

Research on Promoting SME Participation in Global Value Chains

ICT/ Electronics Industry

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Executive Summary

Electronic industry, including ICT (Information and Communications Technology) industry, is one of the major manufacturing sectors in which constant paradigm shift of market and strategy are occurring not only at corporate level, but also in the entire industrial ecosystem. Especially, inter-industrial convergence based on ICT leads the new waves in IT/Electronics industry and intensify global competition. With the new industrial flows, Global Value Chain (GVC) is under continuous development and expansion. Moreover, because of radical changes in competitive composition and ecosystem, structural aspect of GVC is also undergoing reform and innovation.

The purpose of this research is analyzing the current status of Small and Medium Enterprises (SMEs) in GVC and identifying successful cases of SMEs in global market, then review issues related to successful responses to changing market environment and strategies for stakeholders of GVC. Also, various views and ideas will be considered to derive ways to GVC upgrade for SMEs and policy objectives for governments based on outcomes of a series of Public-Private Expert Forums (PPEF) and a GVC workshop.

In GVC, production of goods and services occurs in manufacturing network which is divided into many stages, and a firm's value chain can be organized anywhere around the world as long as such place has cost competitiveness. The concept of GVC suggests most of the SMEs and major companies can develop cooperative relationship. While inter-enterprise competitions become severe in global market, well-positioned second movers in developing economies can also participate in GVC and interact actively with major players in GVC of the high-tech industrial sector. Active participation in GVC allows the companies to access new technologies and business opportunities through the global network. In macro-economic dimension, expansion of GVC can provide impetus for economic growth and job creation.

However, many SMEs lack the appropriate amount of information about the GVC they want to participate, so they require education and in-depth market information provided by the government to overcome the informational gap. Also, the government needs to provide information to SMEs to meet their demand. Such information should be organized by industry or product line and be offered through information-sharing platform. Through this, active exchange of information can be facilitated and serve as a guideline for SMEs.

The trend of GVC has become inevitable in the global economy. The process of product production can happen anywhere in the world where technologies, raw materials and intermediates are provided with the required quality at a competitive price through GVC. However, as intermediates are increasingly crossing borders and the production phase has expanded, the cost of the protectionism that the exporter faces also increases. Therefore global free trade needs to be promoted in order to efficiently utilize the GVC.

Global fragmentation of production has urged many economies to open information, enhance predictability of production and have transparent regulatory system for trade and investment. One of the biggest reasons is that interruptive measures such as tariffs and non-tariff barriers affect not only foreign manufacturers, but also domestic manufacturers. The trend will further lead to more open and

free trade and industry policy in order to achieve growth and employment. FTA creates a bigger market not only in efficient vertical integration but also in formation of effective horizontal relationships. The government needs to focus more on how to facilitate such efforts by mitigation of related laws and regulations.

Additionally, in GVC perspective, industrial and trade policies are required to identify and utilize opportunities in newly evolving GVC through development and supply of innovative products. Also, efforts are needed to reform industrial structure towards higher added-value sectors.

The global ICT industry is constantly changing at even faster pace. The players of the ICT ecosystem including global leading companies and SMEs directly face the changes. In many cases, companies experiences that strategy in the past is no longer working effectively in the changing market. GVC is a key factor dominating the formation of strategy for businesses and governments as well as industrial convergence and global economic integration. These are main issues covered through this study. Moreover, this study reviewed the strategy and policy objectives with specific focus on industry-specific characteristics and sub-sectoral approach. To utilize the outcomes of the study in real business world, stakeholders of GVC may need a strategic approach to internalize the lessons.

1. Overview

1.1. Background and Purpose

The electronic industry is a core axis that not only has influence on the industrial ecosystem but also affects the strategies in business level, which leads to the transformation of the industrial trend of the world. Particularly, progress of industrial convergence based on ICT has led ICT industry to be on top of the new business trend as coupled with ever increasing global competition. On top of that trend is Global Value Chains (GVCs) and the electronic industry, which is reorganized, expanded and altered through the changes in competition structure and formation of ecosystem with the rapid changes of the market. As the changes occur in the market, many changes and innovations are also derived from the structural perspective of GVC.

Nowadays, the industrial value chain that includes development, parts procurement, manufacturing, distribution and service is expanding to various regions or companies in a global perspective. Accordingly, there are many differences in the companies' approach to global trade and the proportion of obtaining a value among stakeholders in the economy. In particular, the electronics and ICT industry has a characteristic of active participation of developing countries in GVC compared to other industries, and contributes to the economic development and income increase of participating countries. However, the role of developing countries in GVC is mainly focused on assembling and manufacturing activities which have a limitation in creating added-value. Assembling and manufacturing are conducted within some developing countries in Asia, but core activities that create high-added value such as design, R&D, standardization are relatively focused in developed countries.

Korea is obtaining comparatively high added-value with the industries that provides core components for semiconductors and display, whereas industries with marginal or low added-value also still remain. Local SMEs require much more investment and interest to fit in the global capacity in order to participate in GVC of the ICT industry. Active response for the ICT paradigm and the spread and structural change of GVC is necessary more than anything else. Diversification efforts are needed in order to participate in the flow of changing paradigms such as entering into industries with high added-value or creating new business by encouraging and spreading SMEs participation in the GVC ecosystem.

Most of the SMEs are not in a direct competition relationship but in a cooperation relationship with global or large companies in final product market. In short, tasks such as cooperation and rising value between SMEs and large companies have important implications as a survival strategy. Excavating and building a focus for policy is a strategy to make the industrial ecosystem more worthwhile. A great amount of effort and research are needed to make policy tasks; therefore, this research first identifies the current situation and successful cases of SMEs in the Korean ICT industry, and then tries to find out the tasks and response strategies for each stakeholder according to market changes. In particular, this research targets to derive policy tasks, methods to make high added-value and changes of SMEs in the ICT industry from a GVC perspective through mentioning the various opinions from fora and workshop that were conducted regarding this issue.

1.2. Scope of Study

This research focuses on analyzing the structural aspect of GVC in ICT/Electronics industry and looks into the necessity of SME's participation in GVC as well as opportunity factors in order to promote GVC participation of SMEs in the ICT and electronics industry. Additionally, the study tries to grasp future trends of GVC structure through an analysis of the structural changes of GVC. The study provides analysis results of successful case of a series of Korean SMEs in ICT sub-sectors including home appliance, semiconductor, smart device, and software/contents. Moreover, research on strategies for SME participation in GVC based on product life cycle model and value chain control will be useful for businesses and policy makers in further considering their GVC strategy. Based on these, the strategies and objectives for SME participation in GVC are considered in separate perspectives of SME, MNEs and the government.

2. Concept of GVC and SMEs' Participation in GVC

2.1. Concept of GVC and SMEs' Participation

2.1.1. Concept and Significance of GVC

2.1.1.1. Concept of GVC

a) Concept of Value Chain

In 1985, Michael Porter defined value chain as a “business system including a series of activities that companies carry out in order to develop a competitive advantage and create value”. Those activities include not only value chain issues such as simple production or supply of parts and raw materials, but also various business activities such as human resources management, technology development and marketing. Porter classifies companies' value chain activities further into primary activities and support activities. Primary activities include physical value of products and services including inbound logistics, operation, outbound logistics and service, which contribute to the creation of added value directly delivered to customers. Support activities include firm infrastructure, technology development and procurement, which support the creation of added value.

In general business administration, value chain is divided into supply chain and distribution chain. Supply chain refers to a whole network related to the process of producing or manufacturing a product including subcontractors and suppliers and distribution network refers to a transaction and a process generated in the downstream of production. The value chain model can define core competencies of a company and provide an analysis tool to develop competitive strategies such as cost advantage or differentiation. Cost advantage can be achieved by rearranging the value chain of a company or reducing the cost of individual activity and differentiation can create unique added value by transforming individual activities within the value chain.

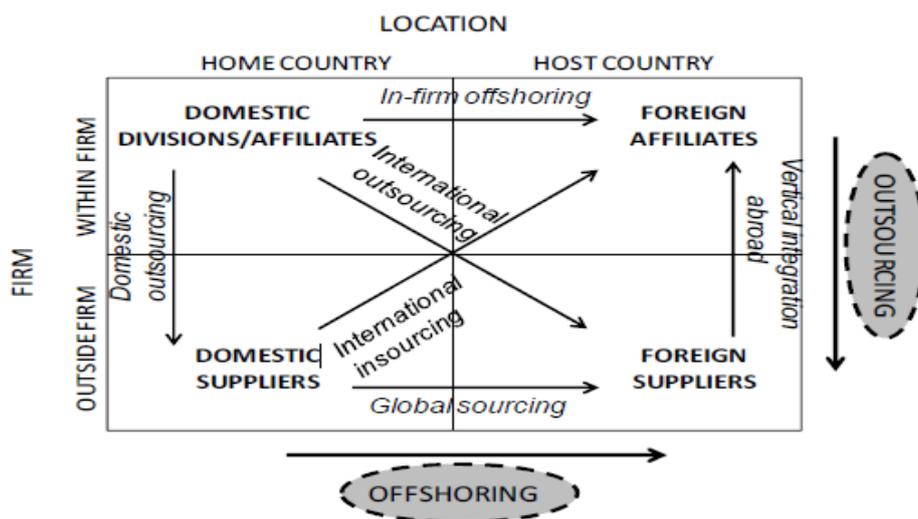
b) Global Value Chain (GVC)

Global Value Chain (GVC)¹ means that the production of goods and services is divided into many steps and firm's value chain that covers planning, production and sales of goods occurs anywhere in the world that has cost competitiveness. The factors for the formation of GVC include increased competition among companies, development of transportation means and information and communications technology, emergence of cheap suppliers in developing countries and changes in corporate strategies due to the liberalization of trade. With intensifying competition among companies, companies concentrate on core competencies and activities with high added value and outsource non-core activities to improve their competitiveness. This is a phenomenon that reflects

¹ Value chain refers to a series of activities that covers from conception, production, delivery to customers, use and disposal of goods and services. The term was called value chains in the 1980s and global production sharing, international fragmentation, vertical specialization, international production networks, off-shoring and outsourcing in the 1990s and finally generalized as Global Value Chains in the 2000s (Jeon Eung-gil, 2013).

the companies' global outsourcing strategies which scale down areas that generate low added value and maintain areas with high added value with the spread of globalization. Multi National Enterprises (MNEs) are classified into horizontal and vertical enterprises and they are divided into outsourcing and offshoring.²

Figure 1. Outsourcing and Offshoring

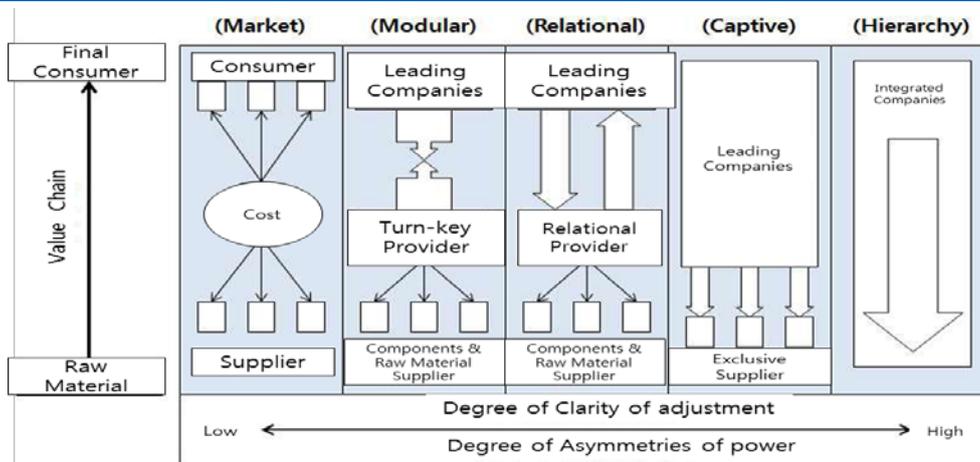


Source: Backer and Yamano(2012)

GVC focuses more on the role of vertical MNCs because MNCs conduct production activities in various countries and production activities in a certain country can serve as inputs for production in other countries forming a complicated production activities among countries. The previous integral architecture focusing on manufacturing has been changed into modular architecture under which GVC classifies production process into design, core system design technology, core and universal parts focusing on capital intensive industries including IT.

² Gary Gereffi and Karina Fernandez-Stark(2011), Global Value Chain Analysis: A Primer, Durham, NC: Center on Globalization, Governance & Competitiveness, Duke University, p.4. http://www.cggc.duke.edu/pdfs/2011-05-31_GVC_analysis_a_primer.pdf

Figure 2. Five Global Value Chain Governance Type of GVC



Source: Gereffi et al (2005), Figure 1 Five global value chain governance type, p.89.

Another way of classifying GVC is to divide it into upstream focusing on production and downstream focusing on market. Upstream is a part of GVC where values are added by focusing on the production of products and services while downstream is a part where values are added by delivering products and services final customers and users. The point that divides upstream and downstream of GVC is called focal point. Focal firms' strength and centralization level are the most important factors in GVC structure as they have the power to control both upstream and downstream.

