

A Study on the SCM Strategies of Mobile Phone Market in Europe

A Master's Thesis submitted for the degree of
“Master of Business Administration”

supervised by
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Affidavit

I, **KWANG SOO CHAE**, hereby declare

1. that I am the sole author of the present Master's Thesis, "A STUDY ON THE SCM STRATEGIES OF MOBILE PHONE MARKET IN EUROPE", 75 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and
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Abstract

The ultimate purpose of this study is to present the factors that mobile manufacturing companies should consider to build SCM strategies suitable for the European market through theoretical and empirical research.

Companies face a situation where they must continuously improve their innovation-related capabilities to maintain a competitive edge within a dynamic market. Effective SCM operations, along with advanced technology development strategies, differentiated marketing strategies are one of the main functions enabling innovation in companies.

Nevertheless, many companies still find it difficult to shape their SCM strategies in a rapidly changing market. In particular, industries that do not have a long history of the market, such as mobile products, and the importance of the online market is rapidly increasing, have a high level of difficulty. Companies have difficulty devising SCM strategies because the environmental factors of the various components that make up the SCM continue to change.

This study deals with the SCM overall flow from an integrated perspective to partially review the components of the SCM. It also deals with the characteristics and impact of European markets and mobile products on SCM operations. Besides, the generalized concept of innovation, Postponement Strategy, addresses the prerequisites and factors that need to be improved when companies are willing to apply it.

Keyword: SCM, Supply Strategy, Innovation, Mobile Phone

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To Seoyoung and my family for their love and support.

Kwang Soo Chae

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1 Introduction

1.1 Research Background and Objective

In the late 2000s, the mobile market was dominated by feature phones but showed remarkable growth with the advent of smartphones. With the considerable growth potential of smartphones, hundreds of electronics manufacturers have continued to invest in technology, taking over companies with new technologies. Moreover, as related technologies, including network infrastructure and semiconductors, grew simultaneously, mobile became a high value-added product. The mobile market has risen steeply, as many electronics makers have predicted. According to the data surveyed, the number of mobile phones sold to the global market stood at about 122 million a year in 2007. However, 10 years later, in 2017, the number of mobile devices sold on the global market grew by 12.6 times to about 1,537 million. Simultaneously, the continued investment in technology by large electronics manufacturers has gradually raised the function of mobile products, leveled among competitors, and companies with slow technology growth have steadily lost market share. In 2017, 74.7% of the mobile market by revenue was occupied by the top three mobile manufacturing companies, forming a fierce competition structure. Since 2017, the mobile market has dropped out of its growth trajectory over the past decade. Mobile sales from 2018 to 2019 have remained at $\pm 2\%$ compared to 2017. Because of this situation, the top three mobile manufacturers, which hold about 75% of the market share, are implementing multiple strategies to gain even more share. Externally, the company shortens the replacement cycle of the model to sell more products, protect the title of the "new model," and internally focus on cost structure

improvement activities to increase profits and innovation activities to improve operational efficiency.

1.1.1 Importance of SCM(Supply Chain Management) Strategy

From the company perspective, there was a period before 2017 when supply was unable to keep up with demand. Besides, the company's management perspective was focused on the production and sales sectors. Increased production, consolidation of production brought direct efficiency to the business, increased sales, and increased market share where the measures to evaluate the company's performance. As the size of the market expanded over time, as consumers' individualization and diversification grew, the entity was required to sell a broader spectrum of multivariate small-volume products. This change in the market has led to a surge in high-frequency, small-volume deliveries while demanding higher flexibility levels from manufacturers. Significant increases in logistics volume and lack of supply flexibility have led to problems such as an imbalance in supply and demand and increased logistics costs. As a result, it has become more critical for companies to deliver quality products efficiently, unlike in the past, when providing quality products at a low cost was at the core of their competitiveness. Until now, the concept of the logistics sector and logistics cost, which had been considered only targets for cost reduction, began to be recognized as an active concept for reducing lead time, improving productivity, and curbing inventory burdens in response to various needs of customers. The importance of the SCM strategy is gradually increasing in this era when the growth curve in the mobile market stops growing, top predators in the market narrow to a handful of manufacturers, and competition among mobile manufacturers is intensifying. Companies are

trying to establish a dedicated department to plan SCM strategies that can generate real performance and value and develop SCM strategies exclusively for mobile products.

1.1.2 Feature of the European Mobile Market

Europe is the third-largest market in the global consumer electronics market. According to the data, the United States and China ranked first and second with \$220 billion each in the global market of \$980 billion as of 2017, with Europe accounting for about 22% of the total with \$210 billion. In the overall consumable electronics market, mobile is an overwhelming \$480 billion, accounting for about 49 percent of the total. (No. 2 PC products are \$170 billion, and No. 3 TV products are \$120 billion.) It is clear from the company perspective that we should focus on the mobile market in Europe. However, in terms of product sales and supply, the difficulty of the European market, which consists of 44 countries, is significantly greater than that of other regions. There are three reasons why supply difficulty is great in the European market:

① Absence of Manufacturing Plant (Geographic Elements)

At present, the top three mobile manufacturing companies all have major production bases in China and Vietnam, which is due to efforts to minimize costs. Supply flexibility is somewhat low for relatively distant US and European markets, and logistics costs are relatively high. Efforts are being made to expand production bases in India, South America, and Africa, but most of them are in the form of Semi-

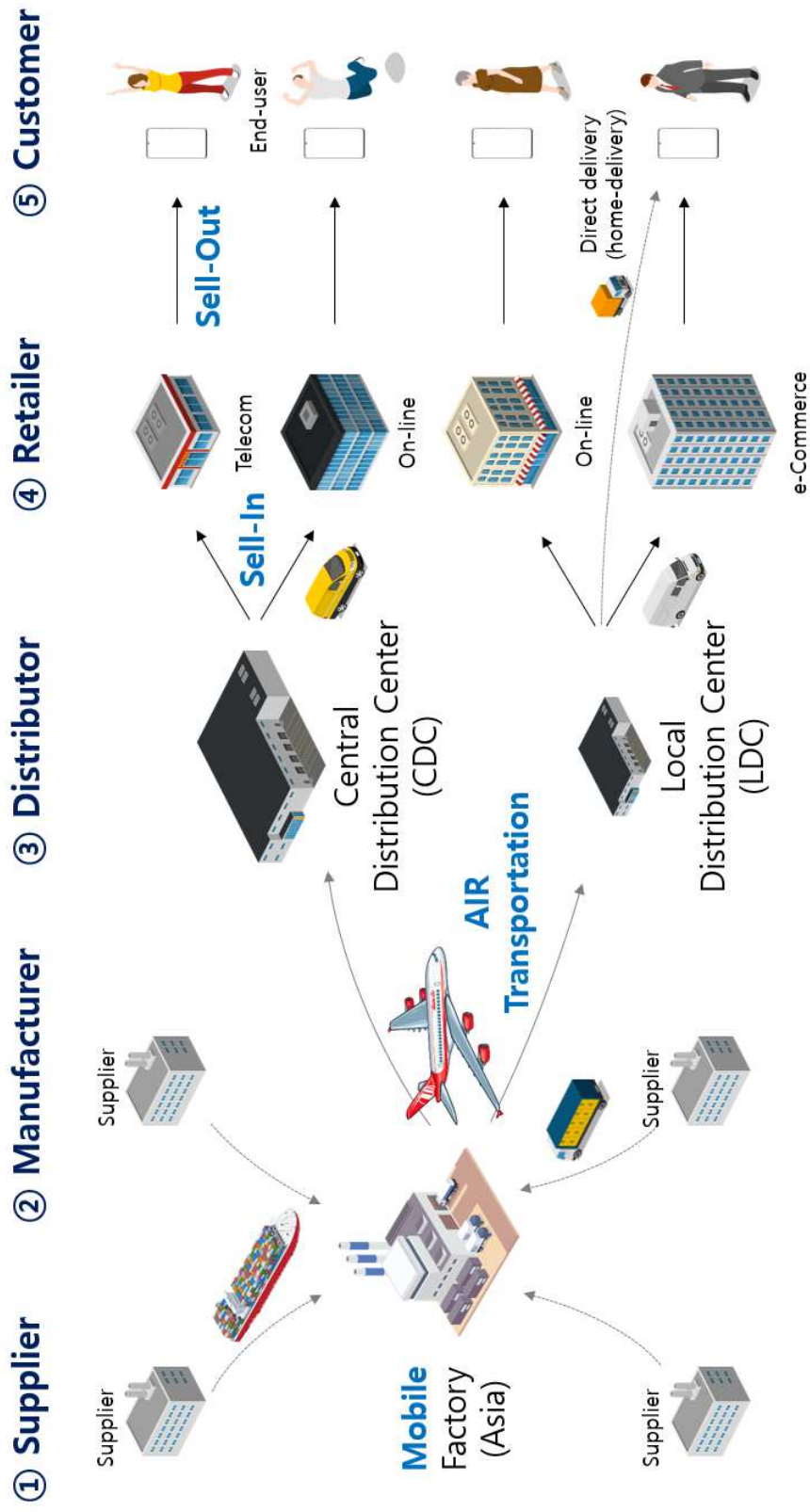
Knockdown (SKD) and supply only to the country's domestic market concerned as a strategy to minimize some taxes.

② Complexity of physical delivery (Geographic + Customer elements)

Most mobile manufacturing companies supply products to all 44 countries in Europe and operate in various forms, including small offices, national branches, and operations of the Europe head office. There are also multiple sales channels. It is sold on a variety of routes according to its customers' needs, including retail sales through its stores, home delivery through carriers, online sales through its online shops, and online sales through pure e-Commerce players. The warehouse location of the client company located by country and the product delivery cycle requested from the customer is closely related to the mobile manufacturing company's SCM operation strategy.

③ Complexity of model operations (Customer elements)

The language required by each country must be included in the product, and it requires a relatively large number of Stock Keeping Units (SKUs) compared to the US and Asian markets due to the different regulations and policies. In other words, a strategy is needed for multivariate small-volume supply.



<Figure 1. Typical SCM Flow for Mobile Phone Manufacturers>

1.1.3 Purpose of Research

With the expansion of globalization, barriers to resource movement among countries have been lowered, and an environment is beginning in which companies can upgrade their supply functions at the same time as the interdependence between countries increases. Companies can gain a competitive edge by securing a more comprehensive range of vendor pool, and in terms of manufacturing and SCM, a more global strategic implementation is essential. However, in a rapidly changing mobile market environment due to excessive competition, mobile manufacturing companies have yet to break away from sales-oriented operations. Most companies either do not have a clear supply strategy, or they have difficulty in strategic approaches. Most mobile manufacturing companies remain at the stage of imitating SCM strategies for TV and PC products with relatively long market history, and there is no systematic and proven theory of mobile SCM strategies. Mobile products are the fastest-growing products in the last 10 years and represent a large market that has stopped its growth trend due to the market situation and requires new changes at the same time. It would be a meaningful study to devise a mobile product SCM strategy in the European market, where complexity and diversity exist in combination. The research was conducted to present the direction of the SCM strategy to companies from a mid- to long-term perspective, and the purpose of the European mobile market-based study was to propose developmental implications that could have a positive effect on smaller portable products, especially AI-related products, and other areas such as the US.

