaining new competences and integration of logistics operations within themselves (Gavrielatos, 2007).

3PL is referring to a third party logistics provider that is also known as outsourcing in tactical level that is based on long-term relationship between two parties that includes negotiated contract management and enhanced operational capacity with integrated IT systems in order to optimize supply chain visibility and ensure smooth information flow between parties. The main purpose of 3PL service provider is to perform a big part of the logistics operations in a supply chain system that aims to lower logistics costs, sharing operational risks and also provide

significant enhancement on logistically-related networks for customers. Hilletoft & Hilmola, (2010), Razzaque & Sheng (1998) listed a number of benefits of using 3PL outsourcing below;

- Greater customer service
- Increased flexibility
- Reducing cost and improve quality of service
- Performing with cutting edge technology and advanced skills set
- Greater management functions because of focusing only core competences
- Improved return of assets
- Increased inventory return

3PLs providers are often not involved in the process of strategic decision and aim to perform logistics activities and management of information flow within and across the logistics network into the SCM (Gattorna, 1998). However strategic outsourcing known as 4PL are considered as the most complex and advanced level of outsourcing that emerged as an integrator that assemble and manage resources, capabilities and advanced technologies to manage the whole supply chain effectively including activities of 3PLs within to provide maximized benefits. 4PL outsourcing also aims to establish a strong integration with a long term relationship and bond between two parties based on full of information sharing and operational transparency (Bajec, 2013).

2.3 GREEN LOGISTICS

Green Logistics is considered as a part of logistics management practices and strategies that basically aims to mitigate carbon footprint of freight distribution and decrease the level of greenhouse gases that occur specifically during the operations in the field of material handling, waste management, packaging and transportation (Seroka & Nowakowska, 2014). It is also concerned with integrating sustainability and social and environmental consideration in the phase of producing and distributing the products and services. Therefore the main purpose is not only involved with the economic outcomes of the logistical service in the organizations but also extends its objective to the creation of value for the society and the environment as well (Sbihi & Eglese, 2009). Green Logistics encompasses all of the activities involved in environmentally

efficient management of product, materials and information in a forward or reverse flow between the point of origin and point of consumption in order to match successfully with the customer requirements within an environmental consideration (Seroka& Nowakowska, 2014).

According to Rogers& Tibben-Lembke (1999) there are a few differences between reverse logistics and green logistic that is worth to mention. Although most of the time they are used in an inter-changeable context with reverse logistics, one of the major difference between reverse logistics and green logistics is their scope. While reverse logistics' main focus is on increase of the profit and saving the budget by enabling re-usage and re-selling materials and reducing costs in operations, however, green logistics focuses on transportation subject and mainly focuses on operations to contribute to the image of the company in public as well (Seroka, 2104). Brito (2004) also extended the explanation in difference between green logistics and reverse logistics and pointed out that green logistics concentrates on forward flows in the supply chain however reverse logistics is considered as sustainable development and he states that "The prominent environmental issues in green logistics are consumption of non-renewable natural resources, and both hazardous and non-hazardous waste disposal".

2.4 RETAIL LOGISTICS

Retailers are mainly concerned with product availability based on smooth material flows which are supported with shared information flow on time within their business and as a part of whole SCM. In order to have product availability on time and at a desired level to match with unexpectedly changing demand as an effect of changing market conditions or customer requests, retailers must be capable of managing logistics activity effectively based on product movement and demand management as well. Fernie et al. (2010) in their journal in which they explained retailers and logistics concepts in the UK in details, pointed out this demand fluctuations and changes as they are required to be monitored to see and control the level of sales that are made in and through their stores in a specific period of time and it is also required to be capable of being agile to respond quickly to change in demand fluctuation. The logistics management process can be divided into five major tasks that are initially related to management of retail logistics that are given below;

- Storage facilities: it can be a warehouse or a distribution center or a specific length of space to be used as a stock room in the retail stores. Retailers use these facilities in order to keep their products in a level that is determined based on an anticipated level of demand from customers and marketplaces.
- Inventory: Almost all of the retailers have finished products or some components of the finished product in their stock to some extent or change and the amount of these products in stock and location of them are determined based on change in demand fluctuation.
- Transportation: many products should be transported in different ways and at different stages from point of manufacturing to the store to be sold and therefore retailers must be capable of managing operations involved in many different modes of transportation.
- Packaging and Unitization: Product size and physical appearance of them with packages are an important factor for the customer when they make a decision to purchase. Therefore product development and design that are optimized to be packed and to be handled and loaded into container in terms of costs, size and logistics are important considerations for retailers.
- Communications: It aims not only to coordinate supply and demand between retailers and customers but also it is an crucial task for retailers to have clear communication at any point during the logistics operations to monitor and decide exact product volume, stock and costs control during the operations (Gustafson et al., 2006).

All of these tasks are inter -connected and linked to each other. In addition to that since the management concept in retailer has included these logistical tasks within, the retailers have used these integration to optimize their processes and reduce the functional obstacles. As an example of these inter-connected elements in function, for example, the data taken from level of sales in a specific period of time can be used to adjust a proper transportation modes and also for scheduling and to deciding for exact location of stocks to be hold. In addition to that since the level of inventory is related to usage of warehouse capacity, an effective control of stocks in inventory can contribute to reduce the cost of warehouses. Lastly if there is an effective collaboration between transportation systems, than this will help retailers to move products from

warehouse to distribution center on time and to deliver it to sales points without causing any delay. Therefore integration of all of these elements are considered as major concerns for retailers.

Large retailers are in need of asking for more help and collaboration with their suppliers in terms of in-store logistics. In- store logistics is a concept that includes the issue of where to locate the merchandize and how to monitor and track it and also optimizing the level of inventory and increasing customer service. In- store logistics one of the most influential element is customer service demand. Related to that one can say that small and medium sized retailers have advantage since they have much more closer and direct relationship with customers (Samli et al., 2005).

3 DEVELOPMENT, DEFINITION AND SCOPE OF SUPPLY CHAIN MANAGEMENT

Many different functions that have formed the discipline of logistics today had been considered as independent units and performed separately in terms of management up to 1960s and 1970s. However starting from 1980s when organizations realized the importance and benefits of integration of these separate units within a system and increased the collaboration within and across the units and therefore the term supply chain management has been started to emerged as a holistic, much wider and inter-connected concept than logistics.

Christopher (1994), defined supply chain as “a network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer”. Following this emphasis of networks in the definition of supply chain given by Christopher (1994), many other authors view it from the same perspective. According to Lambert et al., (1998), supply chain is well established in the literature and can be simply defined as “alignment of firms that bring products to the market”. The supply chain consists of manufacturers, suppliers, transporters, warehouses, wholesalers, retailers, other intermediaries and even customers themselves. In other words it includes every steps of the processes in evolution of raw materials to a finished goods and the movement of the goods in a variety of transactions in the business (Felea & Albăstroiu, 2013). Chen& Paulraj (2004) gave a sample of typical definition of a supply chain. According to

them a basic supply chain consist of “a network of materials, information, and services processing links with the characteristics of supply, transformation, and demand”. Supply chain encompasses all the activities and processes involved in flow of products and information from the phase of supplier selection to the phase of delivery of final product to the final consumer (Handfield& Nichols, 2003). According to APICS supply chain is a large number of processes starting from suppliers initially with the phase of extraction of raw materials and including all the phases in manufacturing, distributing and delivering the final product to the point of consumption and are linked within and across suppliers and user industries between these two points (Habib, 2010). A supply chain can be considered as a greatest network that consists of many different elements within that are inter-connected with each other and includes suppliers, manufacturers, distributors, wholesalers, retailers and customers. A significant objective of a supply chain is to satisfy customers’ needs and maximize the profit by placing customer priority to the center of the whole chain (Chopra& Meindl, 2007).

Ayers (2002), emphasized a holistic and integrated concept of supply chain by defining it as a lifecycle process that covers flows of physical material, information, finance for the purpose of providing flow of products and services from suppliers to the final customers. Waters, (2003) defined supply chain as a bunch of sequence activities and even organizations that are inter-related and connected and performing to move tangible or intangible materials through a planned network from point of origin to point of consumption. Branch (2009), emphasized these connected of series of events in the supply chain that are involved in conversion, assembling or dismantling of raw materials, movements and placement of them through material flow that can contribute to add value to the product and services. It also connects suppliers, manufacturers, warehouse, distributing centers and eventually customers and aims to provide a greater synchronized entire services. Geunes et al., (2011) emphasized the importance of integration and logistics by defining supply chain as a number of organizations that are linked that share the same vision and work for the same objective in a synchronized way to maximize profit and satisfy customer by performing logistics “7R’s” for customers. Supply chain can be defined as a group of organizations that are connected on a network globally that collaborate to enhance the flows of material and information between point of origin and point of consumption at the possible lowest cost as fast as possible. Therefore lowering costs and increasing speed are the objective of a supply chain to increase customer satisfaction at the end (Govil& Proth, 2002).

Mentzer et al. (2001) extended the scope of definition of supply chain to “a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer”.

Considering these consecutive perspectives in supply chain definitions, it can be put forward that supply chain’s multi-organizational structures and dimensions can be categorized into three parts in this complexity that consists of a direct supply chain, an extended supply chain and an ultimate supply chain. A direct supply chain refers to the network that include major elements such as an organization that located in the center of the flow, suppliers and customers that are located in the beginning of flow and at the end of flow respectively and also it is involved in upstream or downstream flows of materials, services, information and finance. This type of supply chain can be considered as a huge vertically integrated collaboration that may not require second tier suppliers. Secondly, an extended supply chain process starts with the supplier’s supplier and finalizes at customer’s customer. Therefore an extended supply chain consists of all the components that can contribute to the production. Generally speaking, when companies have a supply chain issue in terms of visibility or performance, the first initiative which is considered to be taken is to contact suppliers directly. However, through extended supply chain systems organizations have options to reach out and contact directly with the supplier of the supplier to monitor the problems directly or increase enhancement without wasting time. Lastly an ultimate supply chain refers to a complex, multi layers and multi-components supply chain that includes all the elements of direct and extended supply chain within and also in addition to that it includes intermediaries such as 3PL/ 4PL providers that execute the logistics tasks, market researches which can provide information about the characteristic of the marketplace and customer demands and financial information to reduce the risks.

Basically the management of a supply chain that is in charge of ensuring the entire movement of materials from initial suppliers to the final customers go smoothly and also performed effectively. Bozarth& Handfield (2008), defined SCM is “a management of supply chain activities and relationships in order to increase customer satisfaction, maximize customer value and gain a sustainable competitive advantage. Although there are many different perspectives in defining supply chain management, there is not any certain definition of it and it is generally categorized under three headings in the academic literature. Some of the authors define it in

operational consideration refers to flows of materials, products and services, some authors consider it as a management philosophy, some other view it as set of management process and some others defines it as an integrated system (Tyndall,1998).

In terms of operational consideration there is a need for coordination within and across the firms into a supply chain and focus of SCM is on managing flow of materials, services and information. SCM aims to integrate crucial business components and processes between suppliers and final customers that provide a combination of goods, services and information which create value for customers and stakeholders (Lambert et. al., 1998). SCM is a collaborative synchronization of activities within and across the supply chain among vertically connected organizations or firms in order to satisfy customers (Larson& Rogers, 1998). SCM is defined as an methodical approach that aim to coordinate traditional business functions strategically and systematically and set up tactics across these traditional business functions within a specific organization and across businesses within supply chain in order to optimize long-term performance of an individual organization or the entire supply chain (Mentzer et al., 2001). SCM is involved all activities through a network from raw material extraction phase to manufacturing and assembling, storing and managing inventory with distribution and order management across all channels that is finalized by delivering to the final customer and also include information and technology that are required in order to control and track all of these activities (Lummus et. al., 2001). SCM encompasses the management of all activities starting from single inputs of products or services which requires strong collaboration between various departments that are within and outside of the organization for final customer (Eng, 2005). SCM is responsible of managing a multi-layers network of relationships in activities involved in purchasing, manufacturing, transporting, marketing, finance, and coordination between these activities in an organization or between interdependent organizations to provide value adding benefits for customers and maximize profit through efficiencies and high level of customer satisfaction (Stock &Boyer, 2009).

As a management philosophy, SCM has a holistic approach to consider supply management as a whole single entity, consist of sub-departments that each of them perform its own function and form the whole body instead of viewing it as a set of distinct and fragmented units and

departments (Ellram& Cooper 1990; Houlihan 1988; Tyndall et al. 1998). In addition to that it can be said that as a management philosophy SCM aims to improve and extend the alliances between different parts into the whole chain to turn them a collaborative multi-firm effort to control and manage total flow effectively between suppliers and customers (Ellram 1990; Jones& Riley 1985). Hence SCM is an integration and combination of a number of beliefs that all of the firms in the chain are inter-connected and therefore they influence each other's performance and overall supply chain performance in a synergized framework (Cooper et al. 1990). SCM as a management philosophy aims to integrate and synchronize the functional aspects of all intra-firm and inter-firm competencies into a single and combined function (Ross, 1998). In this respect the SCM philosophy seeks to create customer value and increase customer satisfaction through these synchronization. Therefore, SCM philosophy coordinates all the members into chain to have a customer orientation perspective (Langley& Holcomb, 1992). Basis of literature, SCM as a philosophy is characterized by;

- Holistic approaches to consider supply chain as a whole and to control and manage the total flows of material, goods and services and information, between points of origin to point of consumption
- Seeking to synchronize and integrate inter-firm and intra-firm operational and strategic competencies into an incorporated single body and a customer oriented perspective aims to maximize to customer satisfaction by creating value and individual solutions (Mentzer et al., 2001).

As different from focusing on supply chain activities and functions in the literature, some authors emphasize the management process and consider SCM as a set of management process. Davenport (1993), described the processes as configured, controlled and planned set of activities that are formed to create a desired outcome based on a specific objective for an individual customer or market. Lalonde (1997) explained SCM as the process of managing a set of activities such as material flows, information flows, and collaborative relationship within and across the organization to produce optimal customer service and value added services via synchronized management of flow through a configured network between point of sourcing and

point of consumption. A summary of SCM definitions used in this thesis based on their scope is given in Table 2 below.