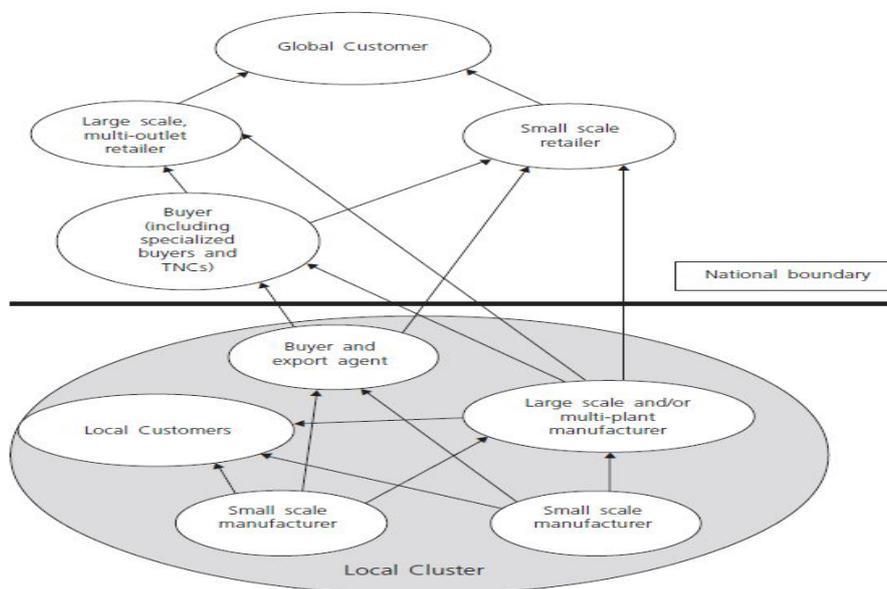
Focal firms have different level of influence on different industry and the existence of focal firms is clearly defined in industries such as automotive, software and movie industry. However, the power of focal firms in industries including medical and science equipment and tourism industry is relatively weak. For example, a company which optimizes a global production and brings about economy of scale becomes a focal firm in the automotive industry, and in the software industry, a company which has a standardised system becomes a focal firm, which is the most important factor in value chain activities.

2.1.1.2. SMEs' Entry into GVC

In the traditional model, the globalization strategy of SMEs is to start basic export activities, go through learning process gradually and enter the phase where direct production in other countries step by step.

However, 2004 OECD report shows that most SMEs are not in a direct competition with large companies or MNCs but in a cooperative relationship with each other in the final product market. In general, it is difficult for SMEs to penetrate into global markets independently through activities like export. Therefore, they are approaching global markets indirectly by being integrated into large companies' GVC as a second or third subcontractors or partners. In particular, for SMEs in underdeveloped countries, integration into large companies' GVC that leads GVC to participate in global activities indirectly may be more effective globalization strategy than independent export by SMEs in developing countries. It can be said that integration of SMEs into large companies' or MNCs' GVC to grow into a global exporter through learning process and upgrading in the GVC may be a universal globalization process for them.

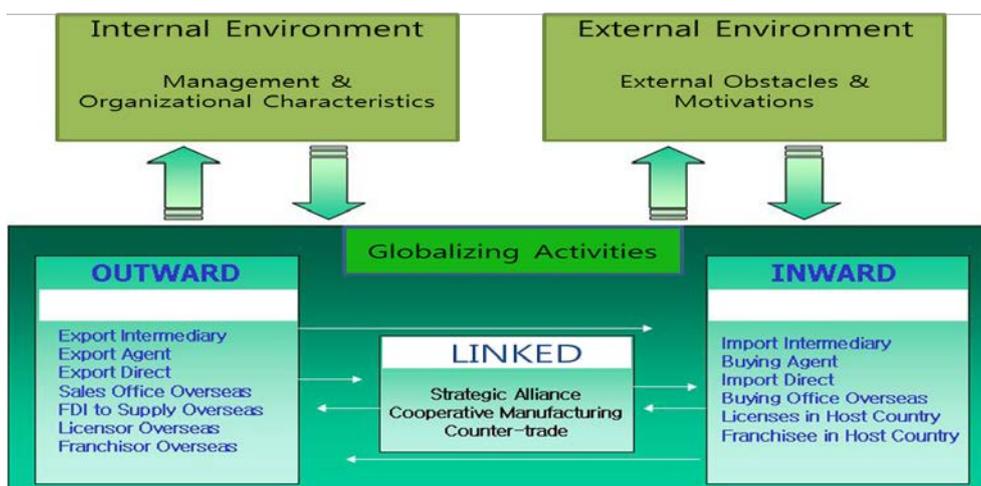
Figure 3. Conceptual Graph of SME GVC Integration



Source: Kaplinsky. R.and J. Readman (2000).

Recently, the necessity of a more comprehensive and holistic approaches to the globalization of SMEs has been raised as business activities of SEMs on the global stage have become more complex and diversified. In short, a holistic approach that looks at not only outward activities including export or overseas investment but also inward activities that attract import or forien investment and linked activities which link outward and inward activities such as cooperative manufacturing based on strategic partnership or cooperation is required.

Figure 4. Holistic Approach towards Globalization



Source: Fletcher (2001),

'Strengthening SMEs' Global Competitiveness by Integration in Global Value Chain'

2. Concept of GVC, the Need for SMEs' Participation in GVC and Opportunities

There are many ways for SMEs' participation in GVC.

First, it can take the form of direct foreign investment or joint venture. While many leading MNCs or technologically superior large companies utilize local SMEs, the SMEs can establish a link with a global market naturally and learn advanced technology. Therefore, SMEs can take their first step of globalization by being integrated into large companies' GVC in the form of foreign investment or joint venture. SMEs can also find a contact point to the global market by connecting with local and foreign buyers. In the late 1960s, many Japanese manufacturers entered Southeast Asian markets including Korea in the process of buying cheap products from Asia and selling them to the US due to the situation in Japan including high labor cost. The process served as an opportunity for SMEs in the region to further their globalization as the transfer of design and technology took place in various forms in the process. In addition, SMEs in the region could find the contact point to the global market through licensing or subcontracting. Most large MNCs equipped with advanced technologies spread their technologies to local SMEs to make the SMEs comply with their product specifications, resulting in promoting globalization of local SMEs.

On the other hand, SMEs can enter GVC through unofficial channel such as replication of product through replication of technology or reverse engineering. In most cases, this happens when a company employs a worker who worked for a company that has an advanced technology or produces products that lead global technologies.

Table 1. Types of GVC Participation of Developing Countries

Types	Contents
Foreign Direct Investment	<ul style="list-style-type: none"> ■ Some foreign companies support local contractors directly by training the local contractors. ■ Most MNCs enhance the experiences and competencies of labor by training engineers and managers in local subsidiaries.
Joint Venture	<ul style="list-style-type: none"> ■ Gaining foreign mechanics, parts, raw material and foreign management technology from joint venture companies and gradually enhancing competencies to produce standardized products in large scale at low cost
Foreign and Local Buyers	<ul style="list-style-type: none"> ■ Foreign and local buyers are entrance to GVC and the main source of marketing and technology necessary for companies in developing countries. ■ Buyers provide information on various types of technology and product design and consulting on quality and cost of accounting procedure to local companies.
Licensing	<ul style="list-style-type: none"> ■ Under licensing contract, local companies pay for the right to sell products in local market and MNCs provide technologies.
Contracting	<ul style="list-style-type: none"> ■ MNCs train local companies under long-term contract. ■ Late comer companies should receive training and technical support and cooperate with the final product. ■ Contracting mostly happens in products and systems with low added value.
Unofficial Channel	<ul style="list-style-type: none"> ■ Including replication of products by employing foreign engineers under short-term contract.

OEM	<ul style="list-style-type: none"> ■ Type of contract that is a developed form of joint venture between MNCs and local suppliers that foreign partner provides advice on production and management and participates in training of engineers and workers, choice of capital.
OEM	<ul style="list-style-type: none"> ■ It started in the early 1980s. OBM is selected to avoid the risk of own brand by designing and specializing OEM electronic appliances and create higher added value.
Strategic Technology Partnership	<ul style="list-style-type: none"> ■ Late commer companies with big influence in GVC develop advanced new products and processes jointly with foreign companies to improve their position.
Overseas Acquisition	<ul style="list-style-type: none"> ■ Global leaders buy companies with advanced technology in idustrialized countries to obtain distribution, technology and production equipment in the proces of initializing their own GVC.

Source: ADB (2006).

2.1.1.3. Significance of Participation in GVC

Fragmentation of production that happens across the borders make many companies have predictable and transparent trade and investment norms with market opening. With the participation in GVC, the trade and industrial policies that can achieve growth and employment of a nation and companies and that are more aggressive become necessary.

GVC has emerged as a new source of economic growth, innovation and job creation. The conventional economic growth showed that when the economic power reaches to the level of advanced countries, industrial policies requires the strengthening of company's innovative sttructure, improvement of technological innovation at the corporate level and establishment of mutually beneficial relationwhip with other companies, suppliers, the government of consumers and related non-government sectors for economic growth based on the strengthening of internal competencies. However, active participation in GVC provides companies with an opportunity to have access to new technologies and upgrade technololgy through international network. Therefore, the expansion of GVC becomes a source of developing new foundation for growth and creating jobs.

Participation in GVC in new sectors aims to find an opportunity through the expansion of existing product categories. The use of GVC for the development of new industry to enter the new fields is meaningful in that it considers not only the procurement of raw materials and intermediate goods but also the possiblity of export under international network.

2.1.1.4. Characteristics of GVC in the ICT sector

a) Value Chain of the Manufacturing Industry

The typical structure of value chain in the manufacturing sector goes through a series of steps: Planning -> research and development -> production of prototype product -> mass production and assembly-> sales-> after sales service and maintenance. The added value structure in this process showed that mass production and assembly step generates the highest added value in the manufacturing industry up until the early 2000s. On the other hand, upstream parts including research and development, design, prototype production and downstream parts including after-sales service and maintenance had the lowest added value creating so-callsed reverse simle curve.

For example, a survey conducted by the Japanese Ministry of Economy, Trade and Industry in 2005 showed that the most profitable process in the whole manufacturing industry is manufacturing

2. Concept of GVC, the Need for SMEs' Participation in GVC and Opportunities

and assembly process and profit of research and development and after-sale service process is very low. It is judged that the Japanese manufacturing industry at that time could achieve the biggest profit in manufacturing and assembly process as it responded promptly to market change through information sharing and adjustment among different sectors and manage efficient production based on optimized procurement of raw and subsidiary materials and production management. However, the survey on Japanese manufacturing industry conducted in Dec. 2012 found that areas where companies obtain the highest revenue in the value chain process were research and development followed by marketing and brand development. Moreover, it is shown that the profit in the downstream parts including maintenance and after-sales service is relatively high while profits in the intermediate processes including production of parts and semi-finished products and processing, assembly and construction is relatively low. An increasing number of global companies emphasize importance of processes located at both ends of the spectrum like research and development, marketing and after-sales service more than intermediate processes including processing and assembly showing a typical smile curve phenomenon in the value chain structure.

Table 2. GVC Type of Manufacturing Industries

	Consumer-driven	Producer-driven		Science-based
		Scale-intensive	Professional supply-shape	
Major industry	<ul style="list-style-type: none"> Traditional industry 	<ul style="list-style-type: none"> Consumer durables Materials industry 	<ul style="list-style-type: none"> Industrial machinery precision equipment 	<ul style="list-style-type: none"> Electronics Fine chemicals
Leading Enterprises	<ul style="list-style-type: none"> Large user 	<ul style="list-style-type: none"> large-scale assembly companies Global enterprises 	<ul style="list-style-type: none"> company holding equipment development capabilities 	<ul style="list-style-type: none"> Company holding research and development capability
Competitive Mechanism	<ul style="list-style-type: none"> Cost 	<ul style="list-style-type: none"> Cost 	<ul style="list-style-type: none"> Performance 	<ul style="list-style-type: none"> Cost/performance
Exclusive possession of competitiveness	<ul style="list-style-type: none"> Brand Marketing Commercial Aesthetic design 	<ul style="list-style-type: none"> Secrets in processing Time difference in skill acquiring Patents Dynamic learning effect 	<ul style="list-style-type: none"> Designing know-how Knowledge of users Patents 	<ul style="list-style-type: none"> research and development know-how Patents process secret know-how Dynamic learning effect
Technical trajectory	<ul style="list-style-type: none"> Save cost 	<ul style="list-style-type: none"> Save cost (designing products) 	<ul style="list-style-type: none"> Designing products 	<ul style="list-style-type: none"> Save cost Designing products
Major upgrading process	<ul style="list-style-type: none"> Process 	<ul style="list-style-type: none"> Process 	<ul style="list-style-type: none"> Products 	<ul style="list-style-type: none"> Product process

Scale of leading companies	• SMEs • Large companies	• Large companies	• SMEs	• SMEs • Large companies
Diversified Technology	• Vertical	• Vertical	• Centralized	• Vertical

Source: Pavitt(1984), Joonho Lee-Jong-il Kim(2007).

b) Value Chain of the IT Industry

The competition of the global IT industry has entered the era of horizontal division of labor after global financial crisis. The international division of labor has been established in the Japanese IT materials industry -> Korean IT parts industry-> Chinese IT assembly and processing industry, each taking its respective roles contributing to the development of IT industry, but now, there is a fierce competition among these three countries as they established their own value chain. China has maintained its second position in the world beating out Japan since 2004 and has become number 1 producer in IT industry surpassing the US since 2006. Both the US and Japan witnessed the reduction of their share in the global IT market recording market share at 28.2% and 19.4% respectively in 2000 and 13.2% and 9.3% in 2013.