1.2 Major research question and research method

Two dependent questions are selected as follows, and the research is conducted based on them.

1.2.1 Key Question and Dependent Question

Companies face a situation in which they must continuously improve their innovation-related capabilities to maintain a competitive edge within a dynamic market. Effective SCM operations, along with advanced technology development strategies, differentiated marketing strategies are one of the main functions enabling innovation in companies. Companies can create practical operational effects through advanced SCM operations, such as sharing sales data, exchanging demand information, and establishing an integrated plan. Improvements in SCM operations suitable for the company's products and environment create effects such as reducing uncertainty, reducing excess inventory, improving customer service, and reducing lead time, thereby reducing operating costs. (Matthias Holweg & Frits K. Pil, 2008, p. 389-406)

Yet many companies still find it difficult to shape their SCM strategies in a rapidly changing market. In particular, industries that do not have a long history of the market, such as mobile products, and the importance of the online market is rapidly increasing, have a high level of difficulty. Companies have difficulty devising SCM strategies because the environmental factors of the various components that make up the SCM continue to change. To devise companies' technology development strategies, the company analyzes and predicts its development rhythm by adjusting the investment

amount and timing and adjusting the scope of investment according to the business expansion plan. For the marketing strategy part, rather than focusing on changes in internal factors, it tends to devise marketing strategies that take into account competitors' strategies based on sales performance analysis activities. In essence, the SCM activity of a company is a flow that connects between the initial product planning and sales phases of a product, and all the elements that make up this chain influence the performance of SCM operation. Innovation in SCM operations also requires improvement in how each element is operated, but that is only a part. The innovation of the whole chain requires an approach from a comprehensive perspective that clearly allocates the functions of each component that constitutes the chain, and at the same time, can improve the entire SCM flow structurally, taking into account the interactions and influences between the elements. For example, the goal of enhancing inventory operations is to save a company's operating costs by reducing inventory. However, from the SCM's point of view, that goal can be slightly different. Ultimately, understanding how inventory reduction activities affect the manufacturing, logistics, and sales phases and combining each element's strengths and weaknesses to form the most advantageous strategy for the entire SCM is a comprehensive and analytical perspective required for true SCM innovation.

The ultimate purpose of this study is to present ideas that can contribute to the improvement of the interests of companies participating in the supply chain by establishing efficient operational processes through strategic SCM operations. (Khawaja A. Saeed et al., 2011, p. 7-42) This research deals with the SCM overall flow from an integrated perspective to partially review the components of the SCM. To grasp the European market characteristics, it deals with the differences and intersections between the SCM operation method of large home appliances with a relatively long history and the SCM operation method of mobile, a small product. Besides, by conducting a

comparative analysis based on differences and intersections, we study the SCM elements that only mobile products have and their characteristics and their impact on SCM operations. Besides, the generalized concept of innovation, Postponement Strategy, addresses the prerequisites and factors that need to be improved when companies are willing to apply it.

- ① **In terms of SCM operations, what are the features and differences that only the European mobile market has? How do those factors affect the operation of SCM?**

- ② **What prerequisites do companies running the entire SCM process need to apply Postponement Strategy effectively? What are the possible effects and limitations of implementing Postponement Strategy?**

1.2.2 Research Method

The primary direction of this study aims to analyze various perspectives on the changing environment comprehensively. It was conducted through semi-structured interviews, one of the types of qualitative research, to derive innovative ideas and pursue more future-oriented strategies. The emphasis was placed on linguistic information rather than numerical information to maximize the quality of information and ideas.

According to a study by Galletta & Cross, the role of researchers in executing Semi-structured Interviews is of paramount importance. When performing Semi-structured Interviews, it is the primary role of the researcher to encourage maximum interaction by reflecting the character of the researcher

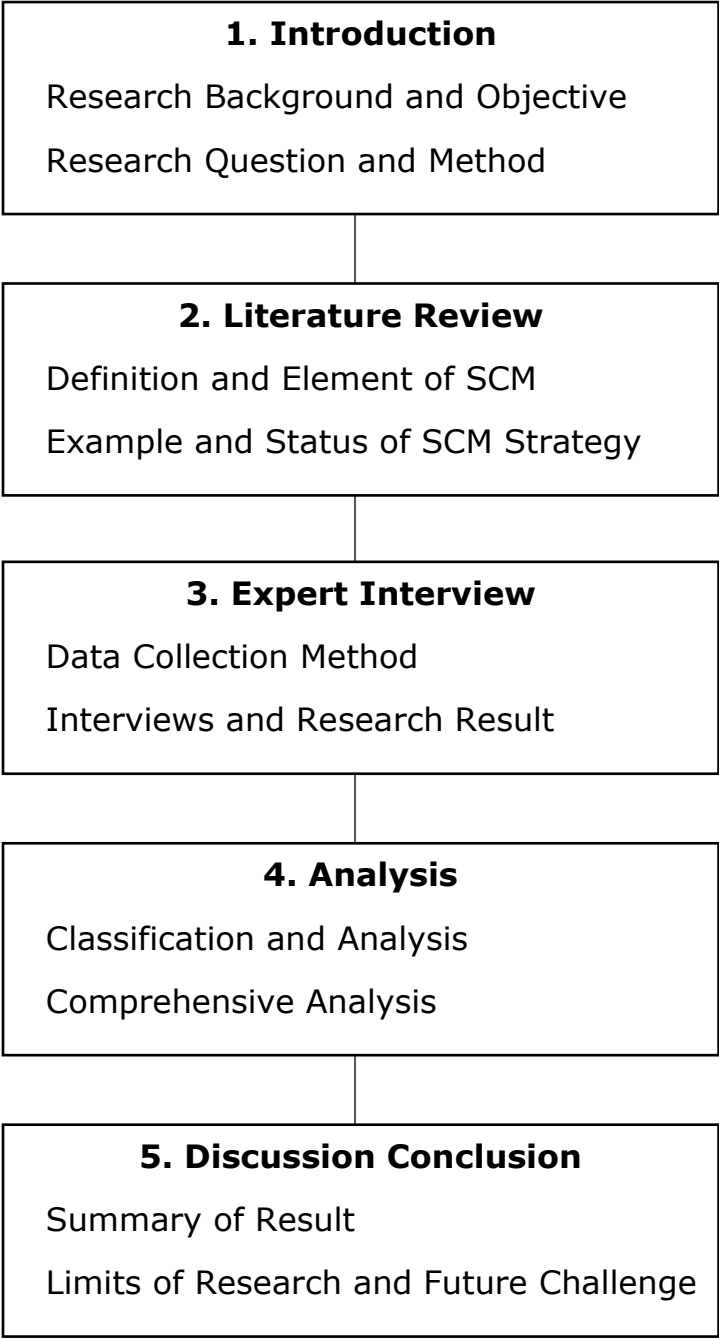
and interviewees. In some cases, they can ask each other questions, rewrite questions, and make various changes. These are frequently emphasized factors in qualitative research and can lead to more creative results. In the process of collecting data through interviews, efforts should be made not to excessively induce interviewees to hypothetical results to collect trends in outcomes. The researcher should also try not to lose the sensitivity of the interview content. Galletta & Cross emphasized two things about setting the interview direction: the first is to find a starting point for coming up with ideas by focusing on the data provided by interviewees that require further interpretation. The second is to place a hold point in the middle of each interview to help interviewees reflect on themselves at any time and not deviate from the subject itself. (Anne Galletta, 2013, p. 75-79)

According to Longhurst's explanation, Semi-Structured Interviews can be used in various studies, creating a natural environment and being used with various methodologies in the form of informal dialogue. Semi-Structured Interviews are more than just 'Chats', and researchers should select interviewees and fill out questions with an awareness of their power relationships with interviewees involved in qualitative research. (Robyn Longhurst, 2010, p. 103-105)

Based on the semi-structured interview format, interviews were initiated with the same topics and questions from experts in each pre-selected field, and efforts were made to open the experts' interpretations and ideas to the fullest extent possible. Attempts were made to gain insight to present SCM innovation by expanding the association among the ideas drawn.

1.3 Composition of Research

The composition of the research is as follows.



<Figure 2. Composition of Research>

2 Literature review

2.1 Definition of SCM

The definitions of the SCM have changed naturally with the passage of the times as the elements of emphasis have changed. The biggest reason for the change is the development of technology, the development of technology has brought about changes in products, and the change in products has caused changes in the market. Products that used to form the market gradually disappeared, and new types of products dominated the market, while the flow of demand between products changed, and the rhythm of the market changed. The development of technology also contributed to the development of logistics technology. The real travel time required for the transport of products or services was gradually reduced by the development of transportation and the development of systems. The storage and classification techniques in the operation of warehouses were steadily enhanced. These environmental changes have changed the criteria for the definition and conceptual interpretation of the SCM, and have also altered the criteria's importance. The general meaning of SCM is a management activity that includes the supply of necessary raw materials through a calculated demand forecast that reflects consumer needs, the flow of goods from the production process to the end consumer, and the follow-up of returns, recalls, disposal. However, there is undoubtedly room for various interpretations. In the market, numerous new products are always sold to multiple customers. Each company operates a manufacturing-production-transport-sales flow in a way that can generate the best efficiency. There is a distinction in how companies interpret the SCM and what they focus on within the SCM strategy in given circumstances. Several preliminary studies

were conducted to establish the concept of SCM more clearly and clarify its principles to maximize operational efficiency and business performance, as follows:

Thomas & Griffin defined SCM as a kind of strategy to increase the efficiency of the supply chain by comprehensively managing the flow of logistics, information, and funds between each sector of the supply chain, and analyzed separately from the perspective of Operation Planning and Strategic Planning. Operation planning interpreted SCM in terms of quantity and scale by dividing it into three categories: Buyer-Vendor coordination, Production-Distribution coordination, and Inventory-Distribution coordination. As an element of strategic decision making for efficient utilization of SCM from the perspective of Strategic Planning, the operation status of Plant and Distribution Center, the operation status of manufacturing facilities and Capacity, and the selection of new product manufacturing locations were presented. (Douglas J. Thomas & Paul M. Griffin, 1996, p. 1-6) To sum up, the definition of Thomas & Griffin is a case of interpreting SCM in the form of some added strategic perspective while retaining traditional concepts.