SCM DEFINITIONS IN THE LITERATURE	
IN TERMS OF	SCHOLARS
OPERATIONAL CONSIDERATION	Lampert et. al. (1998)
	Larson& Rogers (1998)
	Mentzer et al. (2001)
	Lummus et al. (2001)
	Eng (2005)
	Stock &Boyer (2009)
PHILOSOPHY	Ellram& Cooper (1990)
	Houlihan (1988)
	Tyndall et al. (1998)
	Ellram (1990)
	Jones &Riley (1985)
	Ross (1998)
	Langley& Holcomb (1992)
MANAGEMENTAL PROCESS	Habib (2010)
	Ayers (2002)
	Davenport (1993)
	Lalonde (1997)

Table 2. A summary of SCM definitions used in this thesis

In the previous parts, logistics and SCM have been described in terms of their scope, development and functions as they are found in the existing literature and also it has been illustrated how both of the concepts are differentiated from each other that. Based on different approaches in terms of how both of the concepts are inter-sectional and diverged from each other, 4 different perspectives have emerged in the literature. Larsson & Halldorsson (2004), identified these 4 perspectives as it is given in Figure 3 below;

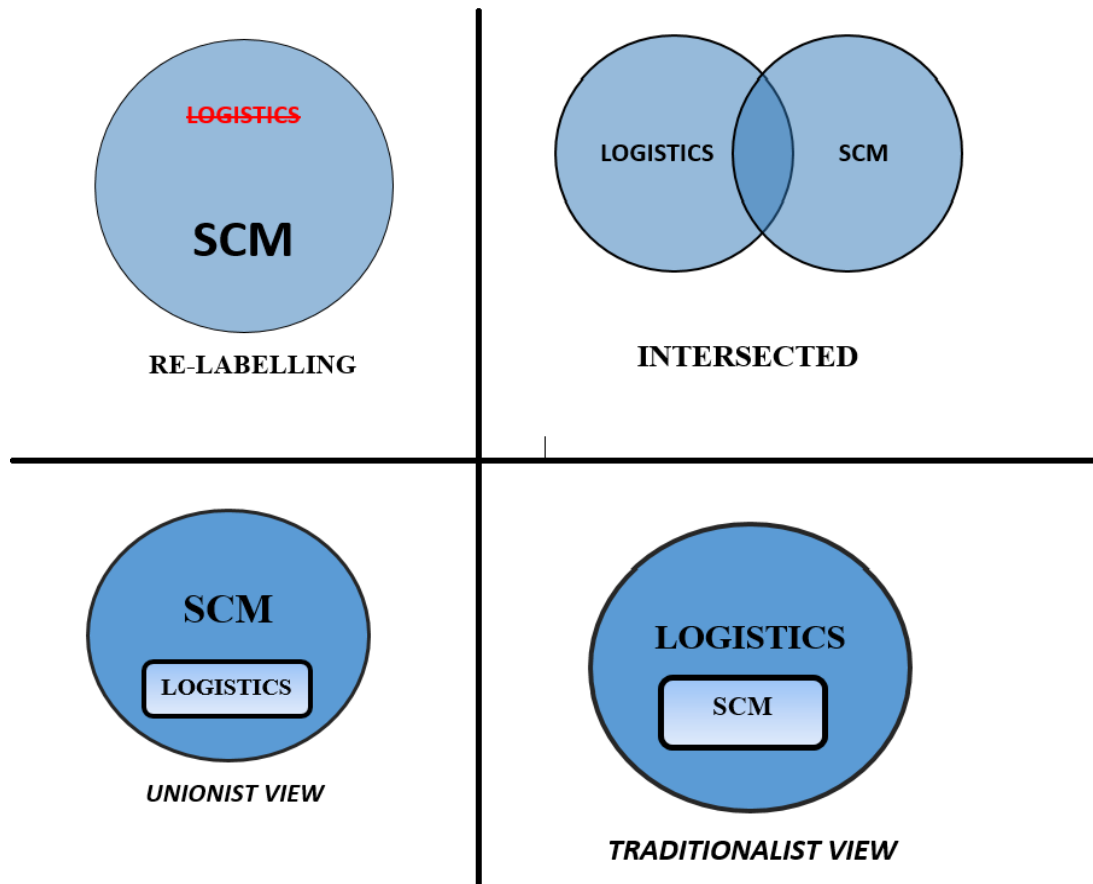


Fig 3. Four major perspective in definition of Logistics and SCM (Modified from Larsson & Halldorsson, 2004).

Based on traditionalist view, SCM is considered to be evolved from logistics and believed as a part of logistics concept and even considered a subset of logistics discipline. Therefore logistics hires supply chain analyst to focus on cross functional, inter-organizational issues in that perspective. In re-labelling view, logistics is re-labelled by SCM. In the inter-sectionist view, both of the logistics and SCM concepts are seen as distinct and there is an overlap between them and in this perspective SCM is considered as related to strategic decisions and logistics is involved in tactical decisions. Lastly, in the unionist view, logistics are considered as a part of SCM and therefore SCM is seen wider and greater than logistics and a holistic discipline. As parallel as the main consideration of the objective in this thesis the unionist view which has been

developed and implemented by British system and used as a major perspective in British industry and academia will be followed in this thesis which consider SCM to be given the highest priority and importance and considered it wider and greater than logistics discipline.

3.1 PROCUREMENT

For the last decades, the function and the importance of purchasing activity has changed a lot in the organizations. Previously traditional purchasing was considered within a basic capability of management framework that covers sourcing function and acquisition of materials and gathering goods and services within the organization. The main objective of purchasing consisted of gathering materials and resources and services at an affordable cost for the organizations. Today since the concepts of total cost reduction and buyer-supplier relationship brings a strategic importance in purchasing activity, it has become a crucial strategic function. This increasing strategic importance of purchasing can be given as an example in the replacement of the word “procurement” for conventional purchasing activity to highlight its significantly strategic position in the supply chain systems. Although they are slightly different, the terms “purchasing” and “procurement” are often used interchangeably in today’s business context and in the literature as well (Ross, 2015).

Procurement covers some process involved in choosing vendors, setting financial agreements including payment terms, selection and the negotiation of contracts and actual purchasing of products and services. Procurement is also related to acquiring all of the required products, services, and labors which are strategically crucial for a business. Procurement is basically an inclusive term which can be considered as an umbrella in which purchasing can be found (Ross, 2015). William et al., (1993) defined purchasing as a major part of a number of integrated activities that aim to perform the task of acquisition of materials, supplies or even services that is required to have in order to succeed organizational goals. In the first sight, it can be said that purchasing term refers to process of only buying activity, however, purchasing as buying process includes many other sub-activities within such as supplier selection, negotiation on setting price, contracts management and final delivery (William et., al. 1993). Based on this definition, it can be asserted some key concepts as it is emphasized below;

- Purchasing can be considered as an important, strategic business function. The management of gathering materials and services in an effective and efficient way from outside of an organization is the task of professional executives that are specialized in purchasing activity.
- Purchasing is involved in activities of building relationship with suppliers. The aim of supplier relationship management in purchasing is to build a collaborative partnerships that focus on sharing the same vision, sharing information, long-term commitment and mutual development and joint interaction in determining product design and specifications as well.
- Purchasing activity and related supplier performance are inter-connected. An effective and successful purchasing management is depend to performance of purchasing activity that based on supplier's performance measurement and order performance as well. The aim is that to have the greatest quality in purchasing without violation of time restriction in delivery and at lowest and sustainable costs as possible and collaboration with maintenance (Ross, 2015).

3.2 WAREHOUSING AND INVENTORY MANAGEMENT

Today, the role of warehouse has become significantly important more than ever in modern business environments as a major contributor to the success of a business (Frazelle, 2002). According to Grant et al., (2006) the functional aspect of warehouse interrupts between supply and demand in a supply chain and create a “break point”. Kiefer & Novack, (1999) explained that it has an important position that is hold between supply chain members which has a potential that can be utilized to decrease costs in supply chain and maximize the service (Kiefer & Novack, 1999).

The main objective of warehousing is to reduce the total cost of operations and maximize the provided service level for the business. In order to succeed in this main objective of warehousing, warehouse management take three components into consideration which are labor, space and equipment. These three components are directly involved in operational cost of warehouses.

Service quality in the warehouse that is provided to customers are determined based on the warehouse functions in terms of processes and procedures of functions such as “receiving, putting away, storing, order picking and shipping or dispatching the product from warehouse” (Scott et al., 2011). Receiving refers to a function that is involved in receiving physical materials and products that arrive to warehouse. Put-away refers to an action that involved in moving and placing the material in storage in the warehouse after receiving it. Since storing is divided into some different modes and systems based on requirements, it is crucial to determine in the phase of putting-away that how much materials or products to store. Storage refers to placing and holding the materials and keep them until they are requested to be moved. (Manzini, 2012). It can be categorized in two types as “unit load system” that is preferred to use for storing a big amount of materials in big boxes or full pallets and on the other hand “small load system” can be used to store small boxes which is limited as less than 500 lbs per storage points (Tomkins et al., 1996). Order picking referring to act of retrieving a material or a product from where it is stored within the warehouse to match with a customer request and also it is characterized most challenging and expensive function in the warehouse. According to Tomkins et al., (1996), order picking is refers approximately to more than half of the warehouse total operating costs. Order picking as a function can cover the packaging of customized orders such as individual products or items as well. If an order includes more than one product to retrieve than it can be sorted or accumulated into individual orders. Shipping is activity of preparing and stacking orders by a carrier to be loaded. Items, products or any kind of materials in a warehouse can be handled by pallet loads, in some boxes that can be made of cartoons that are known as cardboards as well in order to store the items, and in reusable containers or cases that are used to keep items in safe during carriage (Manzini, 2012).

The physical conditions and structures of warehouses operations are considered as a “labor-intensive” part since it is required to have high quality of manpower, management and control that can increase the operation costs. However technological infrastructure and support based on advanced information technology systems can not only contribute the overall efficiency of warehousing but also make warehouse management as an innovative, rapid changing and exciting part of supply chain. Such information systems that can be used in warehouses can be two type; first it can be designed and customized specifically based on the requirements and

capacity of warehouses and secondly it can be a regular standard software package that is also known as bought off-the-shelf. The main aim of a software product to use is to focus on a specific functionality or extend the scope of a specific functionality in the warehouse. ERP system can be given as an example of typical software that is used in modern warehouses with broad functionality that are inter-connected and supporting so many different process simultaneously (Manzini, 2012).

According to Ross et al. (2015), inventory is a pile of assets that can be physical materials, raw materials or items, semi-finished products and spare parts that are hold in stocks in order to be used in manufacturing process and all the complementary functions of manufacturing such as back-up, assembling, repair and operating supplies with customer service function. Ross et al. (2015) defined inventory management as a controlling and management that is in charge of monitoring financial value of materials in stocks and replacement of assets in the inventory based on demand and requirements on exact time and in a desired amount. Therefore, inventory management can be described as a function in the supply chain that cover tasks such as ordering and controlling of materials and also involved in financial tasks of the production process. Inventory can be categorized in different forms as it is given below;

- Raw materials or assets; this form encompasses products that is extracted from nature and needs to be processed to transform a final product to be sold.
- Work in process; inventory under this heading is categorized as raw materials, components, and other items that is waited for assembling and transforming to a finished good through manufacturing process.
- Finished goods; refers to purchased services, items and assembled materials that are ready to be shipped to a customer.

Inventory management was used to be in role of providing value by involving directly in mass production flow from manufacturer to the market in the pass. Highly standardized products used to be pushed to the marketplaces by supply systems. In this type of supply system,

manufacturers' channel and distribution systems and networks focus on carrying products in large volumes and since customization in manufacturing, in design or in any processes were considered as very expensive therefore customers had a very little interaction with manufacturers. However, today, pushing systems of mass production era in old supply chain systems has turned to a new "pulling system" that supports a great variety in product diversity, shortening life cycles, enabling customization and encouraging more customer interaction in manufacturing phase and global standards for high quality. As different from traditional concepts, today customer and supplier relationships have also changed based on increased technological infrastructure and social networks which form a dynamic supply chain that is capable of supporting a high level of collaboration between manufacturer and purchaser and also bring the idea of customization of the products and services based upon customer demands. This changes in supply chain systems has triggered to bring a new perspective into conventional understanding in value of inventory as well. In traditional understanding in the recent years, inventory was considered by companies as an asset to generate profit by selling it to customers who had a limited option to look for other choice in a limited market (Ross, 2015). Today customers have become a major actor that define value and demand and expect their suppliers to be comprehend enough to create solutions based on their specific desire and needs. And it can be said that instead of promoting a typical standardized product or service to a number of consumer today, firms are supposed to create alternative value-added propositions which can offer customized service that are able to be tailored with the challenging requirements of every single customer. Therefore having an effective control and management mechanism on this customer-centered value model is becoming crucial in the complex supply chains today. Inventories can contribute to creation of value in supply chains via some sort of service elements which are illustrated below:

- Improved channel efficiency
- Improved quality
- Supply network simplification
- Improved channel inventory information

3.3 GREEN SUPPLY CHAIN MANAGEMENT

Starting from 2000s with the “revolution” of supply chain globally, it has become an obligation to integrate environmental thinking into a supply chain as a part of “best practices” concept in modern economy and societies today (Srivastava, 2007). There is no doubt that supply chain systems are involved in today’s global economy and in modern societies directly and as a result of this relationship supply chain systems are considered to have an increasing impact on natural environment and as parallel with this impact it has become a huge necessity which stipulates environmental consideration to integrate in supply chain operational processes. Many organizations have started to pay attention to this increasing necessity by changing their traditional vision of business concepts from a motivation based on gaining only short-term profit to a long-term vision which built upon the idea of creating social, economic and environmental values and also gaining financial contribution in the long-term (Negi& Anand, 2014).

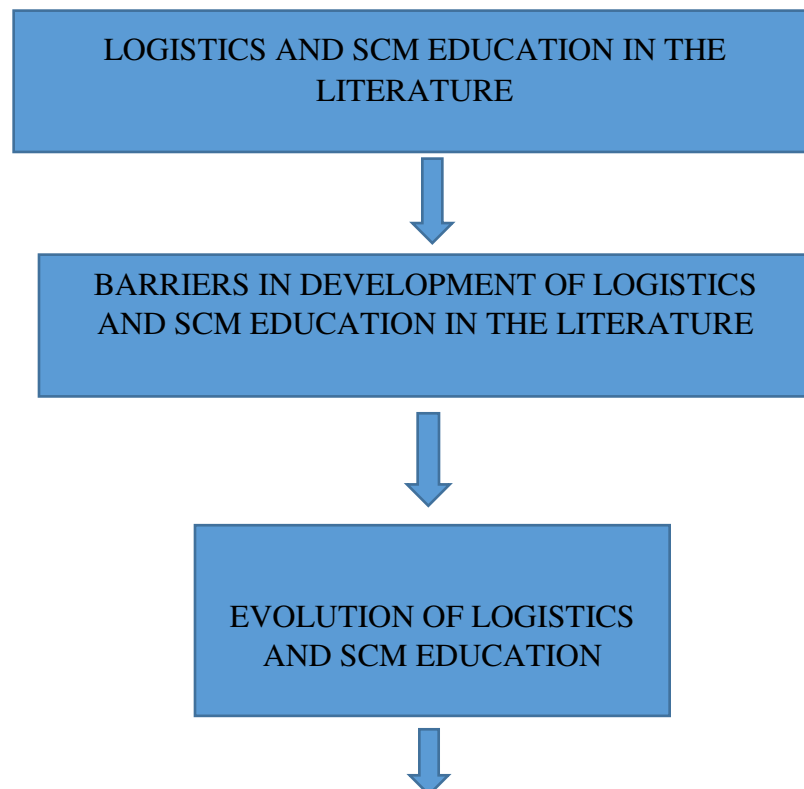
Since the awareness in the modern societies has increased, consumers pay attention more and more to sustainability of the products and services which they prefer to purchase and they demand more eco-friendly products and services (Murray, 2012). Therefore today consumers’ choices are in the favor of companies who have less negative impact on environment by producing eco- friendly products and services and also become socially responsible in their societies (Negi& Anand, 2014). Environmental criteria and green policies are integrated and implemented by organizations and companies that can increase the profit, assist to create a socially positive impact and build reputation for companies and also contribute companies to survive in the global marketplaces (Broek, 2010). Bowen et al., (2001) pointed out these benefits that GSCM brings and stated that implementing green criteria in the supply chain have a number of benefits that ranging from providing direct cost reduction to increasing the level of collaboration with suppliers in decision –making process and supporting innovative perspectives.