Table 3. Changes in Production Costs Rank among IT Manufacturing Countries

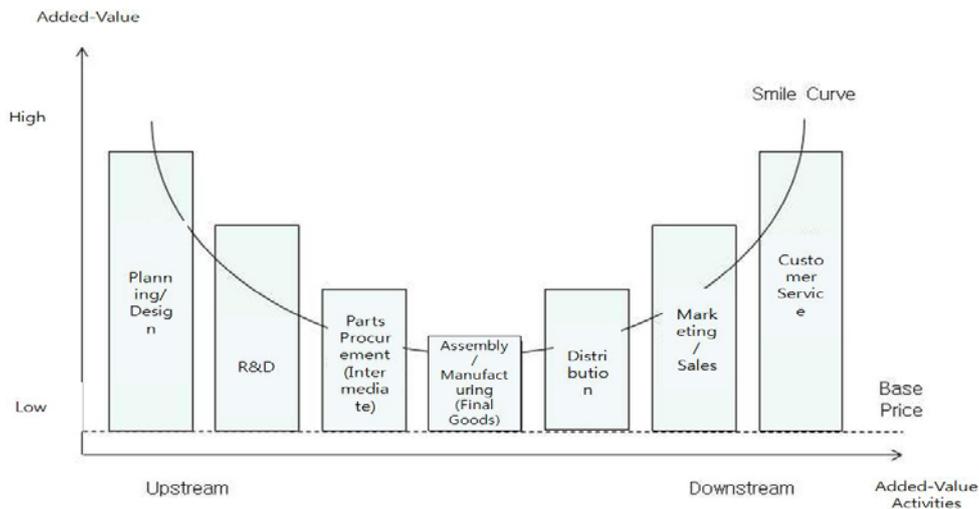
Rank	2000		2005		2013	
	Country	Importance (%)	Country	Importance (%)	Country	Importance (%)
1	USA	28.2	USA	19.2	China	34.0
2	Japan	19.3	China	19.0	USA	13.2
3	China	5.9	Japan	13.7	Japan	9.3
4	Korea	5.6	Korea	7.0	Korea	6.3
5	Germany	3.9	Germany	5.1	Taiwan	3.9

Source: Reed Electronics Research, Year Book of World Electronics Data

c) Value Chain of the ICT Industry

In general, value chain of the ICT industry is composed of a series of value creating activities including planning and designing of product, research and development, procurement of parts, production, sales and after-sales customer service. These processes are not limited to one area and taking place at the global level. Part manufacturers, finished goods manufacturers, distributors, consumers and companies which demand a product participate in the value chain. The industrial characteristics and value creation process are different for specific IT sector and sometimes, the structure can be more complicated in the real world.

Figure 5. Typical Value Chain of the ICT Industry Structure



Source: Korea Institute for Industrial Economics & Trade

In the value chain, input parts (upstream) such as designing and planning and research and development are very important in the ICT industry. Competition in the ICT market is very fierce with rapidly developing technologies and very short product lifecycle. Under the fierce competition environment, companies pursue new innovation and differentiation making the planning and designing and research and development important.

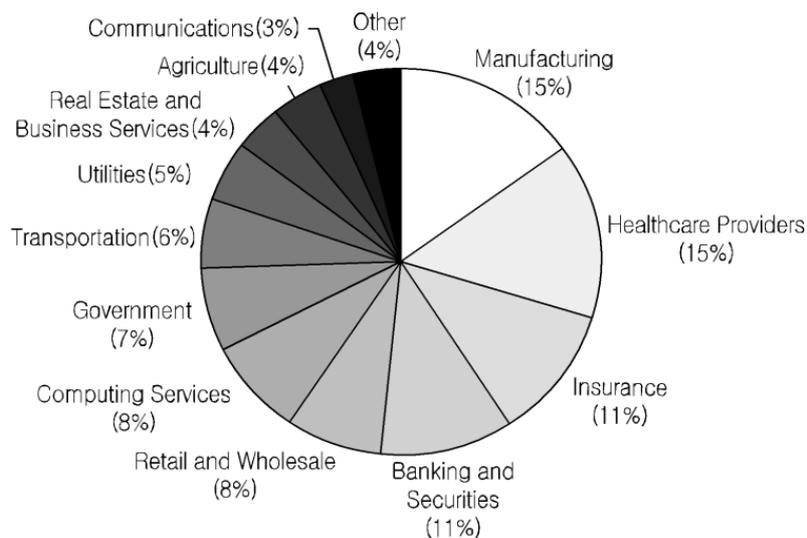
At the same stage, corporate vision and management style play an important role. In addition, specific activities including idea, technology and consumption environment analysis are also important. Securing excellent professionals will influence company's competitiveness significantly. The ICT sector shows the characteristics that the role of platform is becoming more important in the product design stage with the progress of convergence and being smart. It means that platforms are becoming the core element that determines the product design as platforms including operating system are required to make IT products such as smartphone work and operate.

Production stage can be divided into input of intermediate goods and production of final goods. At this stage, the most important part is price factor. Price competitiveness based on the reduction of production cost, securing parts with high efficiency and productivity and establishment of production system play an important role. For this reason, many global IT companies have their production base in the regions including China and Southeast Asian countries where they can secure high location competitiveness and production labor.

Sales and customer service process, which belongs to the downstream of value chain activities, is to provide values to consumers and create added value. At the sales stage, distribution network and marketing capabilities are important factors and establishment of brand image that represents consumer satisfaction and reliability is also important.

d) Value Chain of Internet of Things (IoT) Sector

Figure 6. Importance Portion Outlook of the IOT Industry In 2020



Source: Gartner (2013)

Global standardization organizations including ITU, 3GPP, IEEE and ETSI define internet of things (IoT) that makes all objects connected to the internet and share information in various ways. In particular, ITU³ interprets IoT as an intelligent environment where people and object or object and object can share information and communicate each other as equipment and objects are equipped with communications module and being connected to wire or wireless network. Recently, Gartner, a market research firm, expects that the number of devices with IoT function except for PCs, tablets and smartphones will reach 26 billion units by 2020 and the IoT market size will grow to 309 billion dollars by 2020 thanks to the increased demand for IoT products and services. In particular, it is expected that IoT will create added value of 1.9 trillion dollars in 2020 as various industries will continue to utilize IoT⁴.

Table 4. Economic Value Added Prospect of IoT (Unit: trillion \$, %)

Division	2014	2015	2016	2017	2018	2019	2020
Economic value added	0.4	0.5	0.6	0.8	10.	1.4	1.9
Growth	25	26	27	29	31	34	39

Source: Gartner (2013)

³ ITU-T(International Telecommunication Union-Telecommunication Standardization Sector): “The Internet of Things” report in 2005 expects that the internet in the future will enable information exchange through communications not only among people but also among objects making various services utilizing it possible.

⁴ Cellular-News(2013. 12), “Internet of Things Installed Base Will Grow to 26 Billion Units By 2020

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Korea Internet & Security Agency (KISA) (2012) classifies value change of IoT into semiconductor chip, module/ terminal, platform, network and service by quoting OVUM (2011) as a source. As each value chain is relatively fragmented, global collaboration and networking among companies in each area act as an important factor for the vitalization of market.

Table 5. Value Chain Structure of IOT

Division	Function	Companies
Semiconductor chips	sensor, wired and wireless communication chip, processor, memory, etc.	Qualcomm, Intel, ARM, Texas Instrument
Modules and terminals	module, device, equipment, etc.	Cinterion, Telit, Sierra, SIMCOM
platform	software platform, support, building solutions, etc.	Jasper Wireless, Logmein, Numerex, Amdocs, Axeda
network	wired and wireless networks etc.	Various wire and wireless communications service providers

Source: KISA (2012), p.11

2.1.2. Review of Precedent Studies on GVC

Title	Author	Publication	Contents
The governance of global value chains	Gereffi G., J. Humphrey and T. Sturgeon	2005	<ul style="list-style-type: none"> • Basic of GVC study • Theoretical explanation of GVC types, and the reason for GVC formation
Measuring success in the global economy: international trade, industrial upgrading, and business function outsourcing in global value chains	Sturgeon T. and G. Gereffi	2009	<ul style="list-style-type: none"> • Study that reviews quantitative analysis method of GVC • It pointed out that there is a need for analysis on details of company data and business functions in addition to trade data
Give credit where credit is due: Tracing value added in global production chains	Koopman R.W. Powers, Z.Wang and S.J. Wei	2010	<ul style="list-style-type: none"> • US International Trade Commission (USITC) introduced the result of development and analysis of international input-output table. • It estimated the indirect ripple effects of added value.

Title	Author	Publication	Contents
Staying Competitive in the Global Economy: Moving up the value chain	OECD	2007	<ul style="list-style-type: none"> • It is necessary to have a strategy to respond to globalization of developed countries if developing countries want to chase advanced countries.
Trade, crisis, and Recovery: restructuring global value chains	William M. and D. Winkler, World Bank	2010	<ul style="list-style-type: none"> • Since the global financial crisis, the GVC structure of the global economy has brought about fundamental changes. It is analyzed that production concentration increases in consumer goods and decreases in intermediate goods.
Who Captures Value in Global Supply Chains: Case Nokia N95 Smartphone	Anttila	2011	<ul style="list-style-type: none"> • The study analyzed Nokia's smartphone GVC based on added value • The study analyzed that assembly and processing are performed overseas including developing countries but added value is distributed to developed countries.
Who captures value in a global Innovation Network? The case of Apple's iPod	Jason Dedrick Kenneth L. Kraemer, and Greg Linden	2009	<ul style="list-style-type: none"> • The study analyzed the added value by allocating total profit of iPod to parts • The analysis showed that the value Apple obtained from technology innovation of iPod was very significant.
Analysis of Korea's Global Value Chain based on international industry input-output table	Woo-gi Lee, In-Kyu Lee, Young-Eun Hong	2013	<ul style="list-style-type: none"> • Overview of international industry input-output table • Trade capability calculation method based on added value • Comparison of trade relationship based on total volume and added value with major trading partners
Analysis and policy suggested of trade on employment and value-added	Nak-Gyun Choi, Jin-Hee Han	2012	<ul style="list-style-type: none"> • Trend analysis of employment and added value of GVC • Analysis on the effect of trade on employment and added value • Analysis on the impact of export on the employment and wage of skilled and unskilled labor • Analysis on the determining factor of trade based on added value

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Title	Author	Publication	Contents
Competitiveness in the international value chain of industry	Woo-jin Yoon	2012	<ul style="list-style-type: none"> • GVC structure and trade based on added value • Industrial competitiveness from the perspective of GVC and policy proposal
Analysis of International division of labor structure of Korea, China and Japan, and way to promote cooperation	Young-Suk Oh, Yoon-Ae Cho, Byung-gi Ha, Moon-Hyung Lee, Gong-Mok Sa, Sang-Ho Lee	2010	<ul style="list-style-type: none"> • Comparison of industrial structure and technology innovation structure of Korea, China and Japan • Analysis on the international division of labor structure and pattern of Korea, China and Japan • Ways to enhance international division of labor in the three countries • Ways to improve international division of labor and future image by industry
Economic effect analysis of FTA in region and the structure of East Asia's value chain	Nak-Gyun Choi, Young-Gui Kim	2013	<ul style="list-style-type: none"> • Analysis on East Asian value chain structure by the country and industry • Analysis on the added value structure within East Asia • Analysis on the economic effect of each FTA discussion scenario in East Asia in accordance with rules of origin based on added value
Industry competitive analysis and policy issues as seen from the structure of the international value chain	Jae-Duk Kim, Sung-Wook Hong, Ba-Woo Kim, Doo-Yong Kang, Hyuk-Joong Kim	2014	<ul style="list-style-type: none"> • Analysis on Korea's trade structure under GVC structure • Analysis on comparative advantage of each industry with added value based trade and external competitiveness based on real effective exchange rate • Trade policy and industrial policy suggestions that respond to intensifying GVC

2.1.3. Patterns and Types of GVC Structure

2.1.3.1. GVC Types Based on Governance Structure

In general, tuning or coordination by one or more companies is necessary to determine the production method in a certain value chain. The analysis on governance should be conducted first to understand the relationship between GVC and a company. That is because the governance of value chain not only determines matters related to how and what about the product/service to be produced by companies but also when, how much and to what extent (production timing, production volume and price). Therefore, it is very important to look at not just simple coordination among all entities

in GVC but governance that influences involvement and participation of entities in understanding GVC.⁵

Gereffi (1999) presents two forms of governance regarding value chain: producer driven chain and buyer driven chain.

- **Producer-driven chain:** In the producer-driven chain, MNCs or producers play the role of core coordinator of production network. Automotive, aerospace, computer, semiconductor and heavy industries belong to this chain and the chain usually forms a vertical governance structure.
- **Buyer-driven chain:** In the buyer-driven chain, large retailers or buyers govern the production network of exporters, who are distributed in the third world. In general, labor-intensive consumer goods industries including clothing, shoes, toy and handmade products industries belong to this chain and the chain usually forms a horizontal governance structure.

Humphrey and Schmitz (2000) classifies GVC into two based on the function of adjustment or coordination established between producers and buyers: arm's length market relationship and non-market relationship.

- **Arms'-length market relationship:** In this relationship, a producer cooperates with a professional buyer who is a mediator of the final market. For local SMEs, it is related to sales part of corporate value chain. In this chain, entities such as final retailer, MNCs which are provided with products globally through professional buyers in final consumption country or production network, local consumers and export agencies and large production companies which secure products or raw materials from local suppliers mainly govern GVC.
- **Non-market relationship:** In this relationship, mutually complementary network is established. Even though the coupling relationship by capital is weak, it is divided into quasi-hierarchical relationship in which dominant governor controls and hierarchical relationship in which relationship is linked with foreign direct investment (FDI). Network relationship happens between producers with a mutually complementary technology and similar influence providing an opportunity for individual SMEs to improve efficiency and competitiveness through economy of scale by forming clusters.

e.g.) Fabric industry in Italy, Silicon Valley and Hollywood film industry in the US

- **Quasi-hierarchical relationship:** The relationship between a buyer and a producer is not established through ownership but continues for a long period. This relationship is related to production parts of corporate value chain and influence of leading firms that govern global production network is significant. Leading firms determine standard of companies that can participate in GVC and product standard, support the suppliers (producers) to achieve product standard and abide the performance of producers.
- **Hierarchical relationship:** Producers enter the global market in the form of FDI. SMEs can participate as a subsidiary or branch office of MNCs.

⁵ Morrison, Pietrobelli & Rabellotti, 2008

Table 6. GVC Types Regarding the Control Structure of Value Chain

Type	Definition	Determinants
Arms-length relationship	It is a relationship between independent individual producers and consumers where complete competition that is referred to in the economics occur.	<ul style="list-style-type: none"> • Buyers and suppliers do not need to cooperate regarding the definition of product. • Suppliers define standard without product standardization or considering a certain customers.
Network relationship	It is a relationship where individual producers have similar technologies or are in mutually complementary relationship	<ul style="list-style-type: none"> • Cooperative relationship is maintained at the equal status and suppliers and buyers define product. • In most cases, buyers and suppliers are an innovator or leader in the technology or market.
Quasi-hierarchical relationship	Leading (dominant) firms control international production	<ul style="list-style-type: none"> • The degree of control between buyers and suppliers is high and buyers define product. • Buyers may experience the losses due to the failure of suppliers' performance, so they may doubt the capability of suppliers. If the capability of a supplier is not sufficient enough, buyers invest in a certain supplier or link the supplier to their value chain.
Hierarchical relationship	MNCs produce product through vertically integrated GVC.	<ul style="list-style-type: none"> • Buyers determine the definition of product and relevant technologies through their direct ownership.