Cooper & Lambert approached the definition of SCM from a traditional purpose perspective. They defined SCM as all of the approaches involved in maximizing the efficient use of resources to achieve customer service objectives. Their framework was described as a triangular structure consisting of Business Processes – Management Components – Supply Chain Structures. (Martha C. Cooper & Douglas M. Lambert, 1997, p 2-6)

Over time, many studies have been interpreted from a strategic perspective and a traditional perspective to distinguish the concept difference between the existing Logistic activities and the SCM and to utilize the SCM as a more advanced management strategy. Bechtel & Jayaram defined SCM as a

principle to optimize the flow and activities of information from raw materials to delivery to end consumers to satisfy customers. They also explained that SCM is similar to a kind of business ecosystem concept that examines the interconnection between crucial processes within the company, and emphasized that managers should pay attention to strategies such as partnerships in companies where SCM is highlighted. (C. Bechtel & J. Jayaram, 1997, p. 15)

In discussing the concept of SCM, Londe & Bernard defined it as an activity that strengthens customer relationships and increases customer value economically by organically managing information related to goods from parts sourcing to consumption. (L. Londe & J. Bernard, 1997, p. 6-7)

Since 2000, SCM has been interpreted not only in terms of products but also in terms of services and information. Lambert & Stock defined SCM as integrating key business processes from suppliers to end-users that add value to customers and other stakeholders by providing products, services, and information. (Douglas M. Lambert & James R. Stock, 2001, p. 38)

Of course, even after 2000, there were still many studies defining the SCM from a traditional perspective. Apart from the trend of considering strategic SCM, this phenomenon is inferred from the view that SCM must be enhanced to provide continuously emerging new products and new services stably and desirably. For example, Giannoccaro & Pontrandolfo defined SCM as aligning inventory policies adopted by different supply chain entities, such as suppliers, manufacturers, and distributors. They also explained the purpose of the SCM to facilitate material flow through inventory adjustments, minimize costs, and quickly meet customer demand, thereby creating and delivering value for the end customer. This interpretation is a process-oriented approach that interprets the design, management, and control of

the supply chain from an integrated perspective. (I. Giannoccaro & P. Pontrandolfo, 2002, p. 153-154)

Simchi-Levi and colleagues defined SCM as a strategy to manage all supply-related chains sourced from suppliers to manufacturers, carriers, distributors, and consumers to minimize the cost and time spent on distribution and to help them make decisions that suit their interests. (D. Simchi-Levi & P. Kaminsky, 2007, p. 1-8)

Some studies have argued that the introduction of strategic SCM is also required in service industries such as hospitals. Fantazy and colleagues defined SCM as an integrated approach to planning and controlling the flow of raw materials, production, logistics, services, and information from product or service suppliers to producers and end customers and argued that it was the most significant change in recent management activities. They also analyzed the impact of SCM on sectors such as Supplier/Communication/Service Quality/Financial Performance/Customer Satisfaction Performance from a strategic perspective. They explained that as competition for customer acquisition intensifies, industries that implement services directly to customers, such as hospitals, should also find a new approach through SCM to create and deliver value to customers. (Kamel A. Fantazy et al., 2010, p. 685-590)

Christopher approached the concept of SCM from a relationship perspective, which defines it as managing relationships from suppliers to customers and managing upstream and downstream relationships with suppliers and customers to provide superior customer value by operating the entire supply chain at a lower cost. Besides, SCM was described as a plan-oriented professional work intended to establish a single plan for the flow of products and information. He explained that the goal of the SCM is to reduce or eliminate inventory buffers existing between organizations in the chain

through real-time demand information sharing and management of current inventory levels. Also, he argued in the SCM that 'Network' can replace 'Chain', and that raising the value of the network is the most important view. (Martin Christopher, 2011, p.3)

From a traditional point of view, SCM can be seen as an extension of 'Physical Distribution'. From a traditional point of view, SCM aims for such effects as increased efficiency in product and service composition and reduced operating costs, enhanced logistics functions, and enhanced production processes for companies. From a strategic point of view, SCM is aimed at emphasizing partnerships and eventually creating channel values by leveraging the elements that make up the entire network called supply channels to target innovation in the process and share the vision between channels. Each prior study can be divided into operational and strategic perspectives as follows:

Author	Operational perspective	Strategic perspective
Thomas & Griffin (1996)	O	
Cooper & Lambert (1997)	O	
Bechtel & Jayaram (1997)		O
Londe & Bernard (1997)		O
Lambert & Stock (2001)		O
Giannoccaro & Pontrandolfo (2002)	O	
Simchi-Levi, et al. (2007)	O	
Fantazy, et al. (2010)		O
Christopher (2011)		O

<Table 2-1. Differences in Perspectives on SCM Concepts>

2.1.1 Change in the Definition of SCM

It is necessary to study the change of the SCM concept, starting with Logistics to study the definition of SCM more clearly. In a general view, the term Logistics was first used as a military term. The origin was 'Logistique', a French word derived from the name 'Marechal de logis' in the late 18th century, and was the name of the military unit supporting transport and supply. It is a term coined by scientifically conceptualizing military support services that require advancement at that time. (J. Tepic, I. Tanackov, G. Stojic, 2011, P. 379) At the end of the 19th century, the 'Physical Distribution' concept began to be used in the private sector in the United States. As it developed into the term 'Logistics' over time, the scope of the concept expanded. 'Physical Distribution' is a classical view that focuses on function-specific management, such as logistics cost reduction, transportation, storage, and inventory management. 'Logistics' focuses on streamlining the entire process as a broader concept than 'Physical Distribution' and aims to improve overall profitability by expanding the sales and profits of the business, including cost and efficiency by function.

Many companies currently use the term Supply Chain Management (SCM) as one of their major management strategies. In the early days when the use of the SCM term was expanding, there were cases where the differences in the concepts of SCM and Logistics differed depending on the position of the commentators. Comparative studies were also conducted to clarify the differences between the two concepts. Paul & Larson divided the concept of differences between SCM and Logistics into four groups: Traditionist, Re-labelling, Unionist, and Intersectionist. The Traditionist group defined SCM as a subconcept of Logistics and defined the activity of planning the logistics strategy portion of Logistics operations as SCM. The Unionist group defined SCM as the higher concept of Logistics as opposed to the Traditionist group.

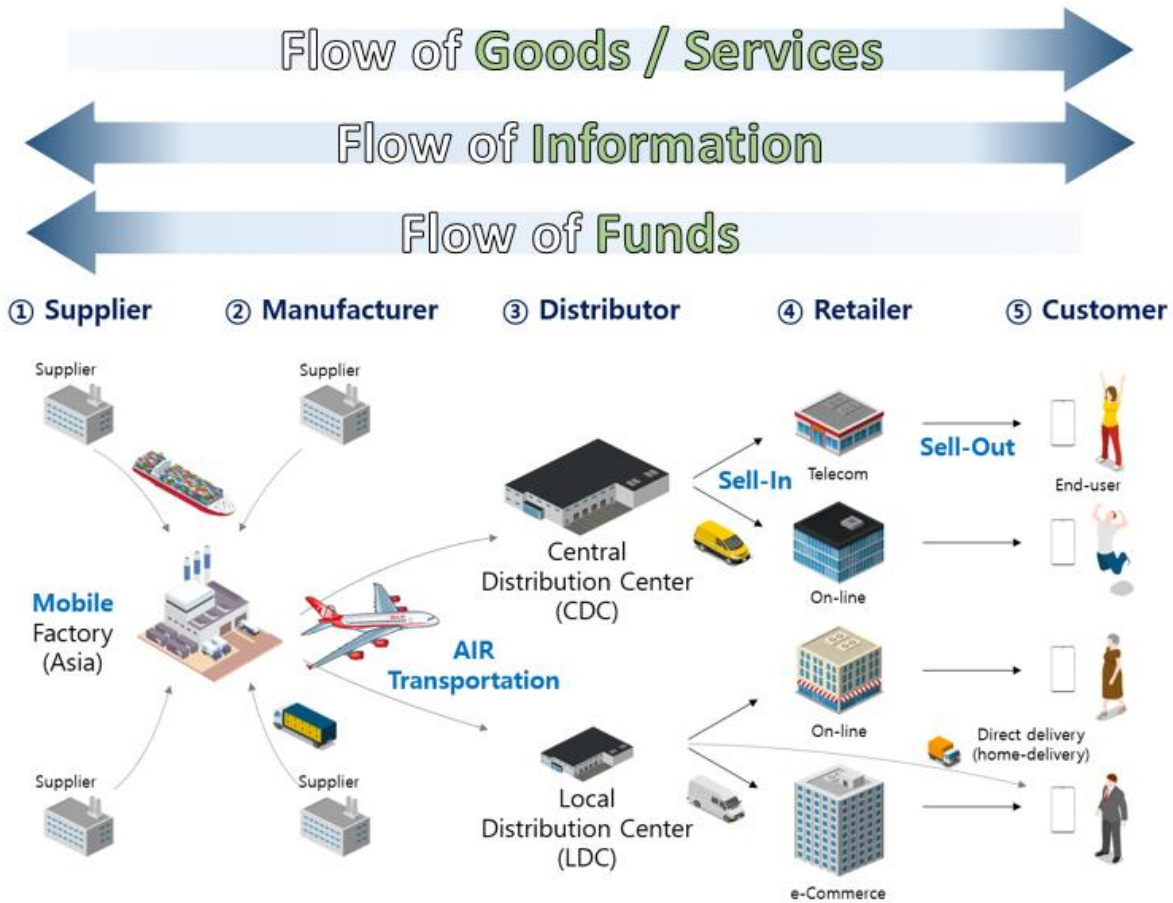
SCM was also defined as a strategic planning activity that should precede the implementation of Logistics, which determines the direction of Logistics' implementation and considers both social, political, and ethical aspects at the same time. The Re-labeling group defined SCM and Logistics as the same concept, and the terms naturally changed over time. Finally, the Intersectionist group defined SCM and Logistics as cross-concepts and interpreted SCM as a strategic planning activity that broadly crosses the entire business through the company's internal and channel for the implementation of Logistics. (Paul D. Larson & Arni Halldorsson, 2004, p. 3)

SCM and Logistics are the same concepts from the objective point of view, aiming to improve the profitability of the business as a whole through innovation in logistics interactions. However, as information sharing technology developed, the visibility of information flow was expanded. Based on this, the management method of monitoring and managing the flow of value among all stakeholders, including end-users, beyond merely managing physical transport is the way companies are currently pursuing it. While the existing concept of Logistics is described as procurement, sales, and production logistics, SCM's present concept can be defined as a broader concept in terms of including all stakeholders, including wholesalers and retailers. From this perspective, the Unionist's view of defining SCM as a higher concept of Logistics is the most commonly used concept in the present.

2.2 Element of SCM

2.2.1 Basic Element of SCM

For a company to innovate and strategic the SCM, it must first identify the elements that make up the SCM and distinguish between the roles and the flow of mutual value between the components. SCM is a structure in which elements, as the word is, are connected by a chain structure, and the elements affect each other and the whole in a mixed form rather than operating independently. (Kent N. Gourdin, 2001, p.17) SCM includes not only the flow of products but also the overall process in which companies create value based on market demand, such as information, customer value, and cash. To create the efficiency of SCM operations, the role and interaction of each element that constitutes the flow of the integrated SCM should be prioritized. It can be said that the efficiency of SCM operations is to minimize the monetary and temporal costs and movements that occur in the process of providing products, information, and value to customers. Also, the activities that generate maximum value at the same cost through re-engineering of SCM configuration and workflow can be described as innovation activities that streamline SCM operations. (Thomas H. Davenport, 1993, p. 24) The basic concepts of SCM defined by most industrial groups are similar. However, there are some differences in the flow of the SCM process, which each industry defines as general. The reason is that each industrial group has changed to achieve maximum efficiency according to its environment. In addition, the SCM process operated by each company is different because there are differences in the production structure, logistics structure, and distribution structure within the same industry. The typical SCM process flow for mobile phone manufacturers is as follows and is reconstructed using Figure 1.