GSCM can be defined as a strategy that aims to change traditional supply chain by adding the environmental consideration into conventional supply chain systems which also aims to ensure to have as minimum detrimental impact as lowest as possible on the environment. It also encompasses “best practices” by mitigating greenhouse gases and reducing carbon footprint within and across the supply chain operations and activities that ranges from extracting raw material with a minimum negative effect on environment, production, transportation, delivery

and recycling (Zhu et al., 2007). In addition to that Gilbert S (2001), described the integration of GSCM in his article as a process and emphasized that this process can cover the whole supply chain networks and activities within and even starting with sourcing activity and involved in relationships with suppliers including the idea of development in the long term to make them implement green concept as well (Gilbert S., 2001).

4 LOGISTICS AND SCM EDUCATION

This chapter will start with the theme of logistics and SCM education in the academic literature. Following that the theme of barriers in development of logistics and SCM education will be presented. Furthermore, as last part of theoretical chapter of this thesis the theme of evolution of logistics and SCM education will be presented. Finally as the main interest of this thesis the theme of curriculum development will be presented with its two sub-chapters as content competencies and skills. Below Figure 4 illustrates the structure of this chapter.



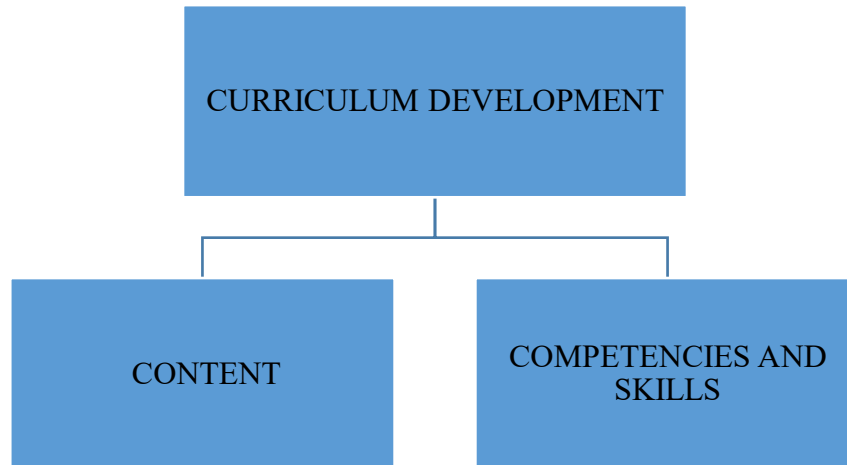


Figure 4. The structure of this chapter (Developed by author)

Logistics has a closer relationship between industry, business professionals and academics. American Society of Transportation and Logistics and the Council of Supply Chain Management Professionals are two well-known business organizations who have taken initiative and put so much effort in order to promote logistics and SCM education in academic world. Especially, the symbol of the CSCMP which is illustrated in Figure 5 below could be given as an example which illustrates the closer relationship between academia and business professionals in the field of logistics and SCM. The symbol consists of a triangle in which every single leg refers to represent the society, business professionals and academia, education and research (Farris& Gravier, 2008).

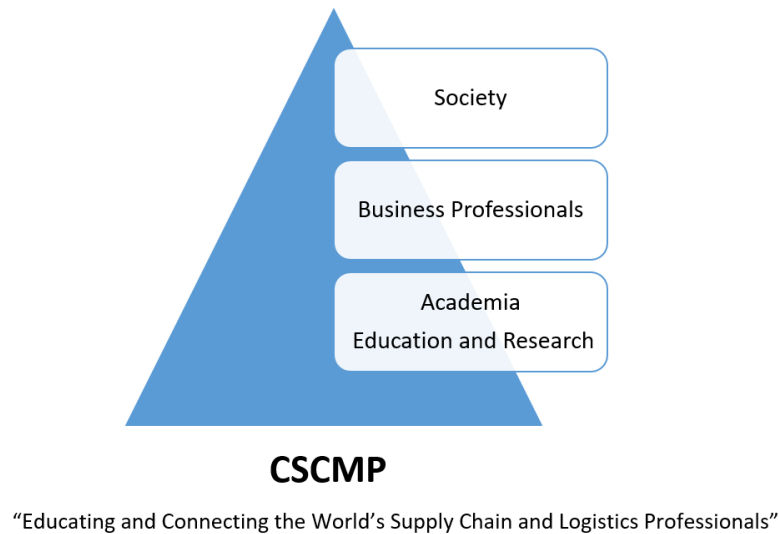


Figure 5. Symbol of CSCMP (Developed by author based on Farris& Gravier, 2008).

Another example related to how business organizations and professionals contribute to development of logistics education given by Lancioni et al., (2001). In their study they enlighten this area and explained the collaboration between academia and industry in the field of logistics and SCM. According to them, the first initiatives in creation of logistics and SCM education at higher educational level was taken by logistics and physical distribution management association that is called National Council of Physical Distribution Management and Society of Logistics Engineers in the US around 1970s. These business organizations formed the conceptual idea of how logistics education is important and support the acceleration for transition of logistics context from military field to the business field and eventually triggered the creation of academic programs at universities and colleges in the US. However, colleges and universities’ approaches were not capable enough to envision the increasing requirements for trained and educated professionals in the marketplaces as it is called “logisticians” in this new field. Eventually only a couple of universities realized these increasing demand and became aware of this need and recognized logistics as an independent discipline and started to form educational programs at their institutions. And over the last 4 decades with the increasing importance of logistics and SCM in the business world as companies and organizations realized their direct contribution to their businesses in terms of reducing costs, increasing benefits and maximizing customer

satisfaction, the interest to these topics increased substantially in academia (Lancioni et al., 2001).

4.1 BARRIERS IN DEVELOPING LOGISTICS AND SCM EDUCATION

The idea of development of logistics programs at higher education had been not easily welcomed and supported by deans, departments and administration of faculties since logistics as a discipline was quite new before 1980s. Sheffi & Klaus (1998) pointed out that logistics as a discipline faced a number of obstacles and barriers to get confirmed by many business colleges and universities. Rutner et al., (1996) have mentioned these barriers and difficulties in their study and referred them lack of resources associated with having capable faculties who could develop and teach logistics courses with sophisticated computerization software which could bring simulative logistics cases and problems in order students to get familiar with practical examples beside theoretical contexts.

Ballou (1974) took it further to explain these barriers in his study. He put forward that many educational institutions were not able to foresee the increasing importance of logistics and SCM-related education and also the major obstacle was related to the perception of logistics discipline since it was not seen as a single and independent discipline. In addition to that, in his study he found out that the main concern was what logistics discipline constituted of and the question of what could be fitted to teach in the field of logistics as a separate field created barriers and an ambiguity for many years to develop an academic program and this ambiguity can be truly found through analysis of different university offers in their logistics management -related degrees in the US. Following that, in order to go deeper to have a comprehensive understanding of these barriers in developing educational program in the field of logistics another study conducted by Smith et al., (1998) can be illustrated. In their study they echoed Rutner et al., (1996) and extended their focus by explaining major barriers in some sub-divided points which Rutner et al., (1996) briefly described them as limited adaptation and integration of development of logistics education in academic world. First, Smith et al., (1998) claimed that a limited access to computer usage and technological infrastructure were one of the major barriers. Secondly, lack of software availability and lack of software-based technical support and back-up were the other barrier that limited the adaptation of development of logistics education and creation of efficient

collaboration with companies in the industry. Lastly, they mentioned about lack of experience and expertise were main obstacles to the creation of contents and curricula in degree offers by various departments at educational institutions and colleges.

From an industry perspective, the barriers to developing logistics education was reflected by Langley & Mundy (1978). (cited by Lancioni, 2001). In their study, they found out and highlighted a significant conflict that is brought up by the question of how logistics should be modified as a distinct subject to fit into an undergraduate business curriculum. The core of the conflict was the disagreement between business professionals in the industry. They were not able to find an answer to the question of what kind of scope to extend in terms of education and trainings to give to students in order to prepare them effectively to the challenges of what they could probably handle after the graduation when they start working in the industry.

Removing these barriers was not an easy task as it was pointed out by Smith et al., (1998). However in their study they eventually stated that, "Previous barriers associated with logistics with student and faculty time are being removed by career placement opportunities. Logistics is already an important source of student placement at a few institutions. As future employers, companies and organizations are attracted to students who have exposure to and understanding of advanced applications". Sheffi & Klaus (1998) mentioned that although there had been barriers and difficulties in order to develop logistics education programs however because of increasing necessity for logistics and SCM associates or professionals in the industry, the circumstances started to change for the last two decades. Both of the disciplines are being recognized as significant subjects in commercial context within a business framework and therefore universities and educational institutions must have started to create and form programs in these fields.

4.2 EVOLUTION OF LOGISTICS AND SCM EDUCATION

Starting from 1970s as it is accepted as the time of beginning era for Logistics and SCM educational research in the literature, the evolution of these subjects and their initials with organizations specifically from industry to academic world, presented as a comprehensive study by Farris & Gravier (2008). They provided a detailed review of the academic literatures from

1960 to 2008 including analysis of more than 80 logistics and SCM related journals and articles. In their detailed research they divided logistics education's implications into three major themes as pedagogy, curriculum, and industry respectively as they are categorized mostly under these headings in the academic literature.

Pedagogy is aimed to explain how principles and proper methods of instructions should be formed and given to the students in logistics and SCM education for the purpose of providing qualified graduates to the industry. Curriculum consists of appropriate courses and topics within the courses in educational programs in order to produce knowledgeable and skilled graduates. And eventually industry refers to a general concept that covers how academia and their educational structure should be collaborated with industrial requirements in order be able to deliver proper amount of capable graduates which supposed to meet with the requirements and needs of changing dynamics in the industry (Farris & Gravier, 2008).

According to Gravier & Farris (2008) in the first twenty years of logistics literature based on the total number of articles and journals published it can be said that the main framework were constituted by expletory contents describe what logistics curricula should include. They found out that all 13 articles that had been released in 1960s and all eight articles in the 1970s respectively referred to the theme of curriculum concern and brought the question of "What should logistics be". In addition to that one can say that predominant logistics degree was mostly formed based on transportation concept at that time and therefore, first articles were questioning whether transportation should be included in a curriculum. Following years as the logistics concept evolved and become more established, the scope of the focus shifted and started to question if the logistics education was pragmatic enough to meet industry's needs. Related to this concern which took industry-related requirements into consideration and supported the idea of collaboration with industry, it can be said that 1970s and following 10 years were marked as a successful period in the literature in terms of aggregated number of published articles and journals and including an increasing interest to these subjects which analyzes fledgling university programs that managed to produce graduates which were valuable to the industry. Below in Figure 6 a chart of total number of articles published by decade and category is illustrated.

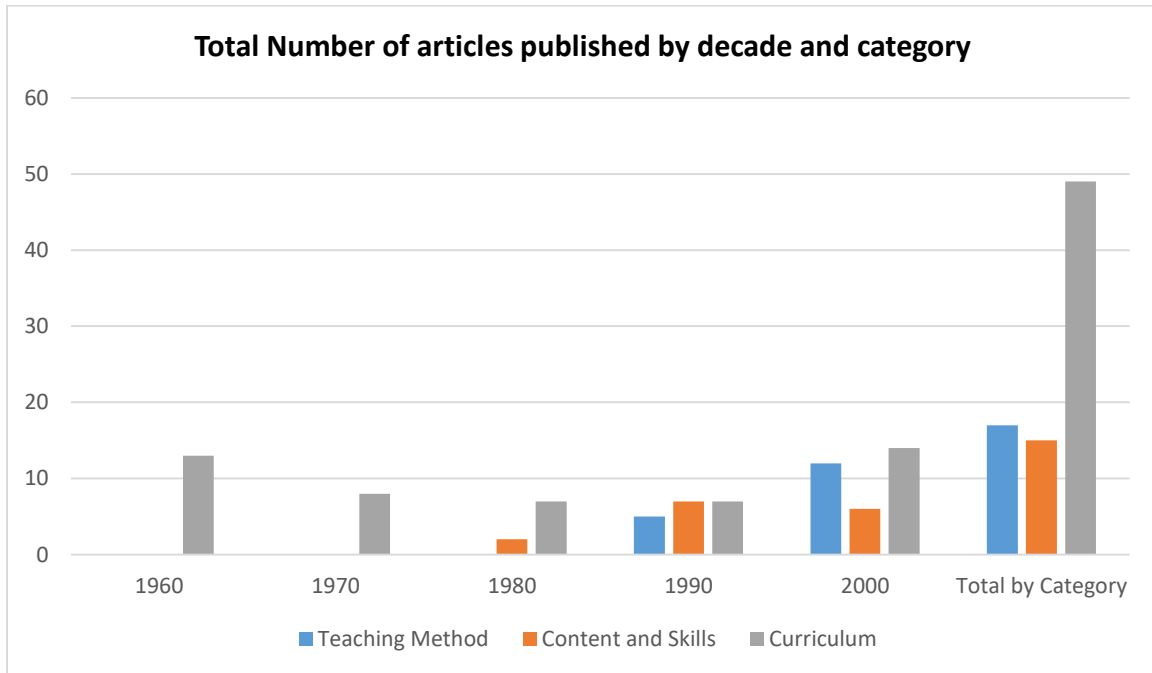


Figure 6. Number of articles published by decade and category modified from Gravier & Farris, (2008)

In 1980s, there was an increased interest and consideration to extend the scope of logistics programs and adding new subjects within in order to enrich the variety of content in curriculums and therefore a tendency as a question of what should be taught appeared. In 1990s there was almost a balance between the numbers of articles published related to content, skills and curricula concerns Gravier & Farris, (2008) emphasized that logistics-education in the literature had started to ask who are we in 1960s and through the next decades it was evolved to another question of what should be fitted into curriculums to teach and eventually starting from 1990s to nowadays the most frequently asked question is how we can teach better in logistics and SCM educational programs at universities and institutions.

4.3 CURRICULUM DEVELOPMENT

In the academic literature involved in SCM and logistics education, curriculum development has been given the biggest interest and attention by researchers as the most commonly chosen theme in researches and studies and also as a chosen subject it constitutes the main interest of this study as well. As a major part of this thesis, curriculum development will be discussed in the remainder part of this section. In addition to that, based on research conducted in the field of logistics and SCM education, it can be said that the balance of articles addressing curriculum development in the literature can be divided into two groups as curriculum contents and skills and competencies. Therefore remainder part will be divided into two sub-chapters as curriculum contents and skills and competencies.