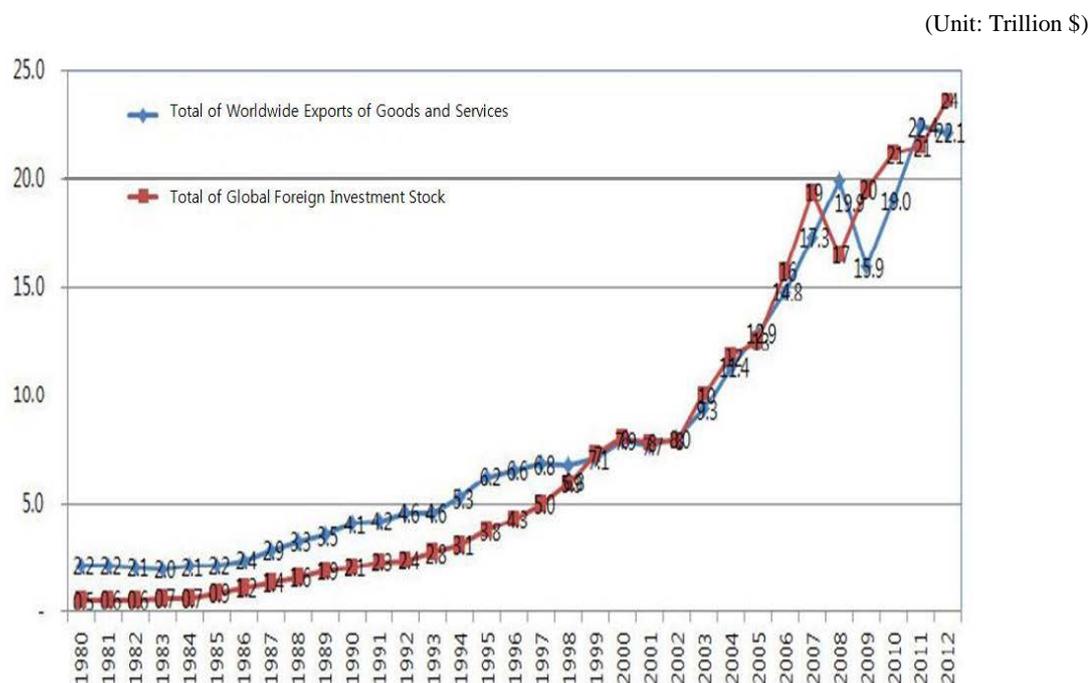
Source: Humphrey and Schmitz (2000), Kaplinsky and Readman (2001)

2.1.3.2. Interaction between FDI and GVC

Foreign direct investment (FDI) means outward foreign direct investment (OFDI) for the purpose of gaining capital to exercise management right or inward foreign direct investment (IFDI) where foreign companies invest in domestic companies.. As globalized companies operate global value chain with FDI, spread of GVC results in trade increase of intermediate goods and final goods. The United Nations Conference on Trade and Development (UNCTAD) reported that about 80% of total global trade volume is explained by GVC of MNCs and the share of intermediate goods, which is the determining evidence of GVC spread, has increased to 60% of global trade.⁶

⁶ Unctad(2013), 'World Investment Report'

Figure 7. Export Trends of Worldwide FDI Goods and Services



Source: Ji-Young Oh, Moo-Sup Jeong(2014).

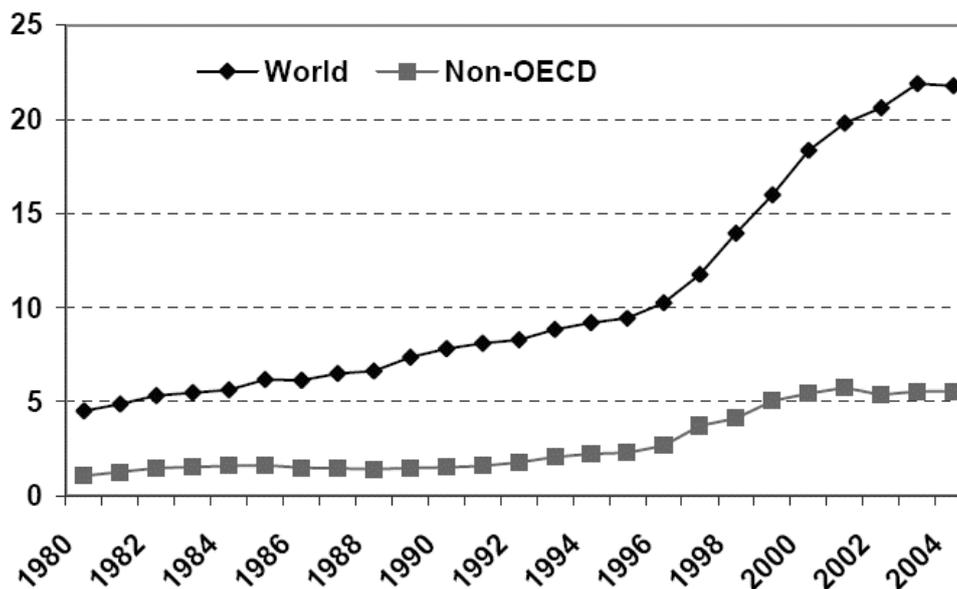
The Korea International Investment and Policy Status in the GVC perspective

With the globalization of value change based on the changes in the global economy, deregulation, liberalization and globalization have been occurring since the 1980s and accordingly, cross-border subcontracting, outsourcing and division of work for production have been accelerated. This means value chain goes beyond outsourcing to offshoring. As the relationship has been developed from the past connectivity based on product supply to division or work for production, the ways for conducting transaction have been diversified and divided into arm's length basis relationship, cluster, global production networks and transnational company (TNC) family. However, the share of networks and affiliation is gradually growing compared to the share of arm's length basis relationship.

As the value chain attracts the globalization, companies participating in the GVC conduct their activities to secure competitiveness based on strategic partnership among companies. Accordingly, GVC becomes accompanied by long-term transaction relationship among companies leading to various forms of FDI including equity investment, M&A and the establishment of a subsidiary. The biggest reason for the increase in the inflow of overseas capital to developing countries in recent years is the increase in FDI but the share of developing countries in total FDI has not increased. It means that all aspects of value chain are being globalized in addition to production cost.⁷ In addition it reflects the fact that FDI is related not only to the relocation of production base to low labor cost countries to reduce production cost but also related to diversification of regions and countries for high-functional production activities including product development, technology innovation and marketing leading to deepening division of labor for production among advanced countries.

⁷⁷ Kaplinsky and Readman, 2001

Figure 8. Changes in World FDI Stock



Source: The ratio of foreign direct investment stock in the world ordinary price GDP(%).

Source: Pain et al.(2006).Ratio(%).

Recently, what is important to maintain a company's or a nation's competitiveness is not the participation in the global market but how does a company or a nation participate in GVC and enjoy continuous growth. This boils down to the effectiveness of FDI. The same company can participate in both outward FDI and inward FDI and it cannot be said that only one of them is desirable. What is important here is the effectiveness of both FDI. SMEs are not in a favorable position to participate in GVC due to the shortage of internal resources but GVC may provide an opportunity for growth to SMEs from the perspective of possible expansion of market and partnership.

As well known, FDI has contributed to productivity increase, employment increase and economic growth through the transfer of management techniques suitable for capital. It is reported that the recent FDI has a significant impact on employment and sales.

- Average number of employees of FDI companies: 370 (2002) → 412 (2005)
- Average number of employees of companies with more than 100 employees: maintaining the level of 700 employees (domestic companies maintain the level of 285 employees)⁸

In particular, direct investment of huge MNCs generates the effects of technology transfer (sophistication of industrial structure), development of backward areas, job creation, increase of export competitiveness and capital inflow in the local country and the investment type is determined by the role of industrial competencies in each region within GVC coordinated by MNCs. Korea is in the middle between advanced countries and developing countries like China in terms of technology level, therefore Korea may secure continuous industrial competitiveness by maintaining technological superiority compared to cost. Recently, MNCs are expanding the role of domestic SMEs not only in

⁸ Jeong Joing-in, Park Sang-ho (2007).

production base but also in research and development and the expansion of SMEs' role through MNC's GVC has become a major route for globalization of SMEs.

FDI is very important for SMEs considering their relatively low productivity compared to large companies and the need for technology sophistication and exploration of overseas markets. In mechanical and chemical industries where there is no focal firms, overseas MNCs play the role of focal firms. Compared with industrial activities of advanced countries, the share of electronic and electrical products in export is very high and that of chemical and general mechanical products is relatively low in Korea implying that the role of focal firms in these areas is not sufficient enough. If the labor productivity by industry in Korea is compared to that of advanced countries, the gap is narrowing at a rapid pace in the manufacturing industry which is led by large companies including electronic and electrical products and transportation equipment while the gap has not been narrowed in the light industry like fabric and paper printing sector for the past 20 years. The ratio of heavy and chemical industry to light industry is high in Korea compared with that of other advanced countries implying that Korea's industrial structure is concentrated on a certain industries including electric and electrical products and transportation equipment sector where large Korean companies play the role of focal firms. It is implied that the activities of SMEs should be active in various industries including light industry for stable growth making connection with overseas MNCs all the more important.

2.1.4. Significance of SMEs' Participation in GVC

2.1.4.1. Significance and Necessity of Participation

Except for SMEs' participation in GVC or entry into global market on their own, the methods and types of participation in GVC based on cooperation between large companies and SMEs can take various forms. SMEs may be integrated into supply chain or distribution chain of large companies home and abroad or integrated into various value chains of the companies in many regions.

Joint entry into overseas market is one of the strategies to strengthen global competitiveness and create new markets for SMEs. It should be noted that joint entry into overseas markets by large companies and SMEs does not end up with unilateral and beneficial support from large companies to SMEs but brings about actual results as it is easy for large companies and SMEs to maintain cooperative relationship without conflicts of interest in overseas markets. It means that when large companies jointly enter overseas market with core partners in the same country, they can minimize the dependency on local companies and maintain quality stably increasing the possibility of success in entry into overseas markets and SMEs can expand the sales channel in overseas markets utilizing the infrastructure and brand power of large companies making it possible for them to achieve original goal of joint growth. The joint entry into overseas market is meaningful in that experience and information accumulated in large companies are transferred to SMEs creating win win situation for both large companies and SMEs upon joint entry into overseas markets.

2.1.4.2. Benefits of Participation

a) Opportunities for SMEs through GVC

For SMEs, sophistication by being integrated into GVC can be one of the important strategies as they cannot achieve economies of scale in terms of purchase, equipment and service and do not have sufficient internal resources to respond to dynamic changes in demand and identification of potential

2. Concept of GVC, the Need for SMEs' Participation in GVC and Opportunities

market independently. The spread of GVC and the opportunities for SMEs by being integrated into GVC are as follows:

First, it is possible to provide an opportunity to realize a new business for SMEs. In particular, it is encouraging that the opportunities for SMEs to participate in GVC are increasing thanks to the utilization of ICT and relevant services and the development of transportation. The increase in large companies' order for subcontracting work through GVC can create new business opportunity and contribute to the stability of business for SMEs. The participation as a subcontractor in GVC makes it possible for SMEs to participate in global markets at the cost lower than the cost occurred when individual SMEs produce products.

With the participation in GVC, SMEs can upgrade their labor and technical resources by being exposed to learning process among partners in global production network and accordingly, the possibility for entering new chains that can create higher added value. The economies of scale based on cooperation among companies cause positive effects for SME in terms of upgrading "process" and "product", but SMEs should participate in continuous upgrading process by participating in GVC to survive in global competition as the exchange of management techniques and knowledge becomes more important as advancement of "functions" and "chains". SMEs can learn as large companies in cooperative relationship provide technology that meets international standard and system as well as future production demand and the learning experience has an effect to learn potential movement to another chain. In addition, the innovation of various technologies and management styles learned at the point where SMEs meet with global companies accelerates the upgrade of SMEs and finally improve the international competitiveness of SMEs.

Table 7. 4 Types of Upgrading

Division	Contents
Process upgrading	It means that the process of turning inputs into outputs is performed more efficiently by restructuring manufacturing system or adopting more advanced technologies.
Product upgrading	It means the movement to more sophisticated product that can provide more profits from the price perspective.
Functional upgrading	It means obtaining new technologies to perform functions that can create higher added value in the value chain like design and marketing and discarding existing functions that create low added value in the value chain.
Chain upgrading	It means the application of competition elements obtained in the process of performing a certain function in the value chain to a new area.

Source: Kaplinsky and Morris (2001)

The learning experience obtained in the process of cooperation among SMEs to be incorporated into large companies' value chain can be important resources. Ernst (2003 b) explained that cooperation among SMEs/micro businesses in value chain generate the opportunity to utilize new technologies and economies of scale under the assumption that innovation is the key to competitiveness and drives productivity growth. This realizes the improvement of learning effect and production growth through vertical connection and production network in GVC.

Another benefits that SMEs may get is the realization of reasonable production through overseas

outsourcing and strategic asset acquisition. SMEs in developing countries improve their competitiveness based on the acquisition of strategic assets, technology, endowed resources and access to global market through FDI. ENSR survey (2003) showed that a third of SMEs surveyed responded that they are not involved in export activities implying that the establishment of overseas subsidiaries by SMEs is not intended to lay the foundation for product sales but to make the basis to access cheap labor, knowledge and technology. The survey results implicate that globalized SMEs put emphasis on various forms of cooperation, either officially or unofficially with domestic and overseas companies.

b) Opportunities for SMEs through Access to Platform

Platform refers to a set of solutions to issues that can be used by members of ecosystem based on connection point and group of interfaces. It is a solution to common issues in the corporate ecosystem, which can be shared. The members of the ecosystem create innovation based on the platform⁹. The role of the platform leader is very important to make this platform work effectively. Platform leader needs to share many parts of values created with the whole ecosystem and keep the balance between maintaining its own values and generosity to share the value with others. Because platform leader can improve the overall health of corporate ecosystem by providing platform, which is stable and predictable group of common assets that can be used by different groups to realize their products/services, strategies and implementation tools. In addition, platform leader increases the soundness of the ecosystem by providing reliable reference point that helps participants in pursuing technology innovation in a consistent manner and responding to new and uncertain environment. In addition, network participants can simplify complicated and connected works using common assets provided by platform leader or making creation of new products by the third party more efficient improving the productivity of ecosystem.