< Figure 3. Flow of Goods/Services, Information, Funds in SCM >

Each of the five symbolic elements constituting the SCM process is responsible for its functions. While it is also important to have operational efficiency for each element to enhance the functionality of SCM operations, the interaction between the elements must consist of an optimized rhythm. Simply put, the links between elements that supply products and deliver information should be optimized without waste. The interrelationships between each element in terms of the overall SCM flow are as follows.

① **Interrelationship between Customer and Company**

→ **Accurate Demand Forecast**

The SCM flow and composition start with the demand from the customer. Most companies are manufacturers and distributors and want to maintain the most efficient rhythm of supplying their products or services to customers. The most efficient rhythm here means the rhythm of supplying products to customers by minimizing the waste of money in the most optimized way from the perspective of the company producing and supplying the products. The company assesses the market environment, market trends, and past sales performance in which it supplies products or services to form an optimal supply chain and, based on this, whether it can meet the needs of its customers. However, most companies are not able to maintain the rhythm they want, except in the case of exceptional companies such as demand transcends supply. Because the requirements of the customer receiving the product vary, and market demand fluctuates continuously. In typical cases, a company utilizes its existing infrastructure for stable growth. From a cost perspective, a company can leverage existing infrastructure to expand its business, thereby avoiding costly investments, increasing efficiency, and lowering the risk for its operations and market expansion. However, in terms of SCM operations, it tends to reduce the flexibility required to meet new customer needs. It can be inferred that this is due to the location of existing infrastructure manufacturing bases, supply hubs, held by the company. Supply rhythms may be required from newly discovered markets and customers that are entirely different from the supply rhythms previously maintained by the company, and the company must devise a new SCM operating strategy and system to meet them. Although there are slight differences in each industry, it is

more profitable for the company to expand its business scope and secure additional customers than to minimize waste by maintaining SCM efficiency. Against this backdrop, in the end, the company must have the flexibility to operate the SCM to meet any customer's requirements. Companies should plan and prepare in advance the necessary factors from production to supply of products to ensure the flexibility and speed of SCM operations within a limited and fixed infrastructure. After all, a supply plan through demand forecasting is an activity that a company must perform to ensure flexibility in operating the SCM. By examining market trends and analyzing trends, companies should focus on obtaining more long-term and accurate demand forecast data. The greater the visibility of demand forecasting by companies, the more cost-benefit they can secure from SCM operations.

② **Interrelationship between Supplier and Manufacturer**

→ **Rapid Information Sharing**

Manufacturing often includes the functions of production planning and purchasing and manages both short-term and long-term production plans based on the demand forecasts described earlier. Although the supplier may be a subsidiary of a company depending on its type of operation, the supplier scope has expanded dramatically as its activities and areas become increasingly global. For example, because barriers between countries were previously high, competition between suppliers to secure territory took place within the same country. However, now that barriers between countries have been significantly lowered. The exchanges between suppliers have become frequent, and their overall technological prowess has been upgraded due to

continuous exchanges. In other words, it has become an environment where the supplier can gain a competitive edge and expand its customer base at any time, depending on its technology competitiveness and price competitiveness. Due to these environmental factors, Suppliers implement continuous technology investments to gain their competitiveness. Besides, the company strives to provide customized services to maintain mid- to long-term business relationships with customers that produce final products. Given a supplier as another company, it is clear that the SCM operation form of supplier and the SCM operation of the company's managing manufacturer must be aligned to some extent to link each other to a robust chain. Although there may be differences in the complexity and scale of the products or services the manufacturer produces, in most cases, the supplier tries to provide flexible supply services in line with the manufacturer's SCM operation type. The manufacturer asks suppliers for the requirements to maintain its SCM operating strategy robustly and reliably and wants to make the most of the supplier's supply capacity to improve SCM efficiency. To sum up, the manufacturer determines the product's SCM operation strategy in the relationship between Supplier and Manufacturer. The management capacity of the manufacturer and the collaboration with the supplier determine the efficiency of the SCM. In order to induce a stable supply from the supplier and to successfully carry out the SCM operation strategy of the company, the manufacturer who manages the short- and long-term production plan must be able to communicate transparent and accurate information to the supplier. It is also necessary to collaborate so that the supplier can achieve maximum efficiency at the minimum cost by rapidly communicating to the supplier a production plan that varies in real-time with changes in

demand. Through this win-win cooperation, we can expect flexible SCM operation between manufacturer and supplier.

③ Interrelationship between Manufacturer and Distributor
→ **Observe the exact delivery schedule**

The most ideal and simple structure for SCM operation is when the distributor's activities coincide with the manufacturer's production rhythm. The distributor's activities can be defined as the physical supply of the product and are dynamic activities similar to the kind of production activities. When a product produced under an optimized SCM operation plan based on the demand forecast is delivered to the distributor, the distributor distributes and supplies the product according to the already scheduled supply schedule. Distributors, like manufacturers, should make the most of demand forecasting to ensure optimal efficiency. The performance of the distributor's production can be expressed as the capacity and delivery volume of the warehouse. Although there are differences between industries, most of the costs incurred at the distributor stage are shipping costs and warehouse operating costs. It is the traditional goal of the distributor to minimize shipping costs and warehouse operating costs. For industries that are relatively competitive in the market, companies need more advanced and strategic SCM operations. Companies try to gain greater supply flexibility, such as changing demand forecast cycles daily and introducing a system that can manage SCM flows in an integrated manner. Another way to respond to fluctuating demand forecasts is to utilize the functions of manufacturing and distribution. The demand forecast referenced by the relatively preceding unit of a manufacturer is less accurate than the demand forecast referenced by the

distributor. If it shortens the cycle of demand forecasting, the difference in accuracy becomes greater. The difference in demand forecasts occurs as much as the production lead time of the minimum manufacturer. For products with relatively longer production lead times, the accuracy of demand forecasting may decrease. At the same time, companies that perform the functions of manufacturer and distributor often give distributors more power to reflect more accurate and up-to-date demand forecasts in their SCM operations plans. Distributors can optimize warehouse operating costs and shipping costs by simultaneously considering the latest demand forecast information and the production performance of the manufacturer. It can also serve to help the manufacturer perform more stable production activities, such as maintaining a certain level of safety inventory by storing pre-produced products in warehouses. To sum up, the distributor should have more up-to-date demand forecast accuracy and grasp the overall flow of inventory and production plan quantities. The optimal supply plan analyzed by the distributor affects the pre- and post-distributor stages. Manufacturing, in particular, increases overall SCM operational efficiency by supplying the correct quantity at the right time in accordance with the production plan proposed by the distributor.

④ **Interrelationship between Distributor and Retailer**

→ **Establish a clear supply target**

In general, the retailer phase is divided into the sales phase, and the CR (Customer Requirement), a requirement of retailer and customer, takes precedence over the SCM operating strategy modeled by the company. For this reason, companies these days may operate in

combination with some stages to create an integrated operational effect in terms of SCM operations. There are two primary examples of this, the first being the integration of manufacturing and distributor, as mentioned earlier. The second is the integration of distributors and retailers, which is uncommon and requires a high level of a difficulty management system. There is a clear difference between the distributor and the retailer in terms of operational purposes. While the final goal of the distributor is to comply with the plan set according to the predicted demand, the retailer aims to go beyond the predicted sales demand. This means that when the distributor and retailer phases are integrated, the distributor will not be able to keep up with the requirements of the retailer to respond quickly to market trends. Eventually, the chain of overall SCM operations will become fragile. The distributor should play a kind of coordinator role by clearly setting its own goals taking into account the overall flow of SCM operations while taking into account the requirements of the subsequent phase retailer.

⑤ **Interrelationship between Retailer and Customer**

→ **Meeting Customer Needs**

The retailer has the most data on ever-changing market demand and trends and is the step that requires the highest flexibility to meet customer needs. For example, the factories' location is fixed, and the facility is limited for manufacturers, distributors, and suppliers. Because these constraints are factors that directly affect SCM operations, investments should be carried out with a long-term perspective. For retailers, however, there are relatively fewer location restrictions. The role of stores in retailer's activities is essential, but

relatively easy to change, which means that customers can move flexibly. In particular, physical stores' role is declining even more nowadays when the online market is rapidly increasing. Before the online market activation, stores played an overall role in the sale of products and services. However, these days they play a somewhat reduced role in giving visiting customers the reliability and experience of products or services.

As described earlier, the efficiency of interactions and practical lead times between each element can eventually increase the SCM process's effectiveness. In particular, because the partnership between each element has unique complementary capabilities, cooperation between them can create outstanding SCM operational innovation. (Stanley E. Fawcett & Stephen L. Jones & Amydee M. Fawcett, 2012, p. 163-178) However, improvement activities that only consider the efficiency of each element without identifying the flow of the entire SCM sometimes cause inefficiency in terms of overall SCM flow. The SCM is literally a supply chain, and if the strength and flexibility of the chain are not equal, the chain cannot be evaluated as a chain of good structure. From the perspective of the entire SCM flow, it is the way to construct a uniformly healthy chain structure that is not biased to either side and is flexible and sustainable to change. Many companies are using the concept of BOD(Bill Of Distribution) to systematize the entire supply structure that is passed from demand input to end customers.

2.2.2 Success factor of SCM

While many companies still operate as sole functions, leading companies collaborate with partner companies to create a variety of effects that can be expected from functional integration. Through collaboration, company operations consist of systems that interact with one another in complex connection from production, procurement, purchase, production to sales, and distribution of raw materials. Except for some large companies with full functionality, the traditional argument that functions that are the source of business performance should belong within the companies is losing its hold. Instead, the logical argument is more compelling that the synergies created by harmonizing superior resources and capabilities with independent functional suppliers associated with the company's production activities can produce better results. Indeed, changes in the market environment and advances in technology are rapidly changing. As barriers between industries are lowered, companies that can perform each function well are working with various product producers across industry barriers. From the perspective of SCM operations, it can be defined that strengthening interdependencies and enabling information sharing through functional collaboration are the critical success factors of SCM operations that companies of today think. It can be explained that the innovation activities of SCM operations through integrated operations help improve quality and productivity in the short-term. In the long-term perspective, all functions or businesses belonging to the SCM channel seek to increase profits from the overall structure by helping to increase customer satisfaction and market share. The process of integrating SCM operations is outlined below.