4.4 CURRICULUM CONTENTS

A previous study which was presented by Larson & Halldorsson (2004) focused on content of logistics and SCM courses conducted via an academic questionnaires and interviews with lecturers in order to analyze and categorize the content of logistics and SCM courses and curriculums given at higher education at different universities. As it is mentioned in the previous parts that SCM was given an increasing importance starting from 2000s and therefore the increasing popularity of SCM was clearly demonstrated in their study. They conducted their survey among academic members of the Council of Logistics Management. They asked the participants to rate the importance of subjects and topics related to logistics and SCM courses. However, their study is limited to include major subjects which was provided by utilization of journals and books in logistics, purchasing and supply management, and SCM. In addition to that there was no reflection of any perspective from industry or from business professionals in creation of contents for curriculums related to question of what should be taught in these classes since their study only aim to show what a specific group of participants which consist of only academicians think ought to be taught. According to their survey, they come up with a conclusion and pointed out that lecturers and educators tend to modify the name of the current courses by adding part of SCM subjects within instead of creating and offering new courses with the current requirement of industry and business world. They also found out that the innovation

and differentiation in developing SCM curriculums mostly show preconception, strengths and background of the lecturers who developed these courses.

Another study that aim to evaluate the curriculum of logistics courses presented by Wu (2007). He used in his study the syllabuses of 77 US- based universities and colleges which have logistics majors and which are publicly accessible to be viewed and also he surveyed online curriculums, collected data from web-pages of these universities and in addition he utilized and reflected a brief summary of the previous studies. According to his study, he found out a crucial diversity in these syllabuses in terms of their scope in curriculums. The research aims to focus only analysis of headings of the courses and therefore it does not go deep into particular reflection of analysis or benchmarking of the contents in the curriculums. A key limitation of his study was that all the information and data was gathered from web-pages of the schools that does not include any contact with the lecturer or the departments. Following that it can be said that it is not convenient to have a clear understanding of what is covered in these classes based on the analysis of the course titles without having learning aim, learning outcomes or entire content of the courses. Therefore, his study put forward that there will be a necessity for a comprehensive examination of curriculums including contents for the future researches.

Van Hoek (2001) presented a study that aimed to reflect the current capabilities of logistics programs whether they meet with the requirement of industry or not. In his study, he raised three major criticism of logistics education such as lack of industry relevance subjects exist in logistics curriculums, lack of practical utilization of theoretical knowledge that is taught students before their gradation and conclude with a critic for poor research abilities. He also pointed out that “ These criticisms and challenges point at needs for greater market relevance and research driven skills in logistics education”. He moved to a methodology to provide a solution related to his critics in lack of industry-related topics and the need to improve research capabilities. He suggested to integrate the hot trends topics into basic courses within curriculums in order to modify and update current curriculums to meet with rapidly changing industry demands and dynamics.

Lutz & Birou (2013) have presented a study that focused on analyzing the topics and methods that are taught and applied in 118 syllabuses of logistics courses in six different countries in both

undergraduate and graduate levels. They found out that a great number of classes apply a conventional research-based approach to logistics and SCM education. In addition to that SCM practitioners do not get involved in a strong and effective integration and connection between curriculum quality and academic research. And they concluded that management education specifically major in logistics and SCM have become less relevant to practitioners and graduates from business school which somehow lack the skills they need and also the current mismatch between industry and academic perspective regarding practical relevance reflects a need for revising and advancing the current curriculums.

Alvarstein & Johannesen (2001), investigated problem-based learning in basic level transportation courses at Scandinavian universities in their journal and illustrated Tromsø University as it categorizes logistics curriculum based on syllabuses and course contents into a couple of main problem areas such as problem-based learning, SCM, domestic transport, international transport, customer service, and freight - forwarding. "Transport Research and Innovation Monitoring and Information System" divided logistics curriculum into nine different parts which are ranged from functionality and administrative skills in business to individual capacity and competence, and classification of planning, support, practical applications in logistical operations. According to their findings as it was explained and illustrated shortly above, it can be said that curriculums and their contents are formed based on institutions and universities' different perspectives and initiatives which are evolved with industrial needs as well.

Starting from 1990s in the USA, as parallel with increasing importance of logistics and expanded demand from industrial field, many universities updated their transportation and logistics programs' curriculums by including and combining many different topics from different departments. Closs& Stank, (1999) emphasized in their journal of business that Michigan State University is one of the first universities in the US which formed a single integrated department major in logistics and combined all the other subjects such as marketing, procurement, and production within the same curriculum as an integrated content under logistics subject to teach. Furthermore the university categorizes the courses into three parts based on their level as basic concepts, core competence and knowledge and lastly comprehensive applications in order to

provide opportunities for students where they can gain theoretical knowledge and practicing logistics problems based on case studies.

Another study focus on European Logistics Association's master degree programs major in logistics and SCM that involved in 19 different universities conducted by Cevik et al., (2013) found that, contents of curriculums at these universities was extended to integrate SCM subject with IT, marketing, finance and law/legal topics within. In addition to that another similar study conducted by Chikan (2001) which focused on analyzing of 11 major universities that are located in Europe and offer higher education programs specialized in logistics and SCM programs found that curriculums of these universities incorporated logistics subjects with other major subjects such as procurement and manufacturing operations.

4.5 SKILLS AND COMPETENCIES REQUIRED

Myers et al. (2004) conducted a study that aimed to identify the contributors to succeed in logistics area. In their study, they reflected Van Hoek's emphasis on industry relevant citing and specifically referred to the importance of "human capital". According to this citation, it is underlined that the human factor in logistics-related jobs are one of the major predictors of the success since educated and trained workforces play an important role and basically the success is determined based on human-centric capabilities in the field of logistics in the new millennium. In particular, they aimed to evaluate how experience, education and job-related-skills can impact on the success. They conducted their survey among a mid-level employees working in the field of logistics. They concluded with a result including statistical facts and indicated that skills directly associated with job-relevance are the major contributor in order to succeed in the business. According to them there is no crucial indicator for the impact of experience for success in logistics. Their research is limited to include only mid-level workers in the industry. They came up with a conclusion which concisely pointed out that education and technical knowledge combined with practical experience might become an important indicator of success in top positions of administrations at companies in the area of logistics and SCM. They emphasized

that future research should aim to indicate how to gain and develop the job-oriented skills in an effective way and how to re-design conventional logistics degree programs.

Another study conducted by Wu et al (2013) focused on required skills and competencies in the field of logistics. In his study he determined 50 skills and categorized them in more than a couple of different sub-category based on their importance in terms of logistics expertise. In addition to that, effective-management, social responsibility, capability of decision-making independently are some of the new subjects and skills worth to pay attention as he claimed.

Murphy & Poist (2007) conducted a study focused on skill necessity and success predictors in the field of logistics. The main difference between their study and Myers et al. (2004) is the scope of their research. Murphy & Poist (2007) used a target population of senior level employees and business executives in the field of logistics. They utilized a similar study conducted in 1991 and analyzed how it evolved during the years and found out that more than 30 business-related skills that were considered as crucial for success at top level of management in the field of logistics in 1991 has changed today mostly due to SCM perspective has appeared as the most important skill to have in terms of theoretical knowledge and practical experience for business executives in 2007.

Sennheiser & Schnetzler (2008) used the term of “logistics potentials” in their study in order to refer to logistics-related capabilities and competencies that are put forwarded as a requirement for succeeding and having a competitive performance. In their study, they draw a framework of potentials in logistics as specific resource and capability and enhancing their suggestion by integrating and illustrating theories such as RBV and dynamic capabilities and competence-based management. Following that, Matwiejczuk (2013) took their suggestions further and expended it to explain how competencies could be utilized from resources and human capabilities in his study.

Bourlakis et al., (2013) emphasized that previous studies and researches involved in various skills, competences and knowledge which was demanded from industries and markets proved that academic field and business professionals agreed on having graduates from logistics and SCM majors should have certain capabilities and skills that is ranged from traditional

administrative skills to comprehensive and specific branch knowledge combined with personal qualifications and ethics as well.

Gammelgaard & Larson, (2001) illustrated a survey outcomes in their journal that conducted by Council for Logistics Management with 123 participants and based on the data gathered from members they determined a couple of headings related to competencies in SCM as they are shown below;

- general skills and capabilities in management
- capability of using technology and quantities skills
- SCM advanced skills

In addition to these categorization of competencies in logistics and SCM education, they concluded with a number of extended competencies and skills that business professionals and executives should have such as proactive approach, self-motivation, leadership, confidence, self-discipline, problem solver and having supply chain awareness.

According to Giunipero et al., (2006) senior level professionals and executives which are in charge of establishing strategic level relationships should succeed in total cost reduction and managing integration and collaboration with suppliers and third parties out of organization effectively. Therefore, having strategic skills are one of the most demanded and highly desired competencies by many organizations rather than having general business and management skills. In addition to that, they identified five skills in order to succeed in strategic objectives such as being strategic planner, team builder, and being competent in communication, in technical and financial field.

Bourlakis et al., (2013) conducted a survey aims to measure and categorizes the importance of theoretical subject knowledge and technical application of related subject knowledge. They analyzed many online job advertisements and found out that theoretical subject knowledge in sourcing, supplier management, warehousing and inventory management are “equally or more important than general business and management skills such as communication and leadership skills” for master degree graduates major in logistics and SCM. In addition to that, project

management, collaborative skills, interpersonal skills and creativity with a problem solving approach are found less important than theoretical subject knowledge in such majors.

Mangan & Christopher (2005) pointed out in their study that crucial skills which logistics experts and executives should have evolved through an extended list including IT-related skills, financial understanding, and analytical capability to understand and interpret with agile and proactive personality combined with traditional skills. In addition to that in their study they emphasized the importance of communication skills specifically for logisticians which is required in businesses to have an effective leadership and maintain effective coordination across different departments. They also found out that although logistics-related education mainly focused on how to improve analytical abilities of students, considering the broader scope of SCM, the importance of communication appeared and increased in terms of importance.

According to Walton et al. (1998) and Wu (2007) logistics and SCM educational approach and related skills and competencies could be various based on different locations. They illustrated differences between logistics executives that perform in different continents. They found out that logistics executives perform in the Europe are skilled in a more extended capacity that deal with a great number of customer demands in a range of various cultural and linguistic struggles rather than their peer in the US.

Burcher et al (2002) conducted a study that compared logistics management between Australia and Britain. According to them, Australians focus on more IT-related technical skills during their studies in their logistics and SCM education however British executives have a need to go further in language trainings and communication skills. They emphasized that executives and business professionals at top level of management in the field of SCM and logistics have to consider to establish a perspective which has strategical approach to their work that requires an inter-disciplinary and global background. On the other hand from the perspective of American and European executives in the field of logistics and SCM, the priority is given to have a position in up-management team first by becoming a manager, and then getting specialized in their discipline has been emphasized lastly (Poist et al, 2001). Therefore one can say that importance is primarily given to have general administrative and managerial skills such as communication, leadership, interpersonal relations, planning and control and technical capability and therefore

functional skills such as logistics and marketing ranked in second place. Furthermore, having capability to offer management skills in a foreign language and also having experience gained in a foreign country and business atmosphere have also been highlighted as valuable assets in their findings in their study.

5 CASE STUDY: COMPARISON OF CURRICULUMS IN TURKEY AND IN THE UK

In this chapter the comparison of two curriculum at case universities will be presented in order to benchmark these two curriculums. First, a list of similar courses that are taught at both university will be illustrated in Table 3. Following that a detailed description of every single course at case universities including their learning outcomes and learning aims will be explained. Following that, the courses which are taught at Cranfield School of Management however which are not taught at Atilim University will be presented in Table 4 in order to show different courses between curriculums which will be used to produce suggestions for improvement of current curriculum at Atilim University in the discussion chapter eventually.

➤ LOGISTICS MANAGEMENT
➤ SUPPLY CHAIN STRATEGY AND SUSTAINABILITY
➤ WAREHOUSING AND INVENTORY MANAGEMENT
➤ NEGOTIATION AND CONTRACT MANAGEMENT
➤ INFORMATION SYSTEM AND E-BUSINESS

Table 3. Similar courses in both curriculum (developed by author)

LOGISTICS MANAGEMENT

For the course of logistics management the main difference between two universities' curriculum contents is stem from their scope. According to the learning aim of the course of Logistics Management in the curriculum at Atilim University, logistic is considered as a separate and independent subject that is not seen as a major part of greater SCM. Therefore logistics as a

discipline and its inter-related connection with the concept of SCM is neglected in the learning aim. In addition to that the learning aim the of course at Atilim University focuses only giving basic elements and functions of logistics and a big majority of logistics content is limited to only transportation framework and therefore it is divided into some major transportation modes such as road, sea, rail and air modes. However some of the other important transportation modes such as pipeline or intermodal transportations from their conceptual description to their potential position and growing capacity in Turkey are neglected to be added into the content. Following that the role of logistics and its functional relationship based on international trade perspective are determined to be given as a major priority in the learning aim of this course. Therefore the concept of logistics management is narrow downed into basic transportation framework and also it is explained briefly in international trade perspective overall and therefore the course aim gives the main priority only to the transportation- related subjects in its learning aim. On the other hand, the learning outcome is limited to a general understanding of logistics foundation and the position of logistics in economic dimension specifically in Turkish economy and also covers basic definitions of transportation modes, logistics functions and includes discussion of basic concepts in value added services in logistics such as customer service, insurance, documentation, terms of sale and incoterms. In addition to that as it is mentioned in their learning outcome activities such as material handling, purchasing and procurement are considered as small minor parts within the whole logistics operations therefore the learning outcomes includes discussion of such activities and their roles in an organizations' marketing and logistics efforts.

However the course aim at Cranfield School of Management has a holistic approach to logistics management as a course in their curriculum. The course aim is formed based on the major vision of “unionist approach” which is most commonly accepted both in academia and in the industry in the UK as it is explained in literature review chapter of this thesis. According to this approach and vision, SCM is considered as a distinct field and also greater and wider than logistics management. Therefore the course aim at Cranfield School of Management positions logistics within the wider and greater context of an organization's SCM strategies. The course aim is determined to focus on supply chain strategies and views logistics and transportation-related functions as a minor part within SCM concept therefore the course aim gives the main priority to the SCM and explain their relationship in details and eventually divides logistics modules into

transportation modes. However as a main difference from Atilim University's perspective in the course aim, emerging technologies which are used frequently and which are also estimated to be an important factor in the near future to shape the future of contemporary transportation modes are aimed to be given to students which can affect the SCM operations and contextualizes these with respect to their operational environment as well.

Since supply chain perspective is given the main priority at Cranfield School of Management, the learning outcomes at Cranfield School of Management focuses on analysis and evaluation of transportation modes in order to show how to choose the most efficient mode which also can be utilized as the most appropriate mode to meet an organization's supply chain strategy, and furthermore it aims to give an understanding of how to analyze operation costs based on this chosen transportation modes including critically evaluation of utilization of innovative technologies in these transportation modes and their potential impact on the overall physical logistics of a company. Therefore it can be said that SCM is the major actor in logistics management course and logistics and transportation modes are taught in the framework of SCM strategies based on their interaction with SCM.