The process of creating values by the use of platform works around two different pillars: economies of scale and network externality. In some cases, the economies of scale plays a bigger role and in other cases, network externality plays a bigger role depending on the type of platform.

The economies of scale is a basic concept in economics and refer to the effect that reduces unit cost as scales (e.g.: production volume, usage, etc.) increase. In case of car platform, if more types of car are designed with the same platform, the cost per car type is reduced as the fixed cost for platform development is spread to many types of car. Outsourcing is largely generalized by economies of scale in that developed infrastructure can be provided to many companies reducing unit cost. In case of Amazon, the unit cost can be reduced as more sellers use the e-commerce infrastructure, which was already developed. It can be said that open type that anyone can use is better as more users should be secured to maximize the economies of scale. Network externality refers to growing values with more connected people or connected companies. App Store of Apple or Facebook has a bigger value in

⁹ In the IT industry, operating system of Microsoft platform provides an access to hardware and one does not need to know how does hardware work. Operating system is connected to basic functions such as disk, device, security, basic user interface, access to printer and video screen. Manufacturing platforms in semiconductor such as TSMC and UMC provide various kinds of design companies with manufacturing capability. This reduces the need for understanding detailed manufacturing process or investing in manufacturing assets dramatically for design organizations. Payment platforms such as VISA card or Master card reduce the need for concerning accuracy or risk of transactions for individual banks. Regardless of details or complexity of platforms, or regardless of sophistication or official procedures that present interfaces, platforms that look very different have a similar architecture playing a very similar and fundamental role.

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many people who demand the service and providers connected to the platform than in economies of scale. The bigger value is generated as application I need or people I want to contact exist when I visit App Store or Facebook. The values are growing exponentially with higher number of people or companies connected to platform (network).

Meanwhile one of the characteristics of network externality is that one platform that takes the lead in the market is likely to be far ahead of others. The larger the platform is, the larger the entire value will be created attracting most users to that platform. The network externality gets stronger in case where connection is important. SMEs which want to enter overseas market want to find a solution to possible problems they may encounter upon entry into overseas market. Usually the solution comes from trials and errors for a long time. If large companies or supporting agencies can provide this platform upon joint entry into overseas markets, SMEs can achieve more effective and efficient results from entry into overseas markets. In case of joint entry into overseas markets, the platform provided by large companies or supporting agencies should make SMEs' activities more productive, stable and innovative and should focus on the distribution of values provided by the platform appropriately. In addition, the joint entry into overseas market with SMEs becomes reasonable when the economies of scale and network externality are considered by large companies or supporting agencies upon the establishment of platform. In this regard, the platform for joint entry into overseas markets should integrate individual platforms expecting network externality.

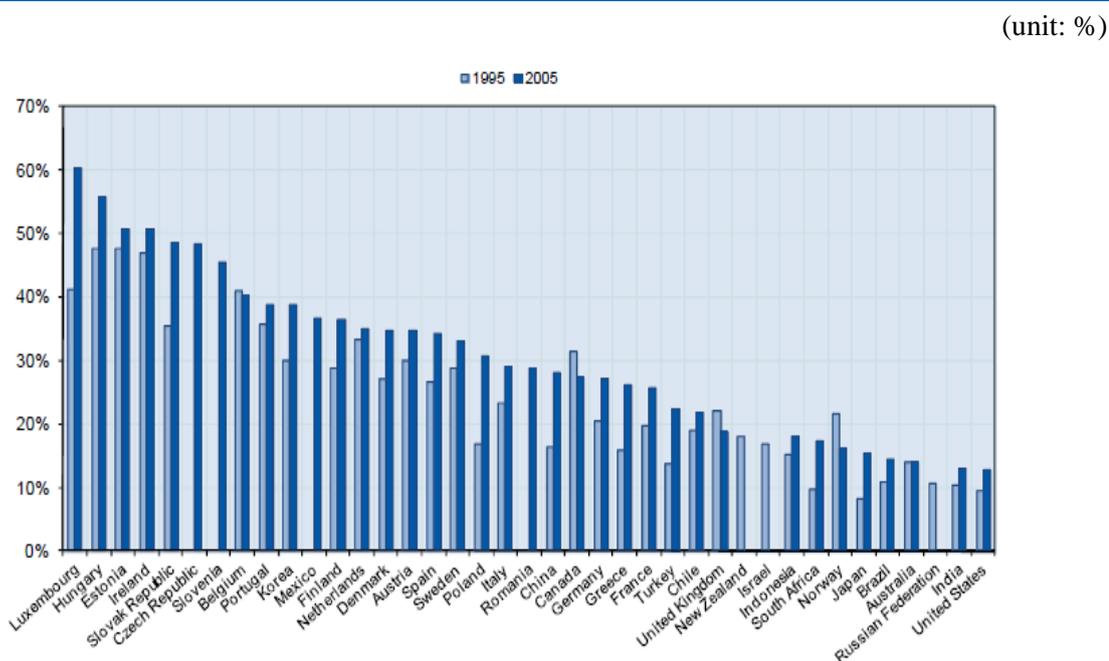
It is necessary to pay attention to how values are distributed from the perspective that joint entry into overseas markets is pursued as an extension of domestic trade relationship. In some cases, large companies use SMEs as a means to reduce risks upon entry into overseas markets putting burden on SMEs. Usually, joint entry into overseas markets assumes the partnership, which is the final stage of cooperation or trust, but in fact, either party may show opportunistic behavior at this stage. In this regard, policy should not only promote but also monitor the joint entry into overseas markets.

2.2. Changes and Development of GVC Structure

2.2.1. Outlook of GVC Structure Changes

It is important to identify the distribution of added value in division of labor and trade among countries or companies accurately to determine industrial competitiveness among countries accurately from the perspective of GVC. It means that it is necessary to have a different view in understanding traditional trade by analyzing industries and countries that create added value in the process of global production from the production of raw material to the completion of final goods and calculating import and export of added value in bilateral trade based on final demand countries.

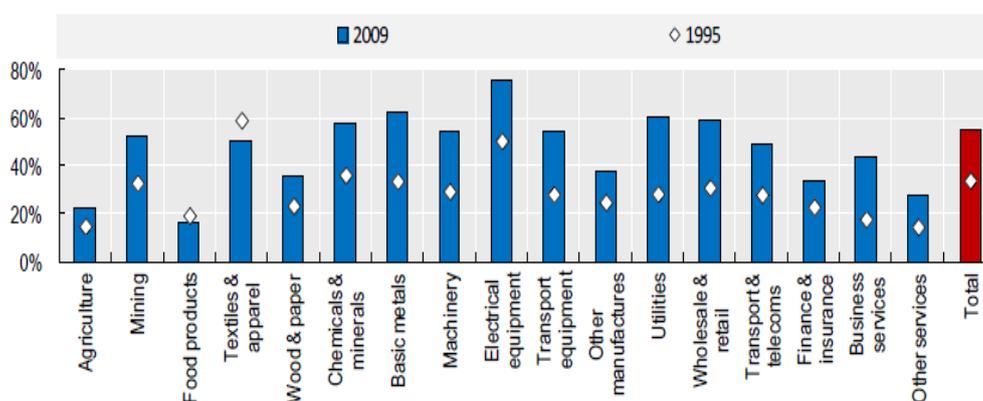
Figure 9. Import Ratio into Export Each Nation



Source: *International Comparative Evidence on Global Value Chains*, Koen De Backer & Norihiko Yamano, OECD Science, Technology and Industry Working Papers 2012/03

De Becker and Yamano (2012) compared the share of imports including intermediate goods in each countries' export with figures for 1995 and 2005. Luxembourg was ranked top with the ratio of slightly over 40% in 1995 and 60% in 2005. In case of Japan, the share of import in export is increasing, but as expected the ratio itself is low at about 10% in 1995 and 20% in 2005. The lowest ratio was found in the US with 10% in 1995 and less than 20% in 2005. The ratio of China was about 16% in 2005 to less than 30% in 2005.

Figure 10. Import Intermediate Materials Ratio Utilized in the Export Production



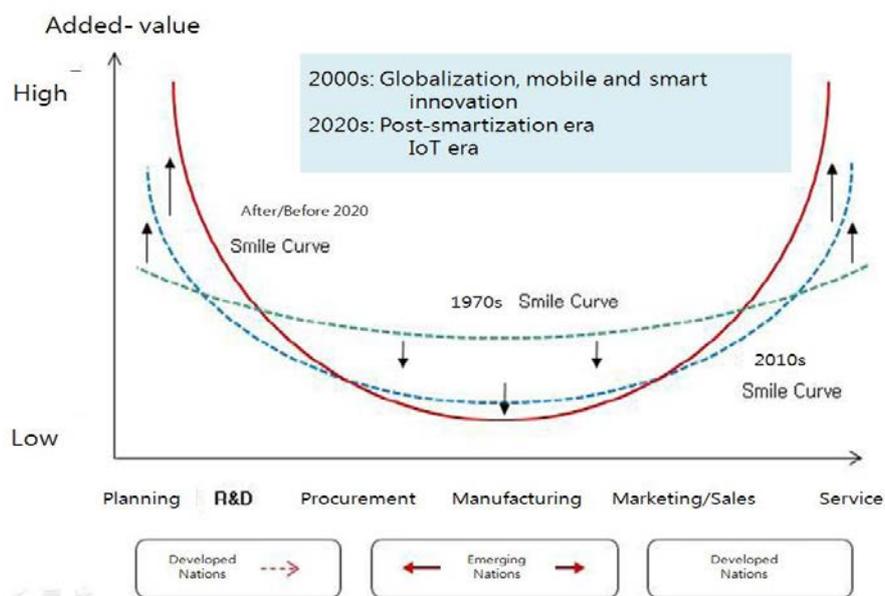
Source: Korea, OECD/WTO TRADE IN VALUE-ADDED (TIVA) INDICATORS (2013).

2. Concept of GVC, the Need for SMEs' Participation in GVC and Opportunities

In the 2000s, the level of added value created from intangible value chain in GVC is growing. That is because in the past industrialization era, most added value came from the manufacturing industry, but in the era of informatization age intangible knowledge including planning capability to come up with a new innovative products and services, research and development and marketing is the source of added value.

It is expected that intangible value chain will create more added value in the global ICT industry. Because securing knowledge-based capability including core technology and service will be more important by 2020 with the outstanding development of ICT convergence and smart technology. In particular, in the upcoming internet of things (IoT) era¹⁰, intangible assets are expected to be very important as a source of high added value creation. The value chain structure of IoT is largely divided into device and service area and IoT is more oriented to service than to hardware device requiring core technology including solution and platform. From the device perspective, semiconductor and sensor technology are important. Therefore, companies that secured these core technologies will lead the GVC in the ICT sector realizing high added value. In addition, in the IoT era, it is expected that appropriate judgement and determination can be made based on IoT with the use of innovative technologies such as big data and smart sensing beyond just exchanging information with the connection between people and objects. In this regard, it is expected that more added value will be create from intangible value chain activities including planning, design, research and development and service by 2020.

Figure 11. World GVC Structure and Outlook of the Change in the Value-Added



Source: KIET

¹⁰ Internet of Things (IoT) is the concept where all objects and people are connected with sensor and network and interact with all information in reality and virtual world.

Currently, the share of emerging countries in common use parts and assembly activities is high in GVC, but in the future, their share of R&D and entry into global markets in the fields of core parts, software and service is expected to grow significantly. This is already shown in the case of Lenovo of China leading the global PC market and Huawei emerging as number 2 company through its emphasis on research and development in the global communications equipment market, which traditionally has been led by the US and Europe. In addition, late comers¹¹ including China and Taiwan strengthen their investment in R&D regarding core areas such as digital TV, smartphone, display and system semiconductor expanding their global value chain. In particular, China is pursuing changes into high value added structure by strengthening investment in technology and innovation moving away from its concentration on production activities in the ICT sector.

In the meantime, advanced countries have focused on core areas including product design, research and development and service by outsourcing production part in the value chain to emerging countries. However, major advanced countries including the US and Japan recently pursue the policy that promotes the manufacturing industry as a tool to overcome economic recession after global financial crisis and vitalize economy. In short, the U-turn of the manufacturing industry, that moves production plant or R&D center located in other countries to one's own country, which is also called reshoring phenomenon is occurring.

For example, GE, the largest home appliance manufacturer in the US relocated washing machine and refrigerator plant in China to the US and established new home appliance plant in the US and Apple and Google push ahead with a plan to produce their own products in the US. Japanese IT companies including Sony, Sharp and Panasonic are also changing to expand their production plant within their own territory. The "Industrie4.0" strategy by Germany to realize the fourth industrial revolution by converging ICT with manufacturing technology is conducted in the similar context.

It seems that the recent reshoring phenomenon of advanced countries is due to reduced competitiveness of the manufacturing industry overseas and easy utilization of experts, reduction of logistics cost and protection of core technologies in the domestic market. The advanced countries' emphasis on the manufacturing industry and efforts to make the manufacturing industry high added value seem to continue for some time. Accordingly, the role of an advanced country as a provider is expected to expand further in the global ICT market.