The first step of integration is to perform each task with each function completely disconnected, such as material management, purchase, production, delivery, and sales. The operational objective for each function is

defined as a KPI(Key Performance Indicator), but there is no link between the functions. There is a possibility that some functions will operate in a direction that conflicts with the overall SCM operating objective. The second stage of integration is functional integration. It allows similar tasks such as material management and production management, or supply logistics management and sales logistics management to be integrated into a single function, and the whole SCM is still an unintegrated stage. If the first stage of integration defines that there is only a product delivery process between each function, the second stage of integration will systematize the exchange of information for each function. The exchanged information will affect the operation of each function. The third step of integration is the phase of integrating all functions within the company internally, including functions such as material management, production management, supply logistics management, and sales logistics management. Finally, the fourth step of integration is the external phase of integration, including the flow of materials from outside the company and customer service, and even the customer itself, which includes the internal integration of the partner companies. The above steps may vary depending on the argument, and in some cases, they may be defined as the integration phase or the cooperation phase or the synchronization phase. In conclusion, the success of the SCM operation begins with the strategic utilization of information technology based on mutual cooperation and trust by all companies participating in the supply chain. By implementing an integrated strategy, the goal is to innovate the supply chain process and maximize customer value by providing quality products and services to consumers. (A. Gunasekaran & E. W. T. Ngai, 2004, p. 270-273)

Based on the SCM operational integration steps outlined above, success factors can be summarized by keywords.

① **Internal Integration**

For the strategic operation of the SCM, interdepartmental cooperation within the organization and strategic cooperation with external partner companies is critical. Internal integration should be prioritized, which means the integration of two or more different departments. Because the responsibilities and powers of various internal departments in the company are different and competitive, it is not easy to coordinate each other's roles or authority to meet one goal. Thus, in order for internal integration to work correctly, it is necessary to align the company with objectives on the premise of data and information systems integration for each area. Many companies have already introduced ERP as a means of internal integration and operate their ERP system and process improvement organizations to standardize and simplify internal processes. This provides companies with timely and transparent information and helps them make effective decisions. (Ram Narasimhan & Soo Woo Kim, 2001, p. 51-74)

② **External Integration**

Integrating with all partner companies and partners within the supply chain domain, and the internal organization of the company, is called external integration. In other words, one central company and its partner companies strategically cooperate through information sharing, strategic alliances, joint problem solving, and technical support. (Kee-hung Lai et al., 2010, p. 273-286) As the scope of integration expands, partners in the same SCM area should expand their management perspectives. Also, the departments or companies responsible for each function should work together to achieve customer satisfaction, the ultimate objective of the central company. Chain-related organizations can participate in various

stages of supply through external integration, contributing to activities such as improving projects, reducing supply time, and improving performance. After external integration, each organization is given a kind of responsibility for the entire process activity beyond merely sharing ideas.

③ **Customer Integration**

In industries where market competition has intensified, excessive inventory is always required to respond to uncertainties and fluctuations in customer demand. Excessive inventory is also called safety stock. Of course, the level of excessive inventory is also managed by demand forecasting, and the range required for excessive inventory ranges from raw materials to semi-finished products. Most manufacturing companies retain their products in semi-finished condition until demand from customers is confirmed to respond flexibly and quickly to changing demands. In particular, customer integration allows the company to share information about the distribution inventory and performance trends held by the customer from the perspective of inventory management. Companies that supply products can plan more balanced manufacturing and supply activities through inventory information at the sales stage. While maintaining the SCM operating flow efficiency, the company can save operating costs and enhance competitiveness through overall inventory reductions, including overstocking. Customer integration enables the company to efficiently share the flow of customer information with its members on the supply chain and increases company operating performance. (Markham T. Frohlich & Roy Westbrook, 2001, p. 185-200)

④ **Information Sharing**

As discussed earlier in various aspects, information sharing is the process itself that connects from the raw material supply stage to the end customer stage. Recent advances in source and telecommunication technologies have reduced the cycles of goods in almost all industrial sectors and increased competition, requiring greater flexibility and speed for companies. Sharing information among the parties involved in the supply chain enables the close integration of value-creating activities to create a competitive advantage. Information sharing technology links internal and external processes, and it is closely related to the company's operational strategy. Information between all parties involved in the supply chain shall be synchronized. To sum up, SCM activities, which created value through increased physical volume and reduced delivery time in the absence of systems, are now creating value through increased amounts of information and shorter delivery times.

2.3 Example of SCM Strategy Model

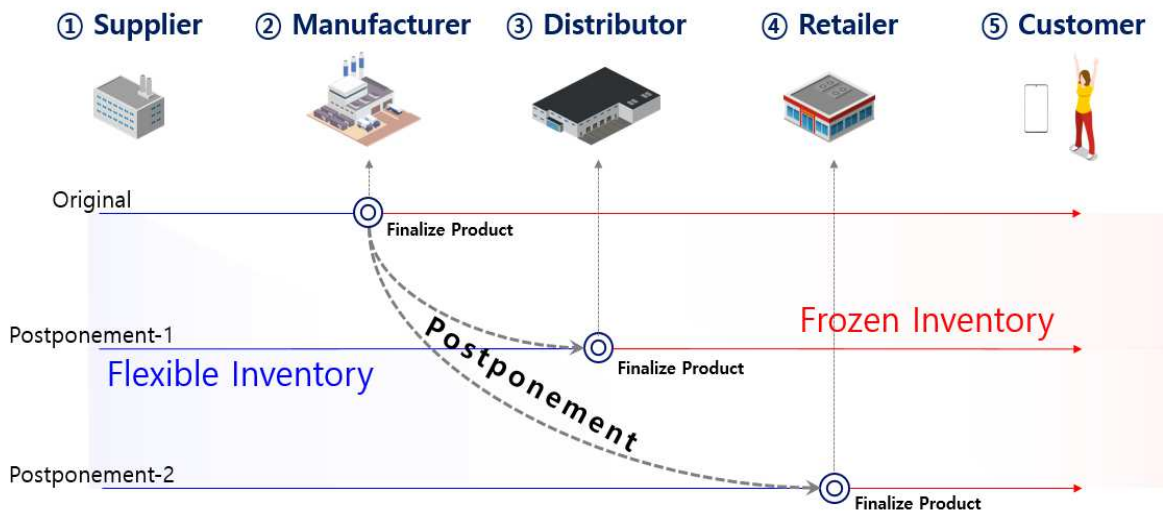
Before discussing SCM strategies suitable for the European mobile market with experts in each field, one SCM strategy model is discussed to help interviewees elicit ideas and raise opinions. By presenting a model currently being used by many companies in various industries for innovative integration and strategic SCM operations, the objective is to obtain direct experience from interviewees and to devise more practical applicable SCM strategies.

2.3.1 Postponement Strategy

Among the theoretical SCM strategy models, one of the most commonly used strategies, along with the expansion of functional integration of SCM, is Postponement Strategy. The key to Postponement Strategy is that as the end-product completion nears the customer's purchasing stage, companies can differentiate their products to meet consumer needs. Besides, the inventory and operating costs of raw materials and semi-finished products can be optimized, and eventually, the overall operating costs of companies can be expected to be reduced. The concept of Postponement Strategy is a strategy to design the SCM so that companies can flexibly respond to changes in demand for various products by delaying the completion of the final product. To be more specific, the strategy is to postpone the completion of the final product by shipping it in one standardized primary form instead of the finished product form when the product is shipped from the production plant. Subsequently, it is the basic form of Postponement Strategy to complete the product just before the distribution or delivery phase to meet the more up-to-date customer requirements that changed during production lead time. After all, it is a method of providing the final product form by adding the parts or specifications that are the core of customized, determined with the needs of the end customer, to a standardized basic form.

As Johnson & Anderson studied in advance, the effect of Postponement Strategy is closely related to the companies' SCM operating environment. The higher the number of products operated by a company, the higher the impact of Postponement Strategy, and the smaller the difference in demand between final products that share standardized semi-finished products, the higher the effect of Postponement Strategy. In addition, Postponement Strategy can have a better impact on industries with a longer production

process time or a less accurate forecast of demand. (Johnson M. Eric & Anderson Emily, 2000, p. 19-35) However, the misapplication of the Postponement Strategy could instead result in cost loss. To avoid this, a company should analyze the accuracy of the forecast of demand for its products to minimize inventory and find an appropriate application point for the Postponement Strategy to respond quickly to customer needs. The wrong point setting of Postponement Strategy may increase in delivery time, and lost economic scale can cause an increase in processing costs. The following figure illustrates two examples of Postponement Strategy. Postponement-1 is an example of a delay in the final product finish to the Distributor, and Postponement-2 is a delay in the Retailer stage. As Postponement Strategy gets closer to the end customer, the flexibility of inventory increases significantly from the whole SCM flow perspective.



< Figure 4. Concept of Postponement Strategy >

In terms of inventory management, Postponement Strategy can be described as a mix of push-pull-based inventory. The Push method is a method of producing and storing products based on predicted demand and then supplying them according to the consumer's order. The Pull method is to quickly proceed with production and supply after the customer confirms the order. Postponement Strategy is similar to the Push method in that it can balance production and supply by predicting demand and constructing a production plan. Also, this is similar to the Pull method in that it produces final products based on confirmed customer demand. Indeed, Postponement Strategy is widely used before and after the end stage of the final product. However, the basic concept is also applicable between the Supplier and Manufacturer for the stage supplying raw materials and between Manufacturer and Distributors. It can also be applied at the stage of demand forecasting, ordering, and products and services. The most important thing in successfully implementing Postponement Strategy is standardization and supply rapidity. The higher the standardization of products in each stage of production, the higher the effect of Postponement Strategy. In addition, the time required to supply the final product after obtaining the confirmed demand should be minimized.

2.4 Status of Mobile Product SCM in Europe Market

2.4.1 Samsung Electronics SCM status

One of the leading companies in the European mobile market was selected to identify the current status and advantages and disadvantages of SCM operations in the European mobile market. The current SCM operation status and its advantages and disadvantages in the European mobile market were

investigated roughly. The company was chosen as the most suitable research target for this study, as it accounts for about 20% of the European market and operates most of the elements of the entire SCM flow on its own. The data surveyed referred to the company's 2019 Sustainability Report, and the deficiencies were inferred within logical levels through various media. (SAMSUNG ELECTRONICS SUSTAINABILITY REPORT 2020, 2020, p. 4-10) These corporate research activities are expected to enhance the feasibility of this study. It will also help make the interview more efficient by having a similar level of understanding with the interviewees and discussing it from a similar level of perspective. Indicators closely related to the SCM elements discussed earlier, and that could affect each component's operation were selected as follows. The data, except for the number of sales corporations and transportation methods, were inferred from the current status of 2019 by referring to the Internet articles and unofficial documents based on the data available in Samsung Electronics' Sustainability report, and errors in the analogy process are judged to be negligible in this study.

① **Operational Scale**

Samsung Electronics sold about 60M mobile products to the European market in 2019, including about 10 percent of Tablet products. Its sales amount is about \$20 billion, and its market share is 17.5% based on Smartphones.