SUPPLY CHAIN STRATEGY AND SUSTAINABILITY

Learning aim of this course at Atilim University consists of only an introduction part to a general understanding of SCM. Therefore it does not include integrated sustainability subjects within the content and learning outcomes. The learning aim of the course is limited to the review of the basic principles of SCM in order student to get familiar with general principles in SCM based on best practices both in academia and in the business field. It is also mentioned in the course aim that basic concepts of SCM are estimated to be affected by globalization in the near future therefore students will be provided with general theoretical knowledge of supply chain policies in globalization concept. Following that learning outcome at Atilim University is determined to be limited to the basic principles of supply chain, development of supply chain and introduction to components of supply chain in a theoretical dimension only and also includes discussion of traditional processes in typical supply chains and introduction to competition strategies in a general level.

On the other hand, the aim of the course at Cranfield School of Management is divided into two major parts. Firstly, it aims to provide a foundation of the major visions and principles that support the concepts of logistics and SCM. In addition to that the learning aim includes as a significant issue of sustainability within SCM framework in a business context. Comprehensive aspects of sustainability and its sub-topics such as corporate responsibility, ethics, and reverse logistics are explored and aimed to be taught as a competitive advantage in the framework of SCM. Secondly it aims to give case-studies and supply chain games in order students to be familiar with the complexity of networks in global supply chains and enable them to understand how to manage the uncertainty and succeed in reaching maximum profit and to ensure to have desired level of inventory under condition of rapidly changing dynamics in global supply chain networks by providing examples of business games and scenarios. Furthermore, the learning aim of this course at Cranfield School of Management includes interactive and competitive business simulations integrated within supply chain principles as case studies that are originated from a bunch of organization in a wide set of business fields that aims to show different supply chain models and particular concepts such as agile and lean supply chains.

The learning outcome is also structured more comprehensively and detailed at Cranfield School of Management than Atilim University. The major difference is inclusion of sustainability as an integrated major part within learning outcome at Cranfield School of Management and inclusion of related emerging topics within supply chain sustainability and reverse logistics. Learning outcome also includes important topics such as distinguishing and evolving supply relationships from arm's length to joint ventures and also five main steps for the implementation of lean thinking, the concept of just-in-time, identification of "seven deadly wastes" and understanding of tools and techniques which mainly aim to reduce waste in the supply chains.

WAREHOUSING AND INVENTORY MANAGEMENT

The learning aim of this course at Atilim University is described as to provide significance of warehousing and inventory and also promote the role of warehousing and inventory management in a logistics system. At Atilim University, the importance and functions of warehousing concept is described as "providing time and place utility for raw materials, industrial goods, and finished products and allowing firms to use customer service as a dynamic value-adding competitive tool.

Also the main purpose of inventory is simply to meet customer demand”. Therefore the learning aim at Atilim University is built upon this vision and learning aim is framed as “to give student the basic warehousing and inventory decisions, operations issues and reasons for holding inventory”. The learning outcome at Atilim University is limited to give an understanding of basic functions of warehouse that is integrated in a logistics system and also some basic value-added activities such as product consolidation, product mixing, material handling, and packaging and material-movement activities performed in warehouse in an overall perspective of transportation consolidation. In addition to that since inventory management is integrated into warehousing to be taught in that course, the learning outcome also includes concept of inventory with its basic definitions with operational issues and reasons to hold the inventory in the warehouse. It also aims to get students to have an understanding of the basic conceptual rationale such as customer service, order processing, inventory management, transportation, information systems and information technologies, procurement, documentation, bar-coding, cross docking and inventory control system.

On the other hand the learning aim at Cranfield School of Management is determined as to provide a deep grounding in the role of warehouse and operations in warehouse including major activities performed in warehouse such as storing and handling equipment, designing warehouse and the utilization of information technology in the warehouse. In addition to that the learning aim focuses on to teach warehousing in light of wider context of an organization’s supply chain strategy and therefore it aims to equip students with the means to tackle the warehousing aspects of complex supply chain problems. Therefore it can be said that the biggest difference between two learning aims is rooted from their perspective on SCM. Mostly warehouse is considered as a single and invaluable unit in a logistics systems in the curriculum of Atilim University however warehouse is considered as an important strategic function in supply chain systems and supply chain strategies at Cranfield School of Management. Therefore, the learning outcome at Cranfield School of Management is built on the basis of assessment and evaluation of warehousing issues as an important part of strategies within complex and sophisticated supply chain systems. Hence, the learning outcome is not limited to basic warehousing concept considered as a distinct unit in a logistics system. It also aims to emphasize increasing importance and functionality of warehousing in the modern supply chain systems in today’s

business world and includes critically discussion of how a warehouse should be designed or improved to meet an organization's supply chain strategy effectively. Following that, it includes to give analysis of methods used in warehouse operations in a systematic way, with regard to layout, equipment, processes and supporting information technology to gain competitive advantage.

NEGOTIATION AND CONTRACT MANAGEMENT

The aim of the course at Atilim University is to give general terms and concepts of contract management in the framework of logistics and foreign trade in a theoretical level. It also aims to illustrate some samples of documents, components of contact managements and promote trade applications in scope of foreign trade activities. The aim of the course therefore targets to get students familiar with concept of foreign trade and contract management with their sub-concepts and give an understanding of how contract management in foreign trade activities can affect international logistics. In addition to that, development of international sales strategies, sales management with IT technology that is used in international sales operations that are framed based on contracts and commercial agreements are taught in a general perspective in scope of contract management. Hence the overall aim of the course is to give students an understanding of the position of contract management in international trade, sales and logistics operations.

On the other hand the aim of this course at Cranfield School of Management is divided into two parts. First it aims to give general understanding of contract management, its structure and lifecycles of the contracts. Secondly it aims to help students to have an insight about interpersonal relationships and its impact on negotiation and contract management. This involves to give an understanding of principles in negotiations, developing technical knowledge, building inter-personal skills and confidence in a range of activities including effective management of negotiations and also termination of contract. It also includes roll-plays and case studies where students have opportunities to practice their interpersonal skills for negotiation and competencies and obtain feedback on their performance to improve.

INFORMATION SYSTEM AND E-BUSINESS

The aim of this course at Atilim University is limited to give a general understanding of e-Business concepts that specifically aims to give students an understanding of trends and hot topics in e-Business field including e-commerce as well. In addition to that it aims to give basic instructions of how to design a web-page, how to use e-commerce web-pages, and how to get familiar with these rapid changing dynamics in e-commerce area in a theoretical perspective. Following that learning outcome is limited to developing ideas and creating a vision about how to get integrated into the concept of e- Business systems in a global world, basic introduction of web-page designs especially in e-Trade concepts and sample application of e-Trade web-pages and also related information such as tools used in e-commerce, types of payment, types of infrastructure including communication, technology and payment infrastructure within and also current positions of Turkish companies in e-commerce sector and also data storage technologies for e-businesses are illustrated. It also includes to give an understanding of general terms, concepts and principles used in e-commerce with some case-studies from industry and brainstorming about these case studies in order to provide a deeper and practical understanding of e-Trade and e-Business concepts mostly in Turkey.

On the other hand this course at Cranfield School of Management is combined with information systems to be taught together. The aim of the course at Cranfield School of Management is to give the significance of information systems and role of information systems in SCM concept. Therefore it can be said that information system and related e-Business concepts are placed in the framework of SCM to be taught in learning aim and learning outcome in the curriculum. Specifically it aims to show potential opportunities, challenges and enhancements that is possibly seen in SCM operations of companies and organizations via integration of information systems and related technology and it also aims to discover impact of these information system and e-business concepts on supply chains. Following that a general framework of software concepts in information systems including some examples of applications such as ERP systems and E-commerce applications and importance and role of data sharing on supply chains are also included in learning outcome.

➤ PRINCIPLE OF STRATEGIC PROCUREMENT
➤ FREIGHT TRANSPORT
➤ LOGISTICS OUTSOURCING
➤ RETAIL LOGISTICS
➤ SUPPLY CHAIN CONCEPT
➤ SUPPLY CHAIN DESIGN
➤ SUPPLY CHAIN OF THE FUTURE

Table 4. The List of Courses that are included only in the curriculum of Cranfield School of Management

PRINCIPLE OF STRATEGIC PROCUREMENT

The aim of the course at Cranfield School of Management is to discover the procurement topic within business context and provide a detailed perspective of their roles, functions and importance in the supply chains. The learning aim also focuses on providing a background of how procurement concept evolved in the history and includes an analysis of competences and skills that are required by business executives in this field to succeed. Following that after discussion of role of traditional procurement and its position in supply chains, the focus is extended to cover trends topics such as e-procurement and emerged technologies such as benefits and limitations and integration of e-procurement within supply chain systems. Specifically leading and innovative approaches including trend technology within e-procurement topic which are created to advance processes and contribute to control overall cost in procurement operations in an effective way are discussed. It also includes to give an understanding of usage of instruments required to analyze and select suppliers and focuses on how to develop strategies for

procurements related to SCM with requirements and necessities for SCM operations of a business. Lastly it includes a case study example as a collaboration with a global company Daikin in order to give a detailed analysis of the procurement operations including traditional procurement, e-procurement and sustainable sourcing activities performed by the company in the industry.

FREIGHT TRANSPORT

The aim of this course is to provide a foundation in transport modes in details. Therefore the course is divided into sub-chapters in order to categorize transport modules such as road, rail, air and sea freight transport. In road freight transportation mode, the module includes to give a comprehensive understanding in fleet management concept and related-operational aspects and introduction to outsourcing concepts in road transport fleets. In addition to that a case study of intermodal rail freight mode will be explained. On the other hand, learning outcome of the course covers some major questions aim to address how to evaluate and choose the most efficient and suitable mode out of various modes in transportation and also how to connect them in a planned network that collaborate with other elements which are taken into account during operations in order to have an efficient and effective supply chain and also seek answers to figure out how to design and plan computerized routes and schedules in a single depot environment and also analysis of effect of restraints on vehicle productivity and assessing the impact of these different transportation modes on supply chain systems. Therefore it can be said that while all the transportation modes and their characteristics are taught in details, however, all these modes and their impacts are linked to supply chains strategy eventually in order to create ideas to improve overall supply chain systems as the major priority of this course.

LOGISTICS OUTSOURCING

The aim of the course at Cranfield School of Management is started with increasing importance of outsourcing activities in the field of logistics. Following that it covers approaches and methods in selection and working collaboratively with logistics contractors and finally it emphasizes the dynamics and development of new logistics outsourcing business models in global marketplaces. On the other hand learning outcomes consists of sub topics such as

advantages and disadvantages of logistics outsourcing, constructing tender evaluation and improvements of logistics outsourcing processes, developing KPIs and frame their role in on-going contract management.

RETAIL LOGISTICS

The aim of the course at Cranfield School of Management has a holistic approach to the concept of retail logistics and therefore it aims to correlate retail logistics within supply chain concept. It starts with the description of the increasing importance of retailers in supply chain concepts and emphasizes how they become one of the crucial key member in an entire supply chain system today. In addition to that the logistics activities of retailers in various aspects are included and explained in this relationship between retailers and SCM in the learning aim of the course. An understanding of components and contemporary trends in retail logistics activities are also included to be given in the course aim. On the other hand, learning outcome consists of a detailed explanation of retail logistics activities, functions and processes and also analysis and discussion of strategic role of logistics operations in global retail companies and their effect on supply chains and the concept of green and sustainability practices in retail logistics. Therefore it includes a set of important and emerging topics in this course beside the retail logistics concept.

SUPPLY CHAIN CONCEPTS

The aim of this course at Cranfield School of Management is to give an understanding of changing dynamics in the entire supply chain concept and including role of logistics and transportation, distribution, inventory and procurement within the whole supply chain. In addition to that it focuses on explaining criteria and implementations in green and sustainable subjects in SCM and also show their impact about how they can bring competitive advantages to the firms run in global marketplaces. It also includes all the fundamental theories in SCM to teach and provide case studies to the students that is originated from a network of organizations in a number of different sectors in order to demonstrate how these supply chain theories and their implementations work. The case studies include supply chain simulation games that is created based on an example of a global company and its operations in retail sector ground in the supply chain where the students have opportunity to exercise improve their theoretical knowledge

accumulated on SCM. Lastly it includes excel exercises aim to teach how to manipulate and utilize a set of data in supply chain and logistics.

SUPPLY CHAIN DESIGN

The aim of this course at Cranfield School of Management is to give an understanding of how to use formulation methods in designing and re-designing supply chains. In addition to that the learning outcome focuses on principles that are required when develop strategies in supply chains and reviewing of required tools and techniques such as process mapping tools which are required for re-engineering of supply chain processes including physical network design as well. Moreover, an understanding of latest trends in SCM and importance of integration of the supply chain, optimization of physical networks with required key criteria within supply chain system will be given in this course as a major part of learning outcome.

SUPPLY CHAIN OF THE FUTURE

The aim of this course at Cranfield School of Management is divided into two major parts which are leadership and organizational management in supply chains and sustainable supply chains. The first module aims to give an understanding of competences and skills which are required in order to implement supply chain activities which can enhance the business. In addition to that the learning aim focuses on promoting leadership subject based on individuals' performances and explain their impact and key roles in supply chains. In the part of sustainable module in that course, it aims to emphasize the concept best practices in SCM that includes reverse logistics and green supply chain management concept and the concept of future trends in supply chains.

6 DISCUSSION

This study has aimed to discuss the differences between two curriculum major in logistics and SCM taught at Atilim University in Turkey and Cranfield School of Management in UK and also provided a detailed comparison of these curriculums in order to create solutions and suggestions to improve current curriculum at Atilim University based on these aggregated result of

comparison. First, a comprehensive literature review in the field of logistics was presented. This was followed by a comprehensive literature review in the field of SCM and then eventually the theme of education in logistics and SCM in the literature was presented in order to build a solid theoretical background for the study.

The empirical part of this study is based on two case universities. The existing contents of curriculums major in logistics and SCM at both universities are presented to be compared based on the differences between their learning aim and learning outcome which consists of common courses that are taught at both university and also including types of different courses which are taught at Cranfield School of Management however which are not included in the curriculum of Atilim University. Lastly, suggestions for improvement of current curriculum major in logistics and SCM at Atilim University was discussed based on analysis of data gathered through comparison and theoretical background provided in the literature review in this thesis.

This chapter also aims to provide a discussion of the result of the study. First, a summary of the results will be presented which will focus on presenting the research questions of the study and match with research questions. Secondly, limitations of the result will be presented. And lastly, a conclusion chapter built upon the result of the benchmarking of two curriculums that includes theoretical background and empirical results with suggestions will be provided to improve current curriculum at Atilim University.

6.1 SUMMARY

The main research question of this study was: How to improve logistics and SCM master's degree programs' curriculum in Turkey? A summarized result for this question will be provided at the end of this paragraph after discussing the most essential findings of the research that can provide the necessary background in order to understand the main concepts in this thesis. A comparative case study which was utilized in this thesis and which aimed to help in answering the main research question that show the differences between two curriculums major in logistics and SCM at Atilim University in Turkey and Cranfield School of Management in the UK will be given in the next chapter.