2.2.2. Implications of Structural Changes of GVC

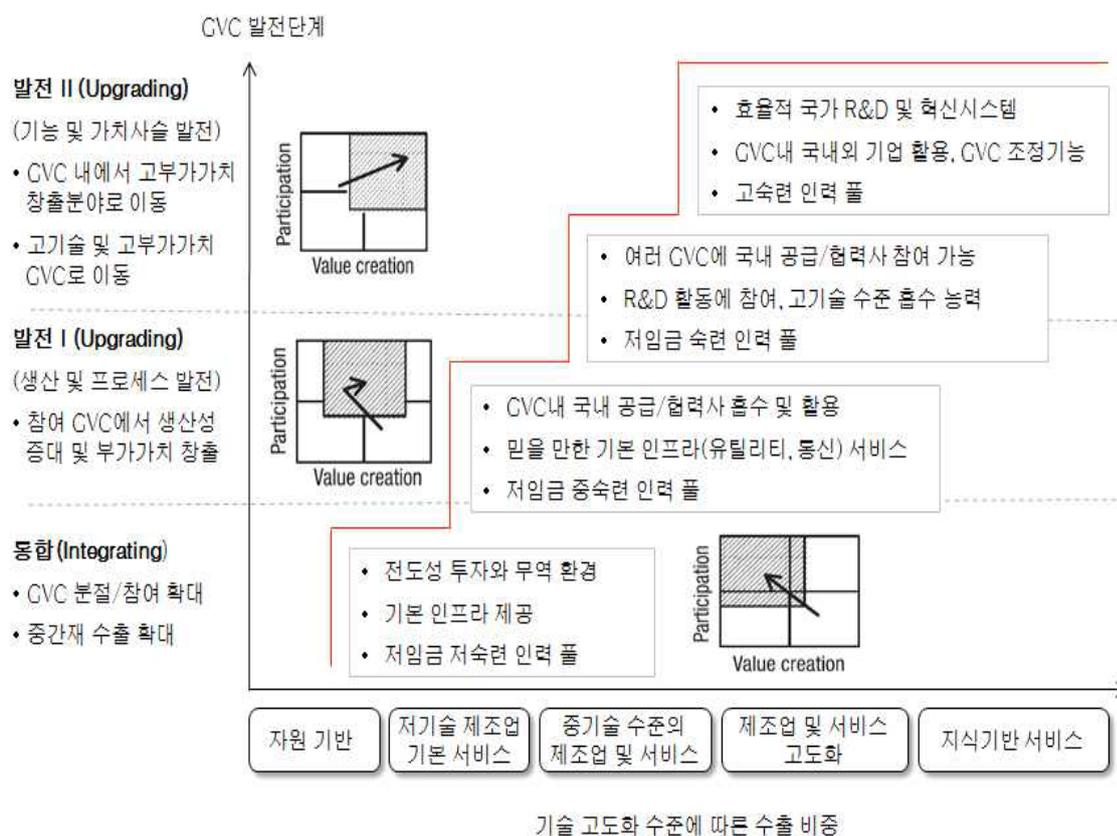
Successful development of GVC should not depend on trade considering only on simple participation in GVC and creation of domestic added value. It should be accompanied by the sophistication of technology. In the integration stage, participation in GVC is expanded based on low-skilled labor and basic infrastructure and export of intermediate goods based on resources increases, but the level of added value created is low compared with export. However more added value will be created by participating in various GVCs with the sophistication of goods and services if one's technology is developed further and productivity is improved based on high-skilled labor. As advanced countries relocate their production plant to other countries or expand outsourcing, the share of advanced countries in the global ICT export market has been reduced while the share of the Asian

¹¹ Major companies include China's TCL, XiaoMi, BOE, Spread Spectrum, Taiwan's Foxconn, TSMC and Innolux.

2. Concept of GVC, the Need for SMEs' Participation in GVC and Opportunities

countries including China has increased significantly. It means that the participation of emerging countries in the part procurement and assembly stage in the GVC that is led by advanced countries is expanding.

Figure 12. Facilitating Factor and Condition for Each Development Stage of GVC



Source: UNCTAD(2013b)

Broadly, GVC shows three steps of development. The first step is integration one where participation in GVC is expanded. Second step is the one where production and process are developed. The last step is the process that develops GVC function and value chain.

2013 UNCTAD survey result shows that most GVCs enter the stage of integration with slight difference among emerging countries. With the expansion and maturity of GVC, active participation of overseas entities within GVC and the establishment of experts, efficient national R&D and innovation system, very high added value can be created through production and export of knowledge-based products and services. Participating entities will move to other areas in the value chain like R&D by creating more added value or participating in other GVC. In addition, they can create high added value by leading GVC based on high-level core competency and innovative infrastructure.

Underdeveloped countries where industrial foundation and resources are not sufficient are hard to participate in global ICT industry GVC while China and major Southeast Asian countries have advantage of having cheap and skilled production labor with industrial foundation and demand market with high growth potential. This is because they can create more added value in GVC by doing so. China has become the world's largest production base by participating in GVC actively and the export

in ICT sector and added value have increased at a rapid pace since 2000. From the different angle, it can be said that this is the result of assigning production activities to China, which is the best place for production, to increase the productivity and added value of GVC led by major countries.

However, production bases are moving to major Southeast Asian countries including Vietnam or U-turn of the manufacturing industry to one's own country like the US and Japan appears as the advantage of China reduces gradually. In addition, this phenomenon influences the trade structure of invested countries. For example, as major Korean ICT companies including Samsung Electronics have expanded their investment in production in Vietnam significantly since 2011, the Vietnam's export of mobile phone and import of mobile phone parts from Korea have been on the rapid rise.

It is implied that improvement is required as the share of added value to export is low compared to that of the US, EU, Japan and China and the share of added value created domestically is decreasing. For the development of companies or the whole industry, export strategy that considers not just the quantitative expansion of export volume but also qualitative aspects is required.

The fact that competition among companies at the global level is getting fiercer and late comers including China participate in GVC actively showing their presence gradually in high technology area indicates that strategy that leads GVC through optimized allocation of ICT production activities and securing core competencies in promising sector is prepared in an urgent manner.

The overseas investment target of IT manufacturing sector has been changed to state-of-the art technology sector since the late 2000s and export items have been sophisticated. As such, the quality of overseas investment is changing from investment focusing on finished goods to investment focusing on parts. Accordingly, strengthening competency regarding planning and development of new and innovative products is required and innovative system and software that can create high added value and is required to lead GVC would be prepared.

2. Concept of GVC, the Need for SMEs' Participation in GVC and Opportunities

3. Changing GVC Structure in ICT Industry

3.1. GVC Structure and Current ICT Industry - Focus on Korean Companies

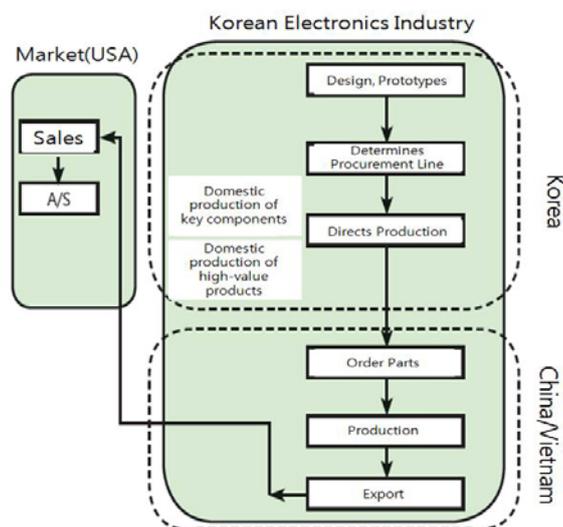
3.1.1. GVC Structure by Sector

3.1.1.1. Home Appliance

The GVC structure of the electronics industry including home appliance shows that electronic industry of an advanced countries are establishing a new globalization strategy through the establishment of GVC. It is attributed to the reduction of transaction cost with the development of IT and spread of global production network establishment and outsourcing with reduced trade barriers as a result of joining WTO. Accordingly, division of structure within the industry value chain is accelerated changing the global comparative advantage reshaping the industrial base at the global level.

As shown in the investment of Samsung Electronics in the LCD factory in Suzhou, China, market-oriented production process is moved to a country with superiority of marketability and as is the case with Samsung Electronics' investment in smartphone factory in Vietnam, the production process with high production marginal cost is concentrated on a country with low marginal production cost.

Figure 13. Division of Labor in the Value Chain of Global Electronics Companies



Source: KIET

In particular, multinational electronics companies prefer countries which joined WTO as the countries guarantee intellectual property rights and international trade norms like China and Vietnam. With the active entry of multinational companies into emerging countries through GVC, technology transfer and diffusion occur at the same time accelerating the speed of obtaining technology. In emerging countries, employment is expanded and income level increases improving purchasing power with increased trade on goods.

Multinational companies are establishing GVC structure by dividing core roles to play between

3. GVC Structure and Changes in the ICT Industry

headquarters and overseas production base.

First, the role of overseas production base focuses on the production of product. Design and making prototype product are conducted mainly in the country where headquarters is located, and technology and knowhow have become a black box. In addition, the value chain structure has a business model where high added value product is produced in the country where headquarters is located while supplies are produced in emerging countries (China, Vietnam, India, etc.). In case of part supplies, the ratio of supplies secured in the local country is maintained at a certain level but procurement from partner companies with which large companies jointly enter overseas market has a priority and others are procured from local companies.

In the meantime, electronics companies in advanced countries select participating companies to establish GVC in the manufacturing process and concentrate on development for massive production of finished goods. In this case, electronics parts companies are selected as a participant in GVC expanding their market. For example, Apple requests core parts to GVC participants for the mass production of iPhone series and signed an agreement with the GVC participants to provide AP, display, memory semiconductor and battery.

In the past, large electronics companies in Korea have established production system that has a vertical integration structure. However, recently, significant portion of manufacturing process is being outsource or moved to other countries (offshoring) with the spread of GVC.

Korean electronics companies are relocating their production base to a number of emerging countries through cost and market-oriented international division of work to overcome increase in manufacturing cost of Korea and narrow market. Usually Korean electronics companies are moving their GVC base from Korea to China to Vietnam.

In the early 2000s, many Korean electronics companies went to China. At that time, the entry into China took the form of assembly of finished goods (mobile phone, DVD, etc.) to reduce manufacturing cost. Korean electronics companies began investment in manufacturing plant in China where labor cost is cheap as part of their efforts to restructure domestic industrial structure after China joined IMF in late 2001. At that time, investment area was assembly of finished goods such as video and sound device, wired communications equipment and computer at that time.

In the 2010s, Korean companies began investment in state-of-the-art technologies such as semiconductor focusing on capital intensive large process industry targeting local market in China. In short, investment is being made mainly on state-of-the-art core parts accompanied by large scale process industry including semiconductor, LCD and battery. In particular, memory semiconductor, display and secondary battery are the core parts areas that remain in Korea and investment scale is getting bigger.

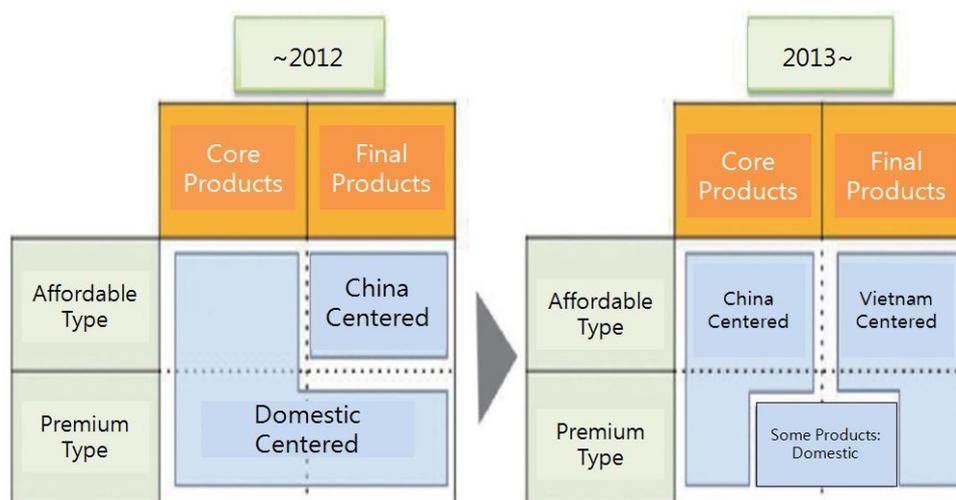
However, restructuring of new GVC base started in the 2010s. Even though many Korean electronics companies went to China after 2002, but they relocate overseas production base to Vietnam starting from 2013. In particular, finished goods companies began relocation of their production base to Vietnam which has a similar political and economic system with China.

Vietnam is attracting foreign investment actively by utilizing their advantage in non-tariff for electronics related items regardless of country of origin by participating in Information Technology Agreement (ITA)¹² after it joined WTO in 2007. As a result, active investment was made in the

¹² ITA (Information Technology Agreement: It refers to the information technology agreement within WTO that stipulates the removal of tariff on IT products in trade, which took effect in July, 1997.

textile and sewing industry was made in Vietnam in early stage but production base for finished goods including smartphone, DTV, refrigerator, air conditioner, washing machine and microwave oven has been relocated from China to Vietnam since 2013. This is attributed to rapid increase in manufacturing cost including labor cost in China and increased uncertainty in economic growth.

Figure 14. Current Status of GVC Base Restructuring Of Korean Electronics Industry



Source: KIET

As a result, Korean electronics companies began to implement survival strategy that restructures GVC bases in response to recent production cost increase in China. In short, GVC bases are restructured to focus their activities on state-of-the art core parts including semiconductor, display and secondary battery in China and on finished goods including mobile device and home appliance in Vietnam.

China and Vietnam joined WTO meaning that they guarantee the international trade norms as well as ITA. For the successful entry into overseas market, electronics companies prefer countries that signed ITA under which free trade without tariff can be conducted regardless of country of origin.