② **Model Structure**

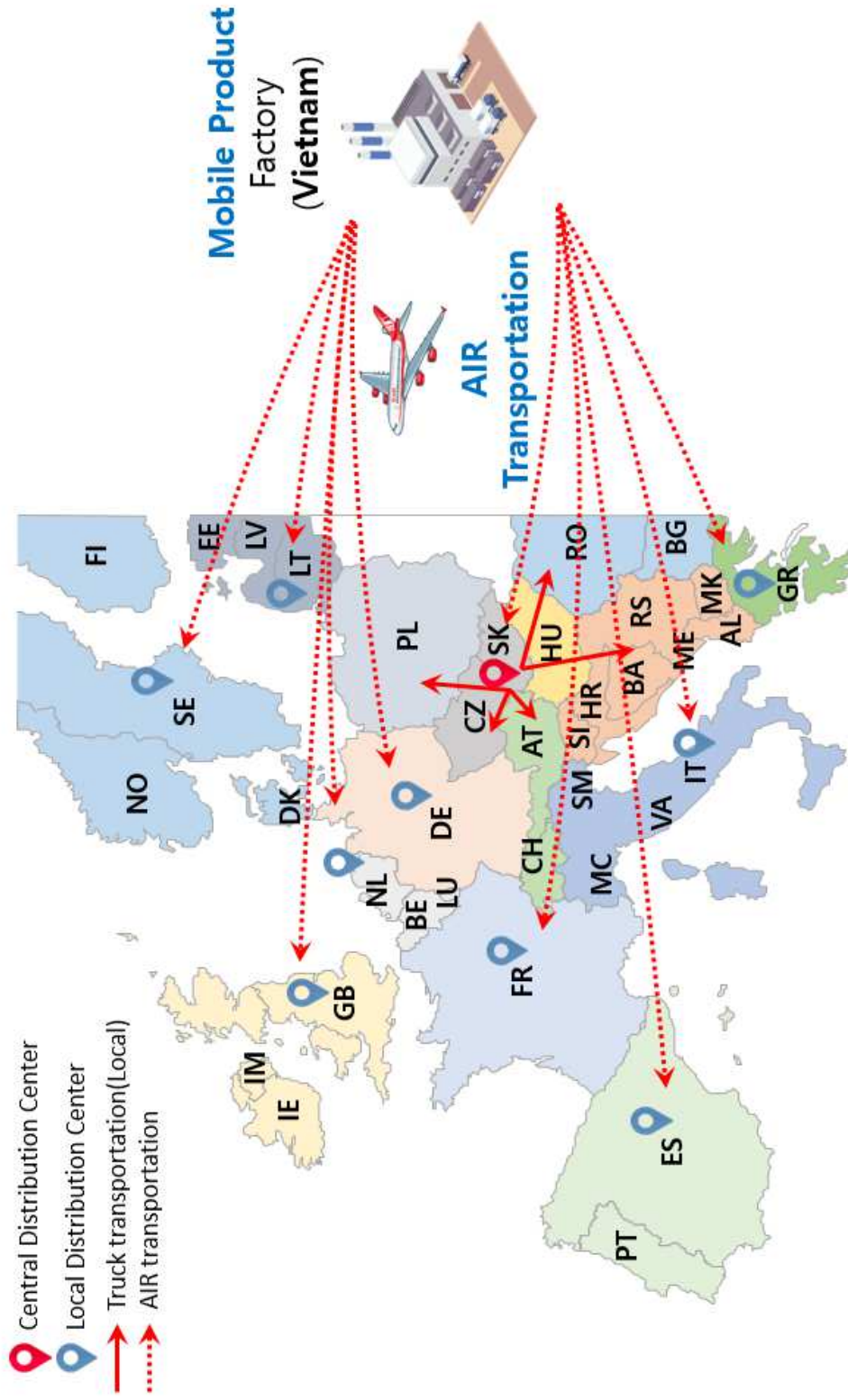
Samsung Electronics sold about 60 kinds of products in the European market in 2019, with SKU(Stock Keeping Units) numbers reaching 3,000.

③ **Operational Organization**

As the European market is a multi-country region, 16 of Samsung Electronics' sales branches among 52 are located in Europe. Also, two offices oversee the European market, responsible for the marketing and strategy of all Samsung Electronics products and mobile products. A total of two integrated logistics centers are in Europe, each located in the Netherlands and Slovakia. The Integrated Logistics Center organization is responsible for the supply operation and strategy of all products, including mobile products. Especially in the case of mobile products, it serves as the hub of Central & East European countries at the Slovak Integrated Logistics Center. The rest of the world has a Local Distributor Center, which includes Western Europe, including Britain, and Greece, and Sweden.

④ **Transport Logic**

Samsung Electronics' main mobile production base is located in Vietnam, and all supplies for the European market are supplied by air transport. Products arriving in the local domestic hub area are transported by truck from the airport to the hub and the warehouse of the customer company.



<Figure 5. Supply route of Samsung Electronics' mobile>

3 Expert Interview

The first half of the previous chapter looked at the essential elements that make up the SCM and the SCM success factors that have been validated based on various prior studies. Through this, the aim is to find the connections that can be referenced in the composition of the European Mobile SCM strategy. The second half of the previous chapter described a strategic model that could make a positive change in European mobile SCM operations. This chapter seeks to approach and verify from a wider variety of perspectives, the individual elements that innovative SCM strategies must be discussed for efficient application, starting with the previously proposed SCM strategy model. A field expert has been selected to be a substantially valid high-quality data collection activity, and we implement a qualitative research method, Semi-structured Interviews.

3.1 Data Collecting Method

In this study, Semi-structured Interviews were conducted with corporate executives and experts to collect data. During the interview process, answers and comments are derived consisting of terms used in practice by interviewees, not 'Yes or No' types of answers. This method was chosen to provide a detailed description of the interviewees' views and experiences and add new aspects to the concepts. Each interview lasts about 40 to 60 minutes, depending on the interviewees' depth and amount of discussion.

3.1.1 Affecting factor of SCM Strategy

The following keywords were presented to help interviewees in the process of deriving their ideas and opinions. Keywords were chosen arbitrarily, taking into account current trends in the mobile market and the specificity of the European market.



<Figure 6. Affecting factors of Europe Mobile market SCM>

3.1.2 Identification of Expert

As discussed earlier, in order to plan the correct SCM strategy, we need to focus on the interaction between each element that makes up the SCM. The ultimate goal of the SCM as a whole should be set, and the integration between elements should be optimized through the establishment of an appropriate information sharing process. Personal relationships allowed managers of mobile phone manufacturers, one of the leading companies in the European mobile market, to be contacted, based on which experts directly related to each element were selected. This company operates from product development to product production, central and local warehouses, and final supply. Its main customers are telecommunications companies that provide telecommunication networks and services. The company may also sell the product directly to the end customer via online or other channels. Interviews with managers who have real experience and theoretical expertise for each component of the SCM will be meaningful.

One in five interviewees is an executive, and four are middle managers with some managerial responsibilities. One marketer is responsible for both online and offline processes in the European market. It also consists of two European SCM representatives, one sales representative in charge of sales in a particular country, and one R&D representative involved in product development. In terms of work experience, all participants have more than ten years of experience.

3.1.3 Selection of Semi-Structured Interview Question

Semi-Structured Interviews are divided into three main parts. A list of questions for each part is based on detailed objectives.

3.1.3.1 Part 1

– An Analysis of SCM Operations in the European Market

The objective of the first part of the interview is to identify the current actual SCM operations in the European mobile market from experts in each part of the SCM and establish a common understanding of the purpose and objectives of this study.

Besides, the goal is to gain the necessary insights in constructing strategies that benefit the SCM process as a whole, by identifying the importance of the elements that make up the SCM from the perspective of experts in each field and analyzing the reasons.

- ① What are the elements of your company's current SCM operating process? What is the most crucial element in terms of SCM operation, and why?
- ② How is your organization organized to manage your SCM operational processes? If an external organization is co-existing in the SCM chain, how is the role of the external organization distinguished? What are the pros and cons of operating SCM?
- ③ In terms of SCM, what are the features of mobile products? Moreover, what are the characteristics of the European mobile market? What is your company's effort to devise an SCM strategy suitable for the European mobile market?
- ④ What is your definition of SCM operational innovation? What is the reason?

3.1.3.2 Part 2

– Postponement Strategy Model Reflections and Validation

The goal of the second part is to discover a strategic model for innovation in SCM operations. Even if it is challenging to discover a strategic model, it is to gain insight into the direction of the strategic model discovery. From the perspective of experts in each field, we aim to review the practical applicability of the Postponement Strategy model that we looked at earlier and see what factors should be based on for efficient application of the model. Interviewees only convey the core concept of Postponement Strategy, and detailed coverage, advantages, and disadvantages are not presented.

- ① Do you think a commonly used SCM strategy model, such as Postponement Strategy, can revolutionize SCM operations? Why?
- ② Which element did you combine with the Postponement Strategy? What was the reason, and how did it work?
- ③ If you were to apply Postponement Strategy to your company, what order and method would you recommend? What factors should precede a successful application? What is the reason?
- ④ If Postponement Strategy has been successfully applied to your company, what effect can you expect? Given the current European mobile market, how effective is the strategy we have devised?

3.1.3.3 Part 3

– Gain new insights into SCM operational innovation

The goal of the third part is to gain new perspectives and insights for SCM operational innovation. The goal is to draw implications for aspects not addressed in this study by asking how and why experts think SCM operational innovation in each field.

- ① Besides the strategy model discussed earlier, is there an SCM strategy model that can be applied to the European mobile market? If so, what are the expected effects?
- ② What complementary technologies can help with innovative SCM operations? How can we use complementary technologies?
- ③ What are the limitations of the SCM strategy? What is the reason?

3.2 Data Analysis and Pattern Recognition

Semi-Structured Interviews with experts in each field were all recorded. Interviews conducted in Korean were also recorded, although they could not be conducted in English according to the interviewee's English usage. This study focuses on finding similarities and differences to analyze individual expert responses and identifying patterns, as shown in Section 3.3 Research Results.

Section 3.4 discusses the details of how to improve the SCM strategy model and apply it to companies based on key factors found through Semi-Structured Interviews.

3.3 Research Results

Semi-Structured Interviews are conducted to identify factors that could help an entity build and improve its SCM strategy that can be utilized in the European market. Therefore, the objective is to improve the SCM strategic model, as mentioned earlier, through the findings covered in this section. Based on the structure of the questionnaire, this section describes the findings related to (1) the European mobile market trends and analysis of the SCM operation status of companies, (2) the applicability of the Postponement Strategy model for SCM operational innovation, and (3) the new implications for SCM operational innovation.

3.3.1 The European mobile market trends and analysis of the SCM operation status of companies

- ① What are the elements of your company's current SCM operating process? What is the most crucial element in terms of SCM operation, and why?

Finding 1: Interviewees recognize that their companies' SCM components are quite closely coupled and operate efficiently. It is also recognized that each role of the SCM is identified and operates within a logically established objective. However, other than SCM experts, sales and R&D personnel are not exactly familiar with the SCM flow and environment of the company. Sales representatives have a theoretical understanding of only how to manage their sales and subsequent phases, and only a rough understanding of the supply phase, which is the previous phase of the sales phase. Besides, it is not aware of how changes in the sales phase affect the previous phases.