Considered on a general level the main differences between two curriculums in terms of courses that are taught can be listed below;

- Principle of strategic procurement
- Freight Transport
- Logistics Outsourcing
- Retail Logistics
- Supply Chain concepts
- Supply chain design

Based on the differences that analyzed in the previous chapter, a summarized outcome that aims to give a comprehensive answer to the main research question of this study can now be provided. The main research question of the study is: “How to improve logistics and SCM master’s degree programs’ curriculum in Turkey”.

Supply chain of the future as a course focuses on explore how the future dynamics and changing conditions and trends could affect the supply chains in the near future. Considering the evolution of supply chain models and concepts from past to today it can be said that supply chains have performed on traditional networks which is performed based on physical network structures and which is estimated to change and turn to a digital network structure in the near future and therefore it will be required for organization and companies to consider how to adapt with these changing dynamics of the traditional components in the supply chains and embracing the idea of integration of innovation and technology as stronger more than ever before. In addition to that as a future estimation it can be foreseen that; digital network structures are expected to be transformed into a cognitive structure which is required to be integrated with the concept of artificial intelligence, industry 4.0 innovations and related technological dynamics into supply chain systems. Furthermore it is foreseen that in 2030s algorithm models are expected to be integrated and used in cognitive supply chain networks globally which will possibly include the concept of robotics and sophisticated software systems within as well. Therefore, these changing business models and supply chain dynamics will become crucial concepts for companies and organizations in the industry and these new dynamics and changing conditions stimulate to have skilled, competent and knowledgeable graduates who can understand these envisioned

challenges and changes in supply chains and business concepts and manage them effectively in the near future. Therefore from past to future, the course aims to explain these crucial content to the students and it should be added into curriculum of Atilim University.

Another important subject which should be updated and improved in curriculum at Atilim University is Information system and e-Business. As it is mentioned above in the concept of supply chain future, traditional supply chains and their physical network structures are expected to transform to a digital structure in the near future and therefore there will be a great requirement for sophisticated information systems and smart software systems which will be performed in supply chains in the near future. Starting from current position of information systems and their impact on traditional supply chains with possible future estimations and utilization of these concepts integrated in supply chains for today and for the near future should be added into curriculum. It is also important to understand that, traditional business models have started to change and adapted e-business concepts nowadays therefore both of the concepts as e-Business and utilization of information technology within should be added into curriculum at Atilim University and should be integrated within SCM concept to teach together instead of focusing on e-Trade applications, web-design and such topics as independently and as isolated from SCM framework.

Contracting is the final phase of an agreement and a result of negotiation process. Therefore it can be said that the whole process can only start with phase of negotiation. At Atilim University the course includes only contracting and its components with concept of risk management within and it does not include the concept of negotiations. It is also not linked with SCM framework. Without initiation process which is expected to start with the negotiation stage initially a contract cannot be done successfully therefore negotiations with the phase of life-cycle of contract process should be added into curriculum at Atilim University in order to give a holistic understanding of concepts. Moreover as it is given at Cranfield School of Management, the individual performances with interpersonal skills beside technical and theoretical knowledge of the concepts which could affect the process of negotiations such as leadership, self-confidence, inter-personal skills and negotiation tactics are crucial factors in a typical negotiation process in today's business world therefore such topics should be added into curriculum at Atilim University as well.

The course of warehousing and inventory management at Atilim University are taught as a part of logistics discipline therefore the overall concept of warehousing is considered quite isolated and fragmented subject and there is no connection given between the concepts of warehouse and SCM in Atilim University's curriculum. This difference basically reminds the understanding of warehousing in the past which was belong to a vision that was hold in 1970s and known as concepts of physical distribution and material handling when they were two distinct majors and separate disciplines before they incorporated into overall logistics concepts. Today the most frequently accepted approach and understanding of warehousing concept in Turkey is still to consider the warehouse as an empty building to be filled and used for distribution centers rather than considering it as a strategic asset to provide time utility and advantage for transportation of products based on strategically chosen location, also bring competitive advantage and customer satisfaction as an integrated component of SCM as it is explained in the literature review in this thesis. Therefore it can be said that this approach to warehouse at Atilim University is to consider warehousing subject as an independent and isolated topic from SCM concepts and therefore it can be seen as an outdated vision in today's global logistics and SCM dynamics. In addition to that, emerging issues and trend topics related to warehouse and inventory concepts such as utilization of cutting edge technology in the warehouse, automatization, robotics, and information technology subjects should be added into learning aim of this course in the curriculum at Atilim University. Furthermore as it is explained in details in the part of literature review in this thesis, it is also important to teach both technical knowledge and practical application of software systems such as ERP and other sophisticated IT systems which can be customized based on warehouse requirements in order to maximize the efficiency in the warehouse and also as an obligation related to the emerging topic such as virtual inventory in the warehouse. Therefore these subjects should be added into learning outcome for this course's curriculum as well at Atilim University.

Besides the main differences between two warehousing courses at both university, it is also important to emphasize that inventory management is taught as a single and independent course under the name of "Inventory Management and Operations" at Cranfield School of Management. Since operation management across and within warehouses as a concept is perceived as the greatest component of a typical SCM which includes management and control of material flows

within, inventory management is therefore integrated within operation management framework and incorporated with operational management perspective to be taught together at Cranfield School of Management. The learning aim of the course of inventory and operational management cover roles of operations in warehouse within the overall context of SCM comprehensively in order to provide an understanding of how to analyze and design effective supply chain operations with the ultimate goal of improving the matching capability between demand and supply. The learning outcomes on the other hand, focuses on the supply chain operations and related activities that are taken place in manufacturing place such as in fabric that includes working processes that occur before manufacturing processes, during the manufacturing process and after manufacturing processes. These supply chain operations are given in details starting with defining the inventory as an asset in fabric and describing stream mapping which aims to show the plans and timing schedule of manufacturing in the fabric. Following that as an important part of learning aim for improving match between demand and supply, some important topics and concepts are taught such as “supply and demand matching” concept, push/pull concepts and Just-in Time concepts with planning and controlling of overall demand management and finally it covers strategies about how to determine and implement sales concept after manufacturing process that is completed in fabric as a part of operation management. Therefore it can be said that, manufacturing processes that is taken place in fabric and warehouses which could be located within the fabric or outside of the fabric are connected with each other under the management of inventory and operation management within the entire supply chain systems as a single integrated concept. Therefore considering the both curriculums contents, it can be said that at Cranfield School of Management the importance and priority is given to operation management as a part of whole supply chain system and specifically focus on operations, activities and related sub - functions which are performed in fabric where warehouse and inventory exist. Therefore it is more holistic approach that aim to teach the topics of inventory and warehousing in details and integrate them within sub-topics of operations in a supply chain strategy and framework in order to give more comprehensive understanding of the topics to the students. In order to make warehousing more functional and synchronized in SCM, this course Inventory and Operation Management should be added into curriculum at Atilim University as a different course and the concepts of warehousing should be considered as a part of SCM rather than an isolated and fragmented topic in logistics.

Another important course which is not included in the curriculum at Atilim University is procurement. As it is explained in details in the literature review part of this study, the function and the importance of purchasing activity has changed significantly in the organizations for the last two decades and today since the concepts of total cost reduction and buyer-supplier relationships can bring a strategic importance in purchasing activity, it has become a crucial strategic function in the whole supply chain system. This increasing strategic importance of purchasing can be given as an example in the replacement of the word “procurement” for conventional purchasing to highlight its significantly strategic position in the supply chain systems. Moreover beside its strategic function and importance, it has evolved to an electronic and mobile concept which are known as e-procurement today. E-procurement activities and related field have been grown in Turkey substantially for the last decades. The overall value of public procurement was 57, 5 billion USD in 2015. This amount is approximately 6, 6 % of Turkish GDP of 2, 59 billion TL in 2015 (Deloitte, 2016). Although procurement has been increasing in Turkey and becomes an important topic for businesses and organizations, there is not any procurement course at any university in Turkey. Therefore, as an important component of supply chain system, procurement with its theoretical background, evolution, strategic importance and position with its emerging matters within such as sustainable procurement and e-procurement topics should be added into curriculum at Atilim University.

Logistics outsourcing is strategically important for businesses in order to reduce costs and mitigate risks while increasing customer satisfaction as it is explained in the theoretical part of this thesis. As a natural result of Turkey’s geographical location and systematically increasing volume in trade capacity, logistics outsourcing activities have been increased substantially for the last decades in Turkey. It can be said that Turkey has a huge potential and becomes a promising marketplace for 3PL, 4PL and 5PL companies to grow. Presently, there is not any company who specialized in 5PL services in Turkey, however a couple of companies offer 4PL services which have been increasing dramatically in the last quarter in Turkey. (Deloitte, 2016). Because of its systematic growth for the last decades and estimated potential to keep growing in the near future in the field of logistics, Turkey has been attracted to international logistics companies as a promising marketplace. These international logistics companies who have been ranked in the first top ten in global rankings currently running in Turkey and manage their

operations independently or through collaborations with their Turkish partners and alliances. On the other hand, Turkish 3PL companies have grown in the marketplace for the last decade as well. The statistics show that growing rates are more than 20% including the years between 2008 and 2012, and therefore it can be said that the significant growth of 3PLs in such a short period of time constitutes a great potential for future opportunities and investments and increase in overall volumes within the industry (Deloitte, 2013). Although increasing capacity and interest in 3PL and 4PL providers in Turkey, there is not any course that is given at any university related to logistics outsourcing in Turkey. Therefore Atilim University should add the course of logistics outsourcing into its curriculum.

The course of freight transport is taught as a minor part of logistics management course at Atilim University. Therefore it is not considered to be taught as a single and independent course in details in the curriculum at Atilim University. In addition to that, it includes only basic foundation of road, sea and rail transportation, however, some of the other important transportation modes are not included within learning outcome to be taught to the students at Atilim University such as pipeline and intermodal transportation modes. Furthermore, according to a research conducted by Deloitte in 2013, the volume of road and sea transportation modes in Turkey will be estimated to extend substantially till 2023 as a natural result of its geographical position and increasing international trade activities across the whole country and therefore there will be a huge need to improve current transportation infrastructures and also it will be required to consider utilization of intermodal transportation modes to be capable to handle these increase in transportation volume in Turkey. Intermodal transportation has been given an increasing attention recently and overall it grew significantly because of improvements in supply and demand side in transportation industry. As parallel with this increasing trend globally it can be said that Turkey has a great potential and capability to utilize intermodal transportation considering its unique geographical position between Europe, Asia and Middle East. Therefore in the light of these indicators, it can be said that freight transportation subject should be taught as an independent course and also it should include intermodal transportation in particular.

Retailers have an increasing impact on supply chain systems and retailer logistics constitutes an important part of these increasing impact as it is explained in details in the theoretical part of this thesis. For the last decades retail industry and related sectors have been dramatically grown in terms of increased manufacturing volumes and sales rates. In order to have an overall understanding of this significant growth a comparison with Germany can be illustrated here. According to a survey conducted by Deloitte, the aggregated growth rates in the retail sector is around 28% in Turkey while Germany has experienced around 5% growth in the same period between 2010 and 2015. The measured size of Turkish retail sector was around 300 billion \$ in 2013 according to Deloitte's survey carried out in Turkey. Considering these increasing importance of retailers in supply chains and also consider it as an increasing sector in Turkey which has growth continually, it is important to have such course in logistics and SCM majors at academic institutions to produce knowledgeable graduates to deal with these increasing capacity and volumes in logistics and SCM efficiently. However, there is not any single course or subject related to retail logistics at any university in Turkey. Therefore the course of retail logistics should be added into curriculum at Atilim University.

Supply chain design is an important and wide aspect of SCM that covers important issues of make or buy decisions, the relationships between buyer and suppliers or vertical integrations, decision for determining capacity and location of warehouses which can have a direct effect on overall performance of a supply chain. Decisions related to Supply chain network design are usually strategic and once they are implemented then they are difficult to change. Decisions can be considered to be categorized in three parts as strategic, tactical and operational. Related to the phase of design in a supply chain, it can be said that visions formed based on strategic approaches such as selection of location for warehouse and manufacturing facility and technology have crucial impacts in the long term. After the network design and related configuration is planned and determined, the interest shifts to implementations in tactical and operational level such as distribution implementations, controlling and planning of inventory within the entire supply chain system. Since the main concern of this research is to provide suggestions in order to improve curriculum major in logistics and SCM at higher education in Turkey which aims to produce graduates who are supposed to perform at top level of management which refer to strategic level of management in logistics and supply chain field, it

can be said that designing supply chain and network design are crucial to be added into curriculum at Atilim University since it is directly matching with the main requirement of industry in Turkey.

6.2 LIMITATIONS

Particular limitations are subjected to highlight in this chapter related to the outcome of this research. This study is conducted through a qualitative method. Although there are some disagreements related to the reliability and the validity of this method in researches, one can say that implementing external trustworthiness and related validity is seemed rather hard for a research conducted in a qualitative method (Bryman& Bell, 2011). Furthermore, this study is conducted only one researcher and it could not be possible to increase the level of internal reliability despite of the fact that some of the scholars have suggested that some other criteria which can be considered alternatively such as trustworthiness and authenticity are required in order to assess researches conducted in a qualitative method in term of quality (Bryman & Bell, 2011)

Other subjected limitation might be objectives of the research in terms of its scope. The result of the study is limited to address the differences between two curriculums major in logistics and SCM at two different universities and provide suggestions based on the comparison of two curriculums from a general business context and perspective. Therefore, the comparison of the two curriculums and analysis of curriculum contents and related suggestions for improvements do not include any specific architectural suggestions rooted from out of case universities which can address the main research question as how to develop curriculum at Atilim University.

7 CONCLUSIONS

As it is illustrated by Larsson & Halldorsson (2004) there are four major perspectives in the literature in understanding and evaluating of logistics and SCM concepts. One of these four

perspectives is “traditionalist view”. Based on traditionalist view, SCM is considered to be evolved from logistics discipline and believed as a part of logistics concept and even considered a subset of logistics discipline. Therefore logistics hires supply chain analyst to focus on cross functional, inter-organizational issues in that perspective. This statement holds true when assessing the results of this study for At Atilim University as well. At Atilim University the main approach to form its higher education program major in logistics and SCM is traditionalist view in which main priority is given to logistics concepts. On the other hand one of other important approach to logistics and SCM concepts in the literature is “unionist view”. Based on the unionist view, logistics are considered as a part of SCM and therefore SCM is seen wider and greater than logistics and considered as a holistic discipline. As parallel as the main consideration of the objective in this thesis, the unionist view which has been developed and implemented by British system and used as a major reference in British industry and academia should also be considered to be used as a major vision and baseline in order to update and improve logistics and SCM program at Atilim University.