3.1.1.2. Smartphone

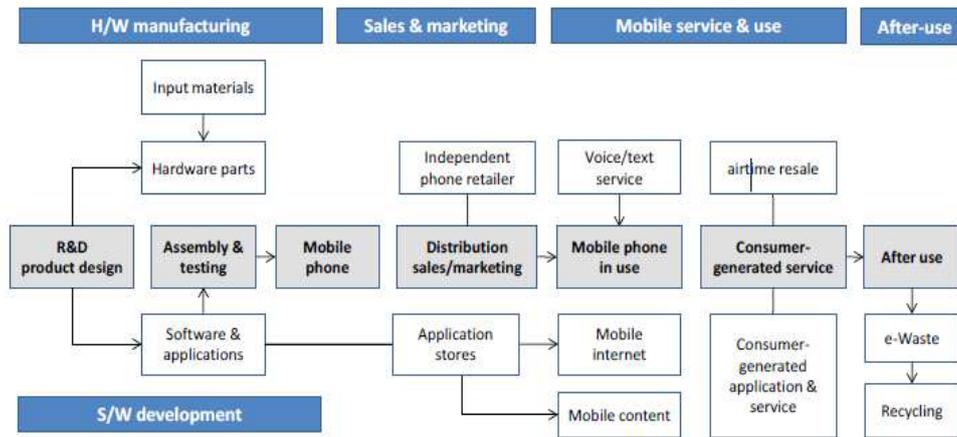
Smartphone is one of the fields that integrate the latest technologies including hardware, software and service of a country or a company comprehensively. It covers all stages of value chain activities from hardware manufacturing to sales and marketing, to mobile service and after-use service.

a) GVC Structure of Smartphone

Manufacturing stage shows that value creation activities from inputs including R&D and design, parts procurement and assembly to the production of mobilephone, a final product, are well conducted. As the characteristics of IT convergence products with high functionality, multi-function and smart function, are reflected, software and application are emphasized. The stages after the production of mobilephone are the same covering distribution, sales, marketing and service. What is different from other industry is that mobile internet, contents and application service as a support area

(or complementary goods) are linked with value creation activities of sales and service.

Figure 15. Value Chain Structure of Mobile Phone



Source: Lee J., G. Gereffi and D. Nathan(2013)

b) Current Status of Mobile Phone GVC

Mobile phone GVC is composed of inputs, manufacturing of hardware, development of software, mobile service and use, recycling and disposal covering planning to post treatment of product. The mobile phone GVC is unique in that hardware and software are combined and it has been globalized with growing participation of developing countries.

Mobile phone GVC encompasses various labor workers from African coal miners who mine core raw minerals such as coltan, young migrant assembler from China, software developer from India and mobile phone salesperson from many developing countries. Despite this global nature, the core part of GVC is concentrated heavily on some countries or companies. As pointed out above, the export of mobile phone has increased for a small number of developing countries such as China and Mexico for the past 10 years and the mobile phone export boom shown in other countries continued for a short term. The share of top 5 exporters in global export volume increased significantly from 52% in 2001 to 72% in 2011.

However, the values created from mobile phone GVC are disproportionately concentrated on a number of countries and leading companies and small profits went to representative suppliers. For example, the amount that Chinese manufacturers can earn from exporting one unit of iPhone 4 is a near 1% of retail price (600 dollars). Most of the values go to large electronics companies that provide high technology parts including semiconductor and display in advanced countries including Korea, US and Germany and Apple which designed and promoted the product.

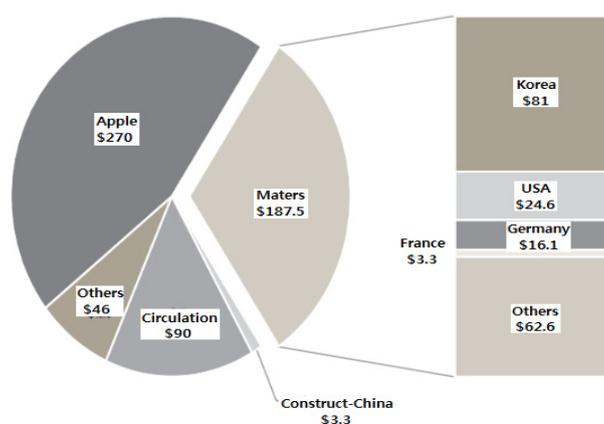
Dedrick et. al., (2009a) identified the distribution of profits based on total profit of iPod and mobile PC at the part level and found that Apple gained significant profit from innovation of iPod while profits that went to PC manufacturers were relatively small¹³. In addition Dedrick et. al.,

¹³ Dedrick, Kraemer and Linden, "Who Profits from innovation in global value chains? : a study of the iPod and notebook PCs", Personal Computing Industry Center, UC Irvine, 2009a

(2009b) analyzed who gains from the innovation of iPod in an environment where contract manufacturers (CMs) and original design manufacturer (ODMs) are connected through global network for production outsourcing. The study showed that if the retail price of 30GB iPod model is 299 dollars only one dollar goes to Korea as a margin. The gist of the study is as follow. First, nationality is important. Second, innovation is important. Thrid, the information on trade statistics may presents a misleading information.

Starting from 2010, changes in the profit distribution structure of relevant countries are being made even though the distribution of profits for Apple has not changed. Three quarters of global mobile phone were sold by top 5 global brands of Nokia, Motorola, Samsung, Sony-Ericsson and LG between 2005 and 2009. However, Apple and Research in Motion (RIM), HTC smartphones' market share has been increased at a rapid speed since 2009 and in the fourth quarter of 2011, Samsung and Apple accounted for 99% of the operatinf profit of the entire industry. Recent OECD (2011) announcement showed that Korean raw material suppliers earn about 13% of retail price (600 dollars) by exporting one unit of iPhone 4 as shown in [Figure 17]. In the meantime, Chinese assembly company earns just 1% and nearly no profits were given to Japanese companies. Most of the profits go to large electronics companies that provide high technology parts including semiconductor and display in advanced countries including Korea, US and Germany and Apple which designed and promoted the product.¹⁴

Figure 16. Value-added Distribution of Apple iPhone 600 Dollars each Nations



Source: OECD(2011)

3.1.1.3. Semiconductor

a) GVC Structure of Semiconductor

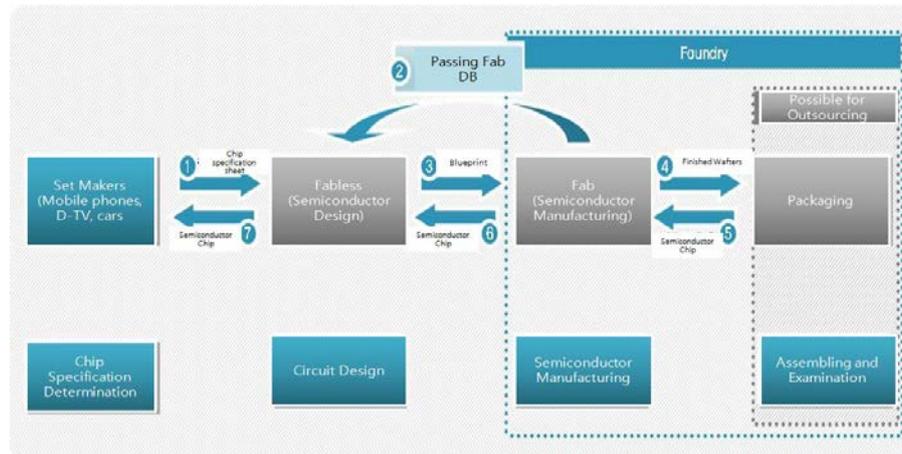
Value chain structure of the semiconductor industry is broadly divided into product design (Fabless), manufacturing (Foundry) and assembly (Packaging) as well as set makers which is in the demand field. In general semiconductor has a characteristic of division of labor at the manufacturing

¹⁴ OECD, "Korea, OECD/WTO TRADE IN VALUE-ADDED INDICATORS", OECD, 2011, 2013.

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process level and semiconductor is produced with design, manufacturing, assembly and test stages. Usually, the Fabless and foundry are classified as pre-process and packaging and test are classified as post-process. The value chain structure of semiconductor does not go away significantly from “design-manufacturing-sales-demand (set makers)” structure but has characteristics different from general value chain structure.

Figure 17. Value Chain Structure of Semiconductor Industry



Source: Meritz Securities Investment Bank Research Centre (2014)

In the semiconductor production, in some cases Integrated Device Manufacturer (IDM) handles all processes from design, manufacturing, test and sales. But in general, specialized companies for each manufacturing process are performing their role. Fabless is in charge of design and sales and most of the cost is related to R&D and labor as they have no production facility. Foundry, which owns fab production facility is in charge of the production of semiconductor chip ordered. Packaging and test are in charge of assembling wafer produced by foundry and testing. In case of non-memory sector (system semiconductor), the work is outsource in many cases as it is not possible to do packaging for various and many products.

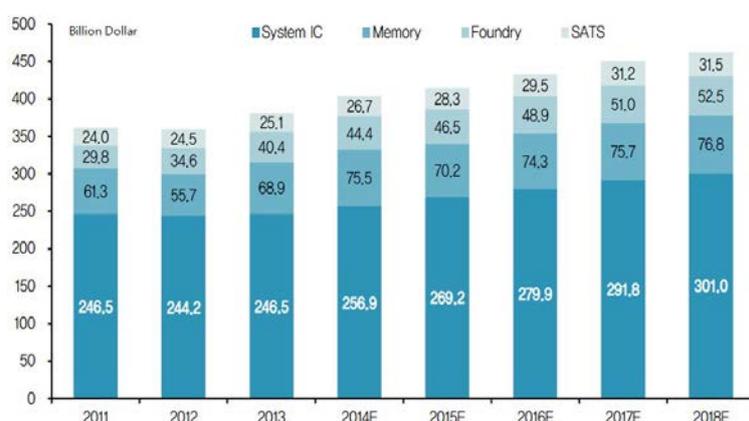
b) Current Status of Semiconductor GVC

The global semiconductor industry, which is the core parts area of ICT is expected to grow by 4% on annual average and record 461.9 billion dollars in sales in 2018 with the IoT era arrives. Foundry¹⁵ sector is expected to grow more than industry average growth rate thanks to the Fab Light Strategy¹⁶ of customers.

Figure 18. Global Semiconductor Industry

¹⁵ Foundry: It refers to business that produces and provides semiconductor designed by other companies.

¹⁶ Fab Light Strategy: It refers to the strategy of semiconductor companies which reduce their own Fab and increase outsourcing due to increase in process difficulty and increase in Fab facility investment. The benefits of this strategy go to Foundry sector which is specialized in production based on outsourcing contract.

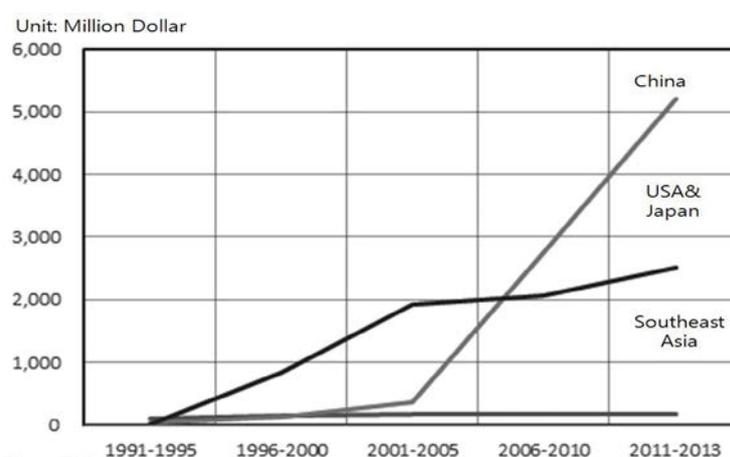


Source: Meritz Securities Investment Bank Research Center (2014)

In case of semiconductor industry massive investment was made in advanced countries such as the US and Japan in the early stage and in China in the late 2000s presenting the characteristics of advanced industries well. It is judged that investment in advanced countries was active until the early 2000s and most of the investment focused on technology development including R&D center rather than on production.

With the investment concentrated on China starting from the late 2000s, the semiconductor industry witnessed a significant change in existing flow. The direct and indirect demand for semiconductor increased rapidly in proportion to rapid expansion of manufacturing in China, massive investment began to be made. The share of China in overseas investment for the semiconductor industry increased significantly with the investment of Hynix and Samsung Electronics in semiconductor plants in China.

Figure 19. Overseas Investment Performance Trends in Semiconductor



Source: Meritz Securities Investment Bank Research Center (2014)

3.1.1.4. SW/Contents

OECD defined the contents industry as the industry that produces, publishes or distributes informational, cultural and entertainment contents with the intention to deliver messages organized by people. From the perspective of media industry value chain, there is an opportunity for the contents industry to grow further with rapid increase in access to and production of contents through social media with political and social changes.

The core competitiveness of the digital ecosystem is to make new added value by combining device-contents-service based on platform with strong software capacity. The digital ecosystem inspired by Apple in the late 2000s established the competition through ecosystem that encompasses all devices, contents and platforms. The pillar of ICT growth has moved from network equipment companies to communications service providers to HW companies to SW companies and the importance of ICT service is getting bigger to establish the ecosystem. In the global competition in the ecosystem, value creation in the ICT service industry, which has been weak so far, is required to make Korea lead the digital ecosystem.

In particular, the consumer driven type is evolved to final consumer driven type with the development of the internet and the competitiveness of this sector comes from capacity of connecting business.

a) Traditional Type of Value Chain in the Contents Industry

The contents industry had formed individual value chain at the independent platform, network and device level before the development of digital transmission. The traditional type of content industry was classified into broadcasting, movie, music, game and publication depending on a media or entertainment style. In addition, market participants were conducting their business in a separated market areas. It was not possible to have a compatible platform or network for each contents so access to dedicated network for a certain contents was mandatory. In short, the relationship of contents with network or device was connected vertically.

The core part that create economic values in the vertical type value chain was contents moderator in charge of selection and filtering of contents in the process of delivering contents to consumers rather than creator or copyright holder of the contents. Contents moderator exerted significant amount of power in the process of converting creative work into a product by controlling the consumers' access to contents. Therefore, in the traditional contents industry, the sources of value were contents but it was platform or network that generates added value for a product. On the contrary, traditional value chain should go through various gates from the perspective of creation. For a content to be published or distributed, various market participants are involved for making an agreement with the creator and selecting the creation. For example, editor should edit the work to publish and make the work of creators. In addition, a musician needs to sign a contract with record companies and a poet should visit a publisher. A writer also needs to submit his/her work to movie studio and be selected to make his/her work a product (OECD,2007a).