Sales representatives agree to some extent on the importance of SCM operations but stress that sales support activities should be a top priority before paying attention to SCM operational efficiency. The company's sales department is aware of the value generated when sales support is successfully implemented in the event of changes in customer demand. However, it can be interpreted that it is difficult to link these activities to SCM operational efficiency. The R&D representative understands the post-development SCM phase's theoretical content but does not know the actual operating environment and trends. The company's R&D division belongs to the head office in charge of the entire product portfolio, and the marketing department that connects the R&D and sales department is divided into regional and model-specific marketing departments. The R&D department considers local information obtained through the regional marketing department when developing the product. At this stage, the SCM operating environment in the area may be considered, but few areas are reflected. As mentioned earlier, marketing departments prioritize sales promotion more than SCM operational efficiency and prefer supply improvement activities that can respond to changes in customer demand in the shortest period to improvements in integrated operating systems such as SCM operations.

Finding 2: Among interviewees, SCM experts prefer optimized SCM operations to meet all relevant departments' requirements. The overall flow from product planning and development to production, supply, and sales are understood more clearly than other interviewees, and the entire flow is defined as a numerical value by BOD(Bill of Distribution). Of course, the SCM expert group is also made up of separate teams by region and does not have much information about the rest of the region except the area in charge. While SCM experts have a positive perception of the value that SCM operational efficiency creates, they acknowledge that it is challenging to apply new innovative ideas to companies. This is due to the perception that

collaboration with the customer company and those responsible for managing the sales phase will be difficult. SCM experts acknowledge that the new SCM strategy model they designed may provide some uncertainty in the short term at the current sales stage. Acknowledge that this uncertainty may be perceived as a risk to sales representatives and customer companies, and will be a significant obstacle to SCM improvement. This perception is attributed to a sales-oriented corporate culture.

Finding 3: The company has all the elements within the company, from product planning to HW/SW development, production, and supply, distribution, and sales. In particular, the process from production to supply of products is closely linked and tries to control the overall flow by operating a particular integrated operating organization at the head office. As for mobile products, supply locations are concentrated in Asia, such as Vietnam and China, relative to the number of sales regions, the top priority for companies is to establish production plans optimized for fluctuations in sales demand. It is an approach to minimize the cost of production and supply by establishing an optimized production plan.

Finding 4: Most interviewees stress that the importance of supply and distribution activities that connect the process from production to sales has increased in recent years. Also, some interviewees stressed that while it is still crucial for companies to minimize the costs they spend on production and supply activities, recent trends in extreme market competition environments and overall sales decline require a new perspective. Some experts explain that immediate response to fluctuating market demands through greater supply flexibility can increase a company's competitiveness.

- ② How is your company organized to manage your SCM operational processes? If an external organization is co-existing in the SCM chain,

how is the role of the external organization distinguished? What are the pros and cons of operating SCM?

Finding 5: The process of product development and production, supply, distribution, and sale during the SCM flow is composed of vertical structures, but part of the supply and distribution process is a mixture of horizontal structures. From a vertical organizational perspective, the department that develops products and manages production at the request of the sales department belongs to the head office and is mostly managed based on integrated operations. The production management departments in Vietnam and China also belong to the head office and carry out production activities based on plans approved by the head office. The process from production to supply to the sale of products is managed by organizations belonging to the company, but most functions themselves are carried out by outsourced partners. Because outsourced partners only carry out processes guided by the company, the company does not expect any special improvement activities from outsourced partners in this environment.

Finding 6: From the perspective of a horizontal organization, the process of supply and distribution occurring after products produced in Asia arrive in the region is managed by the integrated logistics organization in the selling area. Also, the regional integrated logistics management organization belongs to the regional general organization, not to the head office. This organizational structure gives the overall responsibility for the supply activities of the selling regions as a regional integrated logistics organization. Also, it provides an environment for maintaining differentiated operational processes tailored to the local environment.

Finding 7: All interviewees stress that SCM operations through the system are essential to large enterprises. The company manages its operations through the ERP system and develops and utilizes a separate SCM-only

system to manage its products simultaneously. The IT department that manages the SCM system belongs to the head office, and the SCM management department is operated separately by the product. As the company's dependence on systems increases, its development departments feel burdened by continuous system development, and applying new processes without system preparation is prohibited. While SCM operations within an already-prepared system are efficient, some interviewees complain that the time spent preparing the system is excessive.

Finding 8: Most outsourced partners co-existing in the SCM chain are managing SCM-related information through their systems. The company periodically provides information to outsourced partners, but shares data in Excel format via email, except for outsourced partners responsible for some key functions. Some of the interviewees agree that sharing information via email lowers the operational efficiency of a company, but recognize that it is risky to disclose the entire SCM system to outsourced partners.

Finding 9: Operations of supply, transportation, and distribution after the product production phase is carried out by outsourced partners under the company's control. There are two main benefits that a company expects from outsourcing some operations. The first is to create the most efficient performance possible through collaboration with outsourced partners with expertise in the function, and the second is to minimize the complex administrative costs of large enterprises. However, there is also a disadvantage of having to go through a consultation process with outsourced partners when the process changes due to market changes, directly related to the company's flexibility. In this era of rapid market changes, companies are moving to absorb most of their management points internally, except for core capabilities, to gain maximum flexibility.

Finding 10: To sum up the interviewees' opinions, the advantage of the most investigated SCM operation is the efficiency of the optimized production-supply plan calculated by the system logic. However, some say that the SCM management points of a company that have become bloated due to continued internalization make practitioners' work difficult by requiring a complex operating system.

- ③ In terms of SCM, what are the features of mobile products?
Moreover, what are the characteristics of the European mobile market?

Finding 11: To summarize the interviewees' information, the transport method of supply in the European mobile market consists of two main parts. The first part is air transport, where products produced by production factories in Vietnam and China are supplied to Europe, and the second part is inland truck transportation, which is supplied to each customer company from Europe's integrated warehouse and local warehouse. This type of supply is the same for all companies currently leading the mobile market. Also, the most significant feature of mobile products is that there are no manufacturing plants in Europe. This environment is due to the market cycle of the product. Compared to mobile products with an average product cycle of two to three years, large electronic products such as automotive vehicles, TVs, and refrigerators have a relatively long product cycle of four to eight years. This means that the curve of demand variation in the market is relatively gentle. These products are supplied in different forms from mobile products and can be divided into two main types. First of all, there is a way to supply through sea transport outside of Europe, and second, there is a way to build a production base in Europe and supply semi-finished products or parts by sea transport, which quite a few companies prefer. Indeed, it can be seen that many companies operate production factories to supply to the European market. This is also related to the increasingly evolving

automation trend of manufacturing. By setting up a production corporation in Europe, companies are interpreted as their willingness to rein in the increase in costs as much as possible through production automation and secure supply flexibility. Besides, through production activities within Europe, tax-related benefits and tariff minimization can be expected.

Finding 12: As the packaging of mobile products gradually changes to a compact form, most air transport yields costs in a weight-based manner rather than in a volume-based one. When feature phones were the primary market, large-volume packaging, which had a higher advertising effect than light and small products, was widespread. However, companies are increasingly changing their products' packaging to reduce air transport costs, while the prices of their products are on the rise.

Finding 13: Import tariffs on mobile products across Europe are zero percent, which is expected to remain steady. However, if companies import chargers, cables, and earphones included in mobile phone products separately, tariffs of 2 to 3 percent may be imposed on some products.

Finding 14: Except for a few large-scale countries due to the European market's nature, small-scale countries are forming markets in different forms. Most companies that have entered the European market often manage several countries as a single market based on language and regulations. Interviewees argue that how companies operating in Europe combine and manage markets with about 26 languages directly impact SCM operations.

Finding 15: For companies where interviewees work, mobile products are 100% produced in Asia and shipped by air, consistent with earlier research. Also, operating 16 national sales corporations and two integrated logistics hubs are consistent with the research. If the single country's market is large, it also operates a local logistics center, and the logistics center supports both

online and offline. In the case of small markets, some countries are grouped into an integrated logistics center, and the volume managed through integrated operations accounts for about 25% to 30% of the total market in Europe.

- ④ What is your definition of SCM operational innovation? What is your company's effort to devise an SCM strategy suitable for the European mobile market?

Finding 16: As discussed earlier in the theoretical background, interviewees differ slightly about the SCM concept itself. Some interviewees describe the supply process itself as SCM, while others define the entire supply process and the activities that improve and manage it as SCM. Due to these differences, the answer to SCM innovation is also not systematic. Sales representatives describe supply flexibility as the primary goal of SCM innovation and argue that an increase in inventory is inevitable for expanding the supply flexibility. R&D experts argue that improving products' performance is much more important than product structures designed to benefit SCM activities. SCM experts have some realistic ideas to try but reiterated that understanding and collaboration among production and supply departments, including sales and development departments, are paramount. It is also recognized that it is difficult to improve the current SCM process without cooperation from relevant departments. Opinions on SCM innovation are not consistent with each of the interviewees, but they all agree that SCM innovation activities are primarily aimed at contributing to increased sales and minimizing operational costs.

Finding 17: Interviewees recognize that their companies carry out SCM innovation activities in various ways, but do not know how they can support them. Besides, the sales representative spends most of the time increasing sales, and the R&D representative is too busy with the development

schedule to participate in additional collaborative activities other than development activities and have minimal interest. The broad consensus of interviewees is that for SCM innovation, an organizational culture that powers projects by thoroughly carrying out market research and analyzing competitors' trends is essential.

3.3.2 The applicability of the Postponement Strategy model for SCM operational innovation

- ① Do you think a commonly used SCM strategy model, such as Postponement Strategy, can revolutionize SCM operations? Why?

Finding 18: To summarize the opinions of interviewees, commercialized SCM strategies such as Postponement Strategy will positively impact the operations of the company. At the same time, they all agree that the key is to shape the strategy to suit the company's SCM environment and the product market environment.

Finding 19: The sales representative argues that the SCM innovation strategy may not directly affect increasing sales. However, SCM representatives differ slightly, arguing that they can contribute to increased sales by minimizing the lack of sales rather than increasing the absolute value of sales. In detail, the improvement of the SCM strategy explains that it can contribute to increased sales by expanding the flexibility of product inventory management and quickly replenishing the shortage.

- ② Is there any case of Postponement Strategy applied to your company? Which element did you combine with the Postponement Strategy? What was the reason, and how did it work?

Finding 20: The company has a history of applying Postponement Strategy. A typical example is the history of mobile production corporations that have been carried out on a small scale. A small unit here is when it has been implemented within a single element without interaction or role variation between the elements that compose the SCM. The existing method is to complete both HW and SW for specific customers' mobile products at the same time based on predicted demands. The changed method through Postponement Strategy is to delay the product's completion by first producing the standard HW and then uploading the dedicated SW at a time when the accuracy of the forecast of demand increases. Completing products based on this higher demand forecast could contribute to increased sales without increasing inventory, but the downside is that production costs increase. The R&D representative argues that these Postponement Strategies may be extended through the commonization of HW or SW, but that sales representatives from relevant countries should actively wish to agree to use commonized products.