Today the competition is held between organizations’ supply chains and therefore it can be said that supply chain is one of the most important element of any business today and even it can be taken further and considered as a backbone of the businesses in the global economy. Following that logistics can be considered as the most important and greatest part and also complementary component of a greater supply chain system and therefore logistics can be seen as a backbone of supply chain system and finally customer service and customer satisfaction can be considered the backbone of the logistics. Therefore all the elements are inter-connected with each other and considering the greatest picture one can say that supply chain is the greatest actor in this structure. Therefore these inter-connected components and the effect of supply chain should not be neglected in order to have customer satisfaction as an ultimate purpose of any business today. Moreover, SCM should be given the main interest and priority and current curriculum should be re-shaped and contents of the courses should be improved based on this approach at Atilim University. And in order to update course contents, learning aims and learning outcomes and overall curriculum at Atilim University there are a couple of main factors to take into consideration which needs to change when updating and improving curriculum as they are given below;

Firstly, SCM and its importance and functionality is generally neglected in curriculum at Atilim University. SCM - related course contents include only fundamental foundation for the SCM, introducing the general importance, general actors into SCM concepts and covers basic definitions. Therefore SCM –related courses are given in the basic level and there is no intermediate and upper level of course content including such emerging topics as sustainability, strategy, future estimations of supply chains, technology, total quality management, lean and agile supply chain systems, network designs and policy and strategies. Furthermore, the connection between logistics and SCM are also neglected to be explained in the curriculum of Atilim University.

Secondly, the main importance and priority should be given to the subject of supply chain management at Atilim University. A holistic approach and wider context of SCM that cover logistics, procurement, warehousing, transportation and distribution subjects within should be developed and logistics as a discipline should be given under the umbrella of SCM in details. Furthermore, emerging concepts such as green logistics and green SCM and sustainability which can bring complete advantage which therefore can contribute to companies and organizations to survive in fierce competition in marketplaces should be included into curriculum at Atilim University in order to produce graduates who can match with the requirement of industry in Turkey.

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APPENDICES

Appendix 1. The list of courses in curriculum at Atilim University

LOGISTICS MANAGEMENT

Course	
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Objective	<p>“Aim is to give students the foundation and fundamental element of logistics function is based mainly on Transportation by Road, Rail, and Air & Sea, is about the role of International logistics systems in global supply chain and international trade. The basic concept includes theory and practical application of logistics functions. New century has been the revolution in information management in international logistics. In context technological improvements and environmental protection issues also influence international logistics.”</p>
Learning Outcomes	<ul style="list-style-type: none"> • “Introduction the role of logistics in the economy and organization, interest and involvement in international logistic, logistics in different parts of the world, • Discuss the basic concept of customer service, inventory management, warehousing, materials handling, purchasing and procurement activities with theirs role in an organizations marketing and logistics efforts, • Define surface and railway transport, international air transportation, ocean ship and shipping, mix transportation systems • Describe fine international logistics functions and intermediaries, • Explain terms of sale, payment, documentation and insurance”.
Course Content	<p>“Gaining insight about international logistics and the role of international logistics systems in global supply chain management.</p> <p>To gain vision the international logistics of the future.</p> <p>The basic concepts of customer service, modes of transportation, order processing, information systems and information technologies, procurement, documentation, materials and inventory management.”</p>

SUPPLY CHAIN MANAGEMENT

Course Objective	<p>“The aim of this course is to give the basic principles and understanding of supply chain management based on best practices framework that is applied in academia and in industry. It is expected that the main concept of supply chains will be affected by globalization. The concept has an important and impressive role for development of sectors in the industry and also for forming supply chain</p>
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	<p>policies in the near future. Therefore in this context, students’ individual skills will be managed during their career progress”.</p>
Learning Outcomes	<ul style="list-style-type: none"> • “Basic principle and understanding of supply chain, development of supply chain and introduction to components of supply chain • Best practices in supply chain management, traditional processes in supply chains and analysis of competition strategies • Identification of information and value flow in supply chains • Major obstacles and common problems seen in supply chains and solutions to overcome these obstacles in supply chains with risk management • The discussion of supply chain future”.
Course Content	<p>The basic SCM concepts;</p> <ul style="list-style-type: none"> ➤ purchasing, ➤ manufacturing ➤ flow management, ➤ production, marketing, sales, distribution, ➤ customer relationship and service management, ➤ demand management, order fulfilment, supplier relationship management, ➤ IT, product development and commercialization, ➤ returns management

WAREHOUSING AND INVENTORY MANAGEMENT

Course Objective	<p>“Aim is to give students the nature, importance and role of warehousing and inventory management in the logistics system and international supply chain. Warehousing provides time and place utility for raw materials, industrial goods, and finished</p>
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	<p>products, allowing firms to use customer service as a dynamic value-adding competitive tool. Also the main purpose of inventory is simply to meet customer demand. Therefore to give student the basic warehousing and inventory decisions, operations issues and reasons for holding inventory”.</p>
<p>Learning Outcomes</p>	<ul style="list-style-type: none"> • “To be able to discuss the strategic value-adding role warehousing plays in the logistics system. • To explain the basic rationale for warehousing in light of transportation consolidation, product mixing, service, contingency protection, and smoothing. • To develop an analytical framework for basic warehousing decisions. • To be able to distinguish between the different warehouse activities requiring space in the warehouse design and the major principles of warehouse layout design. • To describe the decision-making approach used to determine the number of warehouses in the logistics system and the effect of materials handling and packaging on logistics.”
<p>Course Content</p>	<p>“In this course, the students will gain insight about international warehousing and inventory management and the role of warehousing and inventory management systems in global logistics and supply chain management. And also will gain vision the warehousing of the future. Therefore, the basic conceptual rationale such as customer service, order processing, inventory management, transportation, information systems and information technologies, procurement, documentation, materials handling, packaging, bar-coding, cross docking, inventory control system, ABC classification and economic order quantity models will be taught.”</p>

CONTRACT MANAGEMENT IN FOREIGN TRADE AND INTERNATIONAL LOGISTICS

<p>Course Objective</p>	<p>“The aim of this course is to introduce the basic concepts of contract</p>
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	<p>management as theoretical knowledge. Important actors in contacting of international logistics and foreign trade will be taught in the scope of contract management. Also application and documentation related to international trade and contract management will be promoted. In this context, concept of international contract management with its sub- dynamics will be introduce aiming to show its impact on international logistics. In addition to that, in the scope of contract management, development of international sales strategies, sales management and IT technology that is used in international sales will be introduced.</p>
<p>Learning Outcomes</p>	<ul style="list-style-type: none"> • To understand contract management in terms of international logistics and foreign trade • To understand methods required to penetrate new marketplaces in terms of contract management • To understand commercial terms regarded to contract management • To gain and understanding of international sales t in terms of contact management

E- BUSINESS

<p>Course Objective</p>	<p>“The aim of this course is to give students an understanding of trends and hot topics in e-Business field including e-commerce as well. In addition to that it aims to give the instruction of how to design a web-page, how to use e-</p>
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	commerce, how to adapt these rapid changing dynamics in e-commerce field and all the related information to the students”.
Learning Outcomes	<ul style="list-style-type: none"> • “To give main principles and concepts used in e-commerce • Discussion of how these principles and concepts work in theory and also in real cases in the industry • Discussion of main trends and topics in e-commerce and brainstorming about these subjects about how to get adapted within these e-commerce and e-business topics”.
Course Content	“Types of e-commerce, business paradigms, fundamental concepts, tools of e-commerce, types of payment, types of infrastructure such as communication, technology and payment infrastructure, current positions of Turkish companies in e-commerce and data storage technologies for e-business”.

Appendix 2.

The list of courses in Curriculum of CRANFIELD SCHOOL OF MANAGEMENT / UK

<https://www.cranfield.ac.uk/som/masters-courses/logistics-and-supply-chain-management#Coursedetails>

<https://www.cranfield.ac.uk/som/masters-courses/procurement-and-supply-chain-management>

LOGISTICS MANAGEMENT

Course Objective	<p>“The module is positioned within the wider context of an organization’s supply chain strategy and, equips you with the means to tackle the freight transport aspects of complex supply chain problems. It covers the freight components of logistics management and provides a sound foundation for road, rail, air and sea freight transport. The focus is primarily from a user perspective, in order, to provide a logistics and supply chain management viewpoint. However, in road freight, the module also covers more direct operational and fleet management aspects, recognizing that many organizations operate their own road transport fleets or are controlling outsourced freight services. Contemporary transport issues and emerging technologies are incorporated into the module to enable you to recognize and evaluate the opportunities and challenges likely to impact on supply chains in the future and to contextualize these with respect to their operational environment.</p>
Learning Outcomes	<ul style="list-style-type: none">• Evaluate which mode of transport is most appropriate to meet an organization’s supply chain strategy• Construct an operating cost model and evaluate potential freight rates and job costing• Apply fleet financing and investment appraisal methods to compare life cycle costs across different vehicle types• Critically evaluate the use of innovative freight transport technologies

	<p>their potential impact on the physical logistics of a company.</p> <ul style="list-style-type: none"> • Judge the potential impact of public policies and other external factors on freight transport • Plan and construct manual and computerized routes and schedules in single depot environment
<p>Course Content</p>	<p>Freight transport element comprises</p> <ul style="list-style-type: none"> ➤ Freight transport in the supply chain ➤ Sea and air – modal attributes ➤ Intermodal rail freight ➤ Road freight - regulation and markets ➤ Road freight - vehicle selection, costing and financing ➤ Road freight operations productivity and constraints ➤ Road freight resourcing planning and routing and scheduling ➤ Urban/city logistics ➤ Modal freight exercise

PRINCIPLES OF STRATEGIC PROCUREMENT

<p>Course Objective</p>	<p>“The course will explore the subject of procurement and supply in the industrial and commercial context, explaining its role and purpose within the supply chain.</p>
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	<p>You will learn how procurement has developed, the skills and information needed by procurement professionals, the academic theory and knowledge accumulated on the subject area and the use of specific tools and techniques employed in managing the procurement function. In addition we will explore and use some of the recently emerged technologies within e-procurement which are designed to improve both process and cost management.”</p>
<p>Learning Outcomes</p>	<ul style="list-style-type: none"> • “Understanding of the purpose of the procurement function and its role in the organization. • Knowledge of both strategic and tactical issues in the management of procurement. • Appreciation of the processes involved in procurement and their wider relevance to the supply chain processes of the organization. • Practical knowledge of the role and use of automated and web-based applications used in procurement and supply operations. • Use tools and techniques to analyze and evaluate suppliers and supply markets. • Apply segmentation models to spending within an organization. • Develop a procurement strategy, relevant to the supply chain and operational needs of the organization. • Evaluate alternatives for automation of the procurement process through available technologies.”
<p>Course Content</p>	<ul style="list-style-type: none"> ➤ “General issues affecting P&S and the role of Procurement, including drivers, context, structures, objectives ➤ Supply strategy and segmentation approaches & matrices; buyer-supplier relationships; power issues ➤ Managing inter-organizational relationships ➤ Supplier selection, development and evaluation, including make versus buy decisions

	<ul style="list-style-type: none"> ➤ Daikin case study on value creation - to be prepared by you for class presentations and discussion ➤ e-Procurement – approaches, benefits and limitations ➤ New trends in purchasing: retail industry ➤ International sourcing and total landed cost ➤ The Supply Chain Partnership model ➤ Sustainable sourcing”
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WAREHOUSING

Course Objective	<p>“The module provides a thorough grounding in the role and operation of warehouses including the range of storage and handling equipment, the design of warehouses and the use of information technology. It emphasizes on the strategic use of methods to analyze the wide range of available options. Additionally, the module focuses on developing your ability to discern and use appropriate warehouse design techniques.</p> <p>This module is taught in light of the wider context of an organization’s supply chain strategy and, thus, equips you with the means to tackle the warehousing aspects of complex supply chain problems”.</p>
Learning Outcomes	<ul style="list-style-type: none"> • “A sound appreciation of the role of warehousing within modern supply chains. • A comprehensive knowledge of the range and applicability of equipment types used for warehouse operations. • A practical understanding of recent developments and trends in warehouse technology and information systems. • A conceptual understanding of principles, methodologies and practices employed in the design and management of warehouses and their operations.

	<ul style="list-style-type: none"> • A systematic understanding of how warehouse design decisions should be made with regard to the various options for layout, equipment, staffing and operational processes. • Analyze alternative methods of warehouse operations in a systematic way, with regard to layout, equipment, processes and supporting information technology. • Summaries and critically discuss how a warehouse should be designed to meet an organization’s supply chain strategy. • Assess and evaluate warehousing issues within complex supply chains”.
<p>Course Content</p>	<ul style="list-style-type: none"> ➤ Introduction to warehousing ➤ Conventional palletized systems ➤ Automated palletized systems ➤ Non-palletized storage and handling systems ➤ Order picking ➤ Receiving and dispatch ➤ Warehousing information systems ➤ Warehouse design ➤ Computer aided design and simulation ➤ Warehousing in modern supply chains

INVENTORY AND OPERATION MANAGEMENT

<p>Course Objective</p>	<p>“To provide you with a comprehension of the roles of Operations within the overall context of Supply Chain Management and enable them to analyze and</p>
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	design effective supply chain operations with the ultimate goal to improve the match between demand and supply.”
Learning Outcomes	<ul style="list-style-type: none"> • “Analyze and map operations within a supply chain context to identify where activities add values. • Contrast between push and pull systems in order to formulate the future manufacturing operations. • Appraise different inventory and resource management approaches within the supply chain. • Appraise different tools and techniques used in the Manufacturing Planning and Control Systems, including demand planning and master production planning. • Formulate operational strategies for matching demand and supply. • Assess alternative improvement opportunities within the supply chain.”
Course Content	<ul style="list-style-type: none"> ➤ “Supply Chain operations analysis ➤ Value Stream Mapping (VSM) ➤ “Push and Pull” systems ➤ Just-in-time ➤ Manufacturing Planning and Control Systems ➤ Demand Management and Forecasting ➤ Sales & Operations Planning <p>Inventory Management</p> <p>Capacity Management, Sequencing and Scheduling”.</p>

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SUPPLY CHAIN STRATEGY AND SUSTAINABILITY

Course Objective	<p>“This module is intended to provide you with a sound foundation to the course by introducing the main concepts and principles that underpin Logistics and Supply Chain Management, including the important issue of sustainability.</p> <p>The module is called ‘Supply Chain Strategy & Sustainability’ and presents the fundamental principles of contemporary logistics and supply chain management within a business context. This unit will explore the ways in which good practice in these fields can contribute to achieving sustainable competitive advantage. Overarching aspects of Supply chain sustainability are explored, such as corporate responsibility, ethics and reverse logistics. Further the Global Supply Chain Game will enable you to understand through an interactive and competitive business game the principles of building an efficient global sourcing and supply chain under conditions of uncertainty so as to achieve high levels of profit and product availability.</p> <p>Global marketplaces are characterized by shortening product life cycles, increasing product variety, and highly variable demand that is difficult to forecast. The module explores how the competitive landscape is constantly changing, and the role of logistics and supply chain management in meeting the challenges raised. Research from CLSCM faculty is integrated with our own case studies, originating from a network of companies in a range of sectors to demonstrate particular concepts around agile and lean supply chains”.</p>
Learning Outcomes	<ul style="list-style-type: none"> • “Analyze and debate the basic principles underlying logistics and supply chain management and the potential impact on a focal firm’s competitive position and its performance. • Distinguish evolving supply relationships from arm’s length to Joint Ventures and explain the potential roles of co-ordination and collaboration. • Propose approaches to measuring the lead-time gap and formulate ways to improve it, based on an understanding of the importance of time as a strategy in supply chains. • Prepare the five main steps for the implementation of lean thinking, identify the seven deadly wastes and propose tools and techniques to reduce waste in the supply chain.