Finding 21: The company has a history of applying Postponement Strategy by operating Packaging Centers in Europe and the United States. This strategy is aimed at reducing supply costs rather than reducing inventory. It is achieved through collaboration between the production factories in charge of product production and the integrated logistics center in charge of supply/delivery in Europe and the United States. After supplying HW and SW produced in Asia to an integrated logistics center in each region without packaging in the form of semi-finished products, the packaging is completed based on the demand predicted by the integrated logistics center. Although it has the advantage of significantly reducing air transport costs from Vietnam and China, due to the nature of Europe and the market, the management of process costs is essential due to the high cost of processes compared to Asia.

Finding 22: Except for SCM experts among interviewees, the rest of the interviewees know little about Postponement Strategy's application history. Furthermore, they have never actually been involved in a project.

- ③ If you were to apply Postponement Strategy to your company, what order and method would you recommend? What factors should precede a successful application? What is the reason?

Finding 23: R&D experts propose a Postponement Strategy that can be applied to the product development process. It is a development process that modularizes and precedes part of the development process, collects necessary modules, and applies them to new products when the final product concept is set. A successful application can efficiently reduce development time, but it is hard to find a direct connection to the European mobile market.

Finding 24: SCM experts argue that the Postponement Strategy strategy that companies should now try from a new perspective should begin with the commonization of products. The markets that should be most concentrated in terms of market size are the United States and Europe. Unlike the U.S. market, which has one language and is led by four to five large carriers, the European market needs a way to manage various customer companies in an integrated manner, and it is expected that the commonization of products can address this to some extent.

3.3.3 The new implications for SCM operational innovation

- ① Besides the strategy model discussed earlier, is there an SCM strategy model that can be applied to the European mobile market? If so, what are the expected effects?

Finding 25: The overall contraction trend in the mobile market appears to be an excellent opportunity to centralize the European mobile supply. Especially when the size of the market is divided step by step, it is difficult for some countries, which are medium~large-scale markets that operate local dedicated logistics centers to generate their SCM efficiency. A sales representative argues that a decline in the market is challenging to recover and that companies should focus on creating value through optimizing operating costs.

Finding 26: Previously, many mobile-manufacturing companies had been predicting and investing heavily in the online market, but the "Untact" market environment by COVID-19 situation calls for more rapid change for the company. However, company managers devise a supply process that can simultaneously target the online market while maintaining as much of the offline market as possible, which still accounts for most of the company's revenue.

Finding 27: For the online market, it requires a faster supply than the offline market. For example, offline takes at least three weeks from a product manufacturer to a customer via a carrier. However, online, the product must be delivered approximately one week after the end-user order. Companies are worried that the online market's expansion will lead to inevitable cost increases, but they are more focused on the sales growth effects of the online market.

- ② What complementary technologies can help with innovative SCM operations? How can we use complementary technologies?

Finding 28: Most interviewees suggest a demand forecasting system utilizing AI and Big data analysis. They all agree that relying on AI programs for the overall SCM operation is unrealistic as current technology. However, they agree to some extent that companies can optimize production and

supply activities by predicting distribution inventory held by customers based on dynamic changing market environment information. However, close collaboration with customer companies is essential for upgrading the forecasting system.

Finding 29: Most interviewees suggest improvements in the management system. However, the use of functions of the self-developed SCM system currently being utilized by the company should be prioritized. The current system provides most of the information in real-time, but tools that can integrate the information they have and reflect the SCM innovation process should be developed first.

③ What are the limitations of the SCM strategy? What is the reason?

Finding 30: From the perspective of production and supply operations, innovation in SCM strategy has direct effects such as streamlining operations and reducing costs. However, in terms of sales, innovation in the SCM strategy serves as a support shot. In other words, innovation in the SCM strategy is meaningful only when the company's product sales situation is supported to some extent. In a market where supply is proliferating that it cannot keep up with demand or has reached some degree of stabilization, companies need an innovative SCM strategy. However, in a decreasing market, the effect of SCM improvements is relatively low.

Finding 31: The higher market uncertainty, the more likely companies, and their practitioners tend to avoid SCM innovation activities. Due to the nature of the SCM innovation process, several organizations are involved and often progress slowly while maintaining the same interests. When market uncertainty is high, it is difficult for a company to maintain the validity and continuity of its SCM innovation activities, which leads to increased costs.

Finding 32: The improvement of the SCM process is associated with several organizations and objects. Even if the process agreed upon by all stakeholders based on the innovation idea is established, the idea is likely to fail if the ultimate objectives of the innovation strategy are not clearly shared. In other words, companies should also consider how to apply and manage innovation ideas. If even one element goes wrong, the meaning of innovation activities is overshadowed.

4 Analysis and Integrating Empirical Findings

This section incorporates the empirical findings described in Section 3.3 into the Postponement Strategy model. Based on the case study results, the elements that should be considered for the improvement of the SCM process are grouped and aggregated to discuss how they can be incorporated into the Postponement Strategy.

4.1 Classification of Collection Information

From the perspective of SCM operations, two main distinctions between the mobile manufacturing companies currently lead the market. When the elements of the SCM are largely classified as development-production-supply-distribution-sales, some companies internalize all elements and have them in-house, while others manage only development-sales and outsource the remaining production-supply processes. (Finding 9) A company that outsources some elements may maintain expertise in a particular area, but overall production costs may increase. For companies that internalize all elements, high efficiency can be expected in terms of SCM management. (Finding 3) The companies in which interviewees work are almost all embedded SCM elements. However, interviewees do not feel the efficiency of SCM operations as expected.

The first reason is that collaboration with various stakeholders, departments, and outsourced partners makes up the SCM takes a lot of time and cost. (Finding 1, 5) This causes delays in SCM innovation activities. Companies build and manage systems to facilitate sharing information, but there are no

organizations that can increase system utilization and analyze data to derive innovative ideas. (Finding 7, 8, 10, 29)

The second reason is that there is no consensus on SCM innovation activities. While SCM innovation activities require an aligned sense of purpose and understanding among collaborative companies, some departments, including sales departments, tend to avoid the uncertainties arising from SCM improvement activities by classifying them as a kind of risk. (Finding 2, 16, 19) Also, they often only understand the theoretical background of SCM innovation activities. (Finding 18, 22, 23) While acknowledging that the shrinking mobile market has increased the need for SCM innovation activities, companies find it challenging to carry out projects internally. (Finding 4, 25, 26)

4.2 Comprehensive Analysis

In terms of increasing supply efficiency, HW and SW in mobile products are the factors underlying Postponement Strategy. (Finding 21) Expanding the commonality of HW and SW is a prerequisite for integrated logistics activities, and integrating the bases of countries that operate some local dedicated logistics centers may help improve the company's SCM operation. (Finding 14, 24) Also, market trends should be identified first, and activities are needed to explore ways to utilize integrated logistics hubs in Europe based on the analyzed results. (Finding 15) The effect of reducing overall inventory can be expected by integrating logistics hubs. (Finding 21)

From a cost-reduction perspective, it is necessary to find a way to minimize the volume of products transported by air through localization of packaging materials or some components. (Finding 11, 12, 13) Companies should focus

on finding efficient ways to expand the scope of the Postponement Strategy they have tried before. (Finding 20, 21)

Besides, the rapid transition to the Untact era calls for an SCM process that can simultaneously manage both the online and offline markets. Companies should leverage Postponement Strategy to expand inventory commonality and enhance demand forecast accuracy through big data analysis using AI to build more organic and flexible supply processes. (Finding 26, 27, 28)

In order for a company to successfully implement its SCM innovation activities, it is necessary to share the objectives aligned through constant communication with its members. (Finding 16, 32) Also, efforts should be made to share a clear purpose among the members of the organization. These activities should create an organizational culture that empowers SCM innovation projects internally. (Finding 17)

5 Discussion and Conclusion

The last chapter of this research summarizes what was presented in the previous sections and discusses the future direction of research by grasping its limitations.

5.1 Summary of Research

This study aims to present the direction of SCM development for companies in the rapidly changing European mobile market. To this end, this study examines the literature on the SCM strategy of companies and identifies the characteristics of the European mobile market and mobile products. Besides, experts' opinions are grouped and aggregated in the form of Semi-Structured Interviews. The study summarizes the following.

The first chapter provides the background for research by analyzing trends in the European mobile market and examining the characteristics of mobile products and the logistics flow of current companies. It also explains from the company perspective what it means to study mobile products' SCM innovation activities.

The second chapter introduces relevant literature, concepts, and terminology to gain insight into the SCM innovation model based on Postponement Strategy. By examining SCM's concept that changed with the development of the industry through literature research, the preliminary studies are compared. The study proceeds in the direction of contemplating the concept of SCM that companies now think. Besides, an example of the SCM strategy

model called Postponement Strategy is described, and the direction of the research is established based on the company's case.

In the third chapter, qualitative research is conducted through Semi-Structured Interviews with selected SCM experts based on the previous section's results. Investigate the need for SCM innovation activities and empirical arguments felt by companies at present, investigate the potential introduction of Postponement Strategy by factors, and finally investigate the limitations and development direction of SCM.

In the fourth chapter, by categorizing the results investigated in the third section, the factors that must be predicated for an entity to undertake SCM innovation activities are identified. Besides, based on the characteristics of the European mobile market, we discuss the SCM strategy directions that companies should differentiate.

5.2 Limits of Research and Future Research Challenge

This study, conducted through prior research, case analysis, and Semi-Structured Interviews, has the following limitations. Firstly, there is a lack of statistics related to SCM activities by companies leading the European mobile market. Companies are reluctant to expose their activities, and related costs in the SCM sector, and research through statistical data is difficult due to different standards for calculating costs between companies. Secondly, by studying the cases of companies and regions limited to SCM strategies, there are certain limitations to the generalization of research results.

Future studies will require overcoming the limitations of this study to study a broader range of company cases and to study the types of SCM strategies.

Besides, empirical and predictive analyses based on proven data should be supported.

5.3 Conclusion

Both theoretical and empirical studies show that companies should consider several factors when building an SCM innovation strategy. In addition to building an SCM innovation strategy, companies should also focus on sharing the elements that make up the SCM and the objectives aligned with all stakeholders. Also, efforts should be made to ensure that more efficient strategies can be adopted by taking into account factors outside the company, such as market trends and relationships with outsourced partners. Companies should invest in ongoing market research based on empirical insights from the SCM strategies they have previously attempted to devise strategies that are now market-appropriate. Besides, for companies producing products, SCM efficiency should be enhanced through the commonization of finished and semi-finished products, and stable and efficient SCM activities should be carried out by integrating the European market bases. SCM activities are composed of multiple elements. To successfully implement SCM innovation activities, they need to share the objectives aligned through constant communication with the stakeholders and members of the organization that makes up the SCM. The clearer the objective is set by the company that is the principal of the SCM strategy, the greater the likelihood of success in SCM innovation activities. Internally, organizational culture should be created in which all members of the organization can collaborate organically and empower projects, along with activities that enhance understanding of SCM innovation.

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