	<ul style="list-style-type: none"> • Distinguish the different characteristics of agile supply chains, identify pre-conditions to agility and propose capabilities and practices to improve supply chain agility. • Formulate different approaches to providing high product variety depending upon the customer requirements in terms of customer service and product customization. • Prepare key aspects of a customer responsive supply chain strategy, which go beyond the idea of lean and agile supply chains, given service and demand profiles. • Propose approaches to supply chain integration, both internally and externally, and debate possible effects on firm performance. • Understanding and critical awareness surrounding the concepts of sustainable development. • Conceptual understanding and critical awareness of emerging supply chain sustainability models on reverse logistics. • Understanding and critical awareness of corporate responsibility and ethics. <p>On completion of the Global Supply Chain game students will:</p> <ul style="list-style-type: none"> • Understand the principles of building a competitive global sourcing and supply chain network and the interaction between the elements of the network. • Understand how such a network is managed in the design and operation of supply networks.”
<p>Course Content</p>	<ul style="list-style-type: none"> ➤ “Supply chains and competitive advantage introduces the principles of logistics and supply chain management and the potential impact on a focal firm’s competitive position and its performance. ➤ Supplier relationships covers the different types of supplier relationships from arm’s length transactional to Joint Ventures, explores the nature of collaboration between supply chain members and supplier networks. ➤ Managing the lead-time frontier provides a brief history of time as a strategy in industry, and explains how to measure and improve lead-time gap as measured by the production: demand time ratio. ➤ The contribution of Just in Time and Lean thinking describes the five main steps for the implementation of lean thinking, identifies the seven deadly wastes and a number of tools and techniques to reduce waste in the supply chain. ➤ Agile supply chains are necessary to thrive in volatile demand situations experienced in many markets today. This session compares and contrasts agile with lean, provides a framework for agile supply chains, including capabilities and practices to improve agility. ➤ Variety challenge focuses on proliferating product ranges and strategies that can be employed to deal with this, such as mass customization, form postponement and design for the supply chain.

	<ul style="list-style-type: none"> ➤ Segmented supply chain strategy explores how supply chain strategy can be differentiated to meet different customer and market needs. ➤ Integrating the supply chain explores internal integration between functions and external integration between supply chain members, integrations effect on firm performance and how it can be improved. ➤ Introduction to supply chain sustainability concepts and management. ➤ Managing reverse logistics & producer responsibility. ➤ Thinking strategically, corporate responsibility and ethics. ➤ Supply chain challenges and opportunities into the future gives you a chance to research and present a number of themes including corporate social responsibility, humanitarian logistics, collaborative opportunities to accelerate time to market, increasing servitisation of products and step changes in logistics costs. ➤ Global Supply Chain Game ”
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FREIGHT TRANSPORT

Course Objective	<p>“The Freight Transport module provides a sound foundation in road, rail, air and sea freight transport. The focus is primarily from a user perspective in order to provide a logistics and supply chain management viewpoint. However, in road freight, the module also covers more detailed fleet management and operational</p>
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	<p>aspects, recognizing that many organizations operate their own road transport fleets but also reflecting the importance of road freight as the primary inland freight mode in most geographies for national traffic. “</p>
<p>Learning Outcomes</p>	<ul style="list-style-type: none"> • “Categorize and critically discuss modal attributes, operational issues and market structures for different transport modes. • Construct and apply freight transport cost models and assess the cost/service trade-offs inherent in the proposed transport solution. • Recognize and calculate the impact of lead/transit time on overall supply chain efficiency and effectiveness. • Estimate the breakeven point between modes where distance is the determining factor. • Evaluate and choose between the different transports modes and combine them with other elements to form an efficient and effective supply chain. • Plan and construct manual and computerized routes and schedules in a single depot environment and determine the impact of constraints on vehicle productivity.”
<p>Course Content</p>	<ul style="list-style-type: none"> ➤ “Freight transport in the supply chain ➤ Container shipping ➤ Ports ➤ Freight forwarding and shipping documentation ➤ Air freight ➤ Rail freight ➤ Intermodal rail freight case study ➤ Road freight (regulation and markets) ➤ Road freight (vehicle selection, costing and financing) ➤ Road freight operations (productivity and constraints) ➤ Road freight resourcing planning and routing and scheduling ➤ Modal freight exercise ➤ Module debriefing”

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LOGISTICS OUTSOURCING

Course Objective	<p>“The outsourcing of logistics has developed rapidly over the last ten years. The 3PL (Third party Logistics) providers have become part of a very competitive and dynamic industry. The overall aim of this elective is to take you through the various aspects related to selecting (tendering) and working with a third party logistics contractor. Additional aspects, covering the development of new logistics outsourcing business models (Fourth Party Logistics- 4PL), will also be covered.”</p>
Learning Outcomes	<ul style="list-style-type: none"> • “Describe the relative advantages and disadvantages of outsourcing logistics operations. • Apply a tendering framework to a logistics outsourcing process and to construct a tender evaluation tool. • Develop meaningful key performance indicators and describe their role in on-going contract management. • Describe and apply the different contractual types with respect to 3PL outsourcing and the new emerging business models.”
Course Content	<ul style="list-style-type: none"> ➤ “The development of Third Party Logistics. ➤ 3PL Contractor Selection Framework Tender Evaluation. ➤ Implementation and Contract Management. ➤ Contract Management and Dispute Resolution. ➤ New logistics outsourcing business models.”

RETAIL LOGISTICS

Course Objective	<p>“Over the past decades, retailers have increased their power in the supply chain becoming key chain members and dominating a range of logistics activities. A detailed analysis of the retailers’ logistics activities will expose and analyze these issues.</p> <p>Thus, the aim of this module is twofold. Firstly it aims to provide an overview of the breadth of Retail Logistics operations in modern retail organizations. This involves raising awareness and understanding of the key strategic issues involved in the way retail organizations manage their logistics activities and facilities within and beyond the firm boundaries. Secondly, the course aims to provide participants with an understanding and appreciation of the key contemporary trends in retail logistics.”</p>
Learning Outcomes	<ul style="list-style-type: none"> • “Reflect and evaluate the activities, functions and processes associated with managing the Retail Logistics operations. • Assess critically the significance and application of Retail Logistics theories, concepts and frameworks in the broader context of the retail organization in its competitive and changing environment. • Discuss and explain the strategic role of logistics operations for retail firms. • Demonstrate an understanding of the key trends that have an influence and impact on modern Retail Logistics operations.”
Course Content	<ul style="list-style-type: none"> ➤ “Retail buying and retail procurement. ➤ Retail transportation & retail warehousing. ➤ Efficient Consumer Response, Quick Response. ➤ Customer Service and Out-of-Stocks. ➤ Retail supply chain performance measurement. ➤ Information technology in the retail supply chain. ➤ Sustainability practices in retail logistics.

	<ul style="list-style-type: none"> ➤ Evolution of retail supply chains. ➤ Omni channels / Key future trends. ➤ Global Retail Logistics.”
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SUPPLY CHAIN CONCEPT

Course Objective	<p>“This module explores how the competitive landscape is constantly changing, and how the role of logistics, procurement and supply chain management in meeting the challenges raised. It also discusses the ways in which good practice in supply chain management can contribute to achieving sustainable competitive advantage.</p> <p>Fundamental supply chain theories are integrated with our faculty’s research outcomes and case studies, originating from a network of companies in a range of sectors, to demonstrate particular concepts around supply chain strategies. The taught supply chain concepts and strategies will be then exercised in a supply chain simulation game, designed based on clothing global supply chains. Throughout the simulation you will take on the role of managing the supply of products into a European fashion business, which involves various sourcing, inventory, logistics, transport, distribution, and financial decisions. This module also includes some sessions on statistics and data analysis and manipulation which will help you develop essential skills for use in later modules of the MSc.”</p>
Learning Outcomes	<ul style="list-style-type: none"> • Supply chains and competitive advantage. • Matching supply with demand. • Lean thinking. • Agile supply chains. • Variety challenge. • Integrating the supply chain. • Purchasing and supply relationships. • Supply chains of the future. • Introduction to statistics.

	<ul style="list-style-type: none"> • Manipulating and analyzing logistics and supply chain data.
<p>Course Content</p>	<ul style="list-style-type: none"> ➤ “Identify the factors that enable logistics strategy to contribute to overall competitive strategy. ➤ Explain how supply capabilities can be and are differentiated in order to meet different demand characteristics ➤ Apply ‘lean’ and ‘agile’ philosophies either separately or in combination to develop a logistics strategy ➤ Compare different supply chain and product design strategies which can support high product variety while minimizing lead time and cost penalties ➤ Evaluate how better supply chain integration internally and externally can reduce loss in value in terms of time, cost and quality ➤ Assess the factors by which supply relationships can be matched with supply strategy ➤ Understand how Microsoft Excel can be used for detailed data analysis in the supply chain area ➤ Understand the importance of data analysis for identification of areas for improvement in the supply chain ➤ Apply a variety of commonly used techniques for supply chain analysis using Microsoft Excel”.

SUPPLY CHAIN DESIGN

<p>Course Objective</p>	<p>“Focusing on the design and redesign of supply chains and the associated principles involved in developing supply chain strategy, this module advances your skills in developing practical frameworks for formulating designs, and reviewing tools and techniques available for use in re-engineering the supply</p>
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	chain process as well as its physical network design.”
Learning Outcomes	<ul style="list-style-type: none"> • “Apply process mapping tools for supply chain re-design. • Employ a practical framework for undertaking the planning of supply chain strategies • Evaluate alternative improvement opportunities within the supply chain. • Assess the cost drivers within a supply chain process. • Understand the latest trends in supply chain management and their importance to the integration of the supply chain. • Use advanced spreadsheet skills to optimize physical networks. • Assess key criteria when optimizing a physical network. • Understand the application of commercial packages within the field of supply chain design.”
Course Content	<ul style="list-style-type: none"> ➤ “A systematic approach to supply chain re-design. ➤ Poster session (poster presentations by participants) ➤ Time based mapping and time compression. ➤ Process mapping. ➤ Supply chain process re-design Toolbox Time compression case study. ➤ Supply chain strategy review/framework. ➤ Alternative supply chain modelling approaches. ➤ European case study (Portuguese papers). ➤ Depot location model and CAST logistics demonstration. ➤ Understanding supply chain costs and the cost to serve method. ➤ Gaining transparency and simple techniques for managing supply chain process re-design projects and the change they generate. ➤ This module also starts to prepare you for your academic thesis development.”

SUPPLY CHAIN OF THE FUTURE

Course Objective	<p>“This module addresses the skills required to implement supply chain activities that will enhance the business. It focuses on the key leadership skills required to create a positive environment for managing change projects and will include a bespoke campaign for change that can be applied in the organization.</p> <p>You will develop an understanding of the impact of change on both individuals and the organization and the key role that leadership plays in making change successful. You will understand how change can be effectively implemented and appreciate the dynamic components of the organization, appreciating how supply chain effectiveness depends on a balance of these factors.</p> <p>You will also develop a clear understanding of the relationship between the concept of sustainable development and supply chain operations. Moreover, you will gain an understanding of the design and management of reverse logistics operations through best practice case studies.”</p>
Learning Outcomes	<ul style="list-style-type: none"> • “Explain how the tenets of sustainable development relates to supply chain operations • Assess the economic and societal impacts of unsustainable practices • Evaluate the impact of change on individuals and organizations • Design change management programs • Employ appropriate leadership styles and tactics • Manage effective leadership in change projects”
Course Content	<p>“Supply chain leadership and organizational management:</p> <ul style="list-style-type: none"> ➤ Managing change in organizations ➤ Change frameworks

	<ul style="list-style-type: none"> ➤ Preparing a campaign for influence ➤ The role of leadership <p>Sustainable supply chains:</p> <ul style="list-style-type: none"> ➤ Definition and overview of sustainable development and sustainable supply chain management ➤ The business case for managing sustainably ➤ The implications of sustainable development on supply chain design ➤ Modelling the supply chain carbon footprint and carbon abatement strategies ➤ Environmental issues and management including the emerging discipline of biodiversity and eco efficiency ➤ Measuring, reporting and improving performance for sustainable supply chain management”.
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NEGOTIATION AND CONTRACT MANAGEMENT

Course Objective	<p>“The aim of this module is twofold. Firstly it aims to help participants develop knowledge, skills and confidence in managing negotiations. This involves understanding the principles of negotiation, getting an opportunity to practice them and obtaining feedback on their performance. Secondly the course aims to provide participants with an understanding how to manage contractual relationships throughout their lifecycle, from negotiation through to contract termination.”</p>
Learning Outcomes	<ul style="list-style-type: none"> • “Identify and evaluate the process and approaches to negotiation. • Effectively prepare for and take part in a negotiation.

	<ul style="list-style-type: none"> • Understand the impact of interpersonal relationships on negotiation and contract management. • Discuss and explain the key principles of legally binding agreements. • Discuss and explain the lifecycle of a contract. • Demonstrate an understanding of how to manage contracts.”
Course Content	<ul style="list-style-type: none"> ➤ “Principles of negotiation ➤ Process and structure of negotiation ➤ Negotiation practice sessions (Role-play) ➤ The lifecycle of a contract ➤ Managing contracts ➤ Legal aspects of contracting”

INFORMATION SYSTEM AND e-BUSINESS

Course Objective	<p>“To provide theoretical and practical knowledge about: The value of information and the role of information systems (IS) for supply</p>
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	<p>chain management.</p> <p>The opportunities provided for the supply chain management operations of companies by applying the information systems, and also the challenges that they will have when implementing the information systems.</p> <p>The role of information systems in e-business and the impacts of e-business on supply chain management of companies.”</p>
<p>Learning Outcomes</p>	<ul style="list-style-type: none"> • “Assess the value of information for managing supply chains and recognize the importance of managing information including information quality and data sharing. • Critically evaluate and identify the appropriate information systems required for supporting different functions related to managing supply chains of companies. • Identify the potential opportunities provided by implementing new information systems required for supporting different functions related to managing supply chain of companies. • Recognize and analyze the potential opportunities provided by implementing new information systems for supporting the internal and inter-organizational supply chain operations of companies. • Analyze the potential difficulties of implementing inter-organizational information systems for managing supply chains and the solutions for solving such issues. • Formulate the processes for implementing internal and inter-organizational information systems. • Evaluate appropriate e-Business solutions for supply chain problems. • Recognize and analyze the opportunities and challenges made by development of e-commerce, considering the role of ICT in online selling. • Analyze and practice the applications of data standards in supply chain management systems.

**Course
Content**

- “The value of information for supply chain management
- The ICT landscape across the supply chain; Capturing and sharing information in SC
- The role of information technology in business
- Identifying technology-enabled business change opportunities
- Ensuring benefits realization from technology-enabled business change investments and agile development
- ERP systems
- E-Commerce 1
- Quality of SC data
- Collaborative Tracking and Tracing
- How the future of logistics ICT will look like; Group assignment introduction”.