The characteristics of an individual contents industry have been weakened with the adoption of transmission method based on digital technology. In addition, digital convergence makes mutual connection and replacement of contents network possible integrating these individual contents industries. In short, networks, access providers and platforms, which have been distributed at the contents type level compete each other with digital convergence resulting in horizontalization of value chain at the layer level. The horizontalization means the decoupling phenomenon under which

contents are separated from physical equipment that sends the contents. It means contents are separated from dedicated terminal or network and contents consumption are not limited to a certain terminal or network anymore (OECD,2007b,p.8). Instead, the integration of value chain at the layer level is found in the horizontal structure.

b) Changes in Contents Industry Value Chain in Digital Convergence Structure

EU (2002) classified the value chain of digital contents industry into 8 processes and grouped the processes into three areas: contents, packaging and distribution.

Figure 20. Digital Content Industry Value Chain of the EU



Source: Anderson (2003)

- **Contents area:** It includes companies or individuals who have a copyright, entities that have a production know-how and intermediate traders who trade the copyright of contents produced.
- **Packaging area:** It includes program packagers who combine and arrange individual programs produced in contents area and aggregators/access providers who sell contents by bundling individual channels.
- **Distribution area:** It includes network that distributes contents through a certain infrastructure such as a satellite or terrestrial, access providers and companies responsible for manufacturing, selling and marketing customer premises equipment (CPE) related to access.

CCTV, China's national broadcaster, is now developing into comprehensive media group. What should be noted in this industry is the remarkable development of media companies in Asia. Up until a few years ago, Chinese media companies limited their operation to domestic market focusing on one type of media. Recently, however, media companies have expanded to media group with increasing presence in the global market. CCTV is a state TV of China but is now being developed into a complex medial group.

What global media companies have in common is that they concentrate on contents stage. The gist of the media companies going abroad lies in contents. That is because the core strategy is the

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utilization of contents in various ways and combination of contents with service.

Media companies' entry into global market is carried out mainly in countries or regions with high similarity in terms of language or culture. In this regard, English-speaking countries have the biggest advantage. In addition, leading media companies are located in Portuguese and Spanish speaking countries or South America and Africa. It is not surprising to see that Chinese media companies go to Chinese-speaking countries mainly. In particular, Asian media companies expanding their business to Africa actively is a significant implication.

Travel and tourism industry are globalized at a rapid speed with the advancement of communications and transportation. In the past, the industry was supplier-driven depending on human, cultural and natural resources but it is changing into demand-driven one managing value chain in transportation, accommodations and information and being led by leading companies with superiority in access to people who demand the service.

The movie industry is a typical supplier-driven global industry with characteristics of contract driven (finance-production-distribution-marketing). Major strategy is the utilization and sales of intellectual property rights focusing on distribution and production.

In fact, the movie industry is actively exploring ways to pursue horizontal diversification only after the establishment of digital convergence environment even though the horizontal diversification is carried out for the purpose of maximizing added value by distributing already produced contents as much as possible.

The horizontal integration of value chain has become visualized at the start of the 2000s and takes the lead in the restructuring of value chain these days. The center of the digital convergence is the value chain restructuring process led by horizontal integration.

3.1.2. SMEs' Participation in GVC by Sector

3.1.2.1. Home appliance Industry

a) Air Vita

Company Introduction	<ul style="list-style-type: none"> ■ A company specialized in air cleaner established by CEO Lee Gil-soon, in 2000. <ul style="list-style-type: none"> - Established as a private business in 2000 and incorporated in 2003. - Develop and sell air cleaners with functions of air purification, bad odor removal and anti-bacteria. - Invention made with ideas found in daily lives - Developed a compact and portable air cleaner that makes installation convenient and won the Gold and Special Award from Geneva international Invention Exhibition in 2005 and 2008
Core Products and Services	<ul style="list-style-type: none"> ■ Air cleaner for home and car <ul style="list-style-type: none"> • Sell air cleaner for home and car mainly, which is based on anion and cation sterilization - Manufacture air cleaner by identifying optimized ion combination that exists in the nature with complex ionization technology beyond the manufacturing of anion air cleaner - The existing air cleaners were difficult to install in each room as they are built-in base, however, Air Vita makes it possible to purchase and install a number of air cleaners in each room

[Figure 1] Air Vita Q, air cleaner for home use



Source: <http://www.airvita.net/>

Situation at the Time of Entry into Overseas Markets

- Launch of Neo Gold, that combines socket for light bulb with air cleaner
 - Neo Gold was a creative product that can be used as a light as well, but the market reaction was indifferent.
 - In the 2000s, most electronics products were produced by large companies making people recognize only products of large companies.
 - The electronics product consumption pattern of Korean people was tilted to large, but compact one and people put more emphasis on display than practicality creating the atmosphere that people do not trust the performance of compact product.
- At that time, air cleaners were not common in Korea.
 - Air cleaner made in Switzerland costs 4 million won.
 - As the use of air cleaners was common in Japan, the company planned to enter Japanese market.
- Air Vita decided to enter global market and increased the export volume after getting relevant certification in the US, Japan and Europe.

Strategies for Entry into Overseas Markets

- Air Vita targeted overseas market first and then enter domestic market as there was lack of recognition and market for air cleaner in Korea.
 - It won the Gold Medal at the International Invention Competition, which was held in Geneva.
 - The response in overseas markets was much better than that in domestic market and more people are interested in the product after winning the award.
 - It achieved a big hit in German home shopping in 2007 and recorded about 200 million won in sales.
 - After than order was placed from Turkey and Air Vita entered Japanese market.
- Demonstration of the quality of product through international certification
 - It showed the reliability of products by demonstrating excellent quality of the product to overseas consumers based on quality assurance certificate including ISO 9001, ISO 14001, CE (electrical appliances safety certification of Europe) and certification in major countries including Japan, China and Germany.
- Utilization of government support program
 - In the wake of Korea-US FTA took effect in 2012, it participated in the “mid-term US market pioneering group” organized by the Small and Medium Enterprise Agency and started promotion of product actively in overseas market.
 - Currently, the products are being sold in the largest US home shopping channel, and large marts including Wal Mart and CVS.
 - Air Vita tried to enter the US market for 10 years previously but did not make a successful entry.
- Innovative products
 - Innovative products as the air cleaner has no filters

3. GVC Structure and Changes in the ICT Industry

	<ul style="list-style-type: none"> - In case of ultra-compact air cleaner for car use, the air cleaner system is fitted into electrical socket, which is different from existing products. - Anion air cleaner that does not use filters. - It can be used semi-permanently as it does not require filter purchase or post management as it is washable with water. It does not cause additional maintenance cost. - More than 2 million anions are generated at once providing the best air purification function
<p style="text-align: center;">Results</p>	<ul style="list-style-type: none"> ■ Export to more than 26 countries including the US and Japan. <ul style="list-style-type: none"> • Won Gold award at the International Invention Competition held in Geneva, Switzerland in 2006 and attracted and grabbed the attention in the overseas market. <ul style="list-style-type: none"> - It achieved 200 million won in sales by selling products through German GVC home shopping channel in 2007 - Delivered air cleaner for car use to Japanese car maker Toyota Motor Corporation. ■ Successful entry into domestic market based on the success achieved in overseas markets. <ul style="list-style-type: none"> - Air Vita targeted overseas markets first due to lack of recognition and market for air cleaner in Korea. - After the launch of product in E Mart in 2010, the company began to sell in large markets in Korea grabbing the largest share in domestic anion air cleaner market. - In 2014, it recorded 16 billion won in total sales and it is about to achieve 25 billion won in total sales in 2015. The company plans to enter home appliance market beyond air cleaner.

b) Cuckoo Homesys

<p style="text-align: center;">Company Introduction</p>	<ul style="list-style-type: none"> ■ A company specialized in small home appliances, which started as Sung-kwang Electronics in 1998. <ul style="list-style-type: none"> - Launched its own brand “Cuckoo Homesys” in 1998. - Developed electronic programmable pressure rice cooker with built-in cooking function. - Became a leader in domestic rice cooker market.
<p style="text-align: center;">Core Products and Services</p>	<ul style="list-style-type: none"> ■ Rice cooker <ul style="list-style-type: none"> • Developed electronic programmable pressure rice cooker with built-in cooking function. <ul style="list-style-type: none"> - Secure competitiveness of Cuckoo by adding the advantages of pressure cooker. • Currently, Cuckoo started selling home appliances including air cleaners, dehumidifiers, pots and kitchen supplies expanding its business area. • With the launch of product rental service, it currently provides rental service of massage chair and water purifier. <p style="text-align: center;">[Figure 2] Rice cooker of Cuckoo Homesys</p> <div style="text-align: center;">  </div> <p style="text-align: right;"><i>Source: http://www.cuckoo.com/</i></p>
<p style="text-align: center;">Situation at the Time of Entry</p>	<ul style="list-style-type: none"> ■ Japanese rice cookers are the best

<p>into Overseas Markets</p>	<ul style="list-style-type: none"> • In the 1980s when the Cuckoo rice cooker was launched first, Korean rice cookers were not good to the extent that buying rice cooker from Japan was popular. • As existing rice cooker had rice cooking, heat retention and little advanced timer functions, many research institutes under the government and private companies participated in the development of rice cooker. <ul style="list-style-type: none"> - Rice cooker was developed rapidly based in competition among many home appliance companies and currently, the rice cooker is advanced to the extent that semiconductor chip is embedded in the cooker. - Cuckoo has secured its own competitiveness based on advantages of pressure cooker with various functions added and in Korea there was an atmosphere where people do not trust the performance of product.
<p>Strategies for Entry into Overseas Markets</p>	<ul style="list-style-type: none"> ■ One for One Program by Amway Korea <ul style="list-style-type: none"> • It is the program to identify quality products of Korean SMEs and sell the products through Amway distribution channel every time when Amway launches a new product. <ul style="list-style-type: none"> - It secured distribution channel through Amway Korea as soon as the company launched its own brand in 1988. - Amway could obtain excellent product of Cuckoo Homesys and Cuckoo Homesys could utilize Amway's sales network amounting to 140,000 at that time. - More than 16 million Cuckoo Homesys rice cookers were sold until 2010 with this program. ■ Strategies suitable for the market <ul style="list-style-type: none"> - Launched the products considering the taste of local people from product development stage. - Customized products to reduce the bundling of rice upon cooking for countries that use mainly Alan rice such as Indonesia and Vietnam. - Controlled heat retention temperature considering local environmental factors including temperature and humidity. - Pre-programmed favorite menus among local people based on survey in the country and provided the most appropriate level of heat for each product based on a certain algorithm. - Strengthened service through direct service centers and dealers in each country and established local A/S centers. • Long-term market research <ul style="list-style-type: none"> - Expected the increase in the demand for Japonica rice with increase in real income of China based on the market research before entering Chinese market. - Expected that the demand for pressure rice cooker will increase in China, too. ■ Continuous launch of new product <ul style="list-style-type: none"> • Development of IH rice coker <ul style="list-style-type: none"> - It keeps a consistent taste of rice by making current flow with electrical coil installed at the bottom and side of the pot and making the heat spread to the whole inner pot. - It is more expensive than normal rice cookers, reduction of demand for product due to price increase is not significant based on excellent quality of the product/ • Stable turnover rate <ul style="list-style-type: none"> - It is estimated that average product life cycle is about 5.5 years. - As such, the company develops a new product based on life cycle to keep the turnover rate stably. ■ No participation of large companies <ul style="list-style-type: none"> - Large companies do not actively participate in the rice cooker market as the major markets are limited to Northeast Asia including Japan, China and Korea. - As large companies do not participate in the market actively as the technology that deals with pressure may lead to explosion tarnishing the brand image significantly, it is easy for Cuckoo to enter overseas markets.
<p>Results</p>	<ul style="list-style-type: none"> ■ Entered about 30 countries including China and the US

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	<ul style="list-style-type: none"> • Chinese travellers show clear preference for the product <ul style="list-style-type: none"> - It is expected that the sales in China would reach 31 billion won in 2015. • It account for 71% of export of Korean rice cookers. • It recorded 25 billion won in export to Russia, Southeast Asia and the US. <ul style="list-style-type: none"> - After entering the US market, the products have already shipped or markets are being explored in Europe and America including France, Germany, Belgium, Netherlands and Peru. - Developed electronic rice cooker with multi-cooking functions and patent application was made in those 8 countries.
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c) HAAN

Company Introduction	<ul style="list-style-type: none"> ■ Small home appliance company that started as Hanyoung Electronics in 1999. <ul style="list-style-type: none"> - Leader in steam home appliance market starting with steam cleaner in 2001. - Recognized as a company that opens a new chapter in domestic home appliances. - Carry out business diversification including cosmetics and cooking wares based on steam technology. - Guarantee the reliability of the company to customers by adopting the representative's name as company name
Core Products and Services	<ul style="list-style-type: none"> ■ Steam cleaner <ul style="list-style-type: none"> • It is the only steam cleaner which registers invention patent in Korea. • Developed steam cleaner for the first 3 years after establishment to make the product suitable for Korea's Ondol culture. • Currently, the company is expanding its business to home appliances including steam iron, water purifier, dehumidifier and air cleaner as well as cosmetics. ■ Cleaning service for home appliances <ul style="list-style-type: none"> • Sterilization cleaning for washing machine and air conditioner <ul style="list-style-type: none"> - Applying mold removal and prevention technology - Service that considers the health of consumers - Focusing on cleaning of home appliances, which is different from post management repair service <p style="text-align: center;">[Figure 3]HAAN steam iron</p> <div style="text-align: center;">  </div> <p style="text-align: right;"><i>Source:: http://www.ihaan.com/</i></p>
Situation at the Time of Entry into Overseas Markets	<ul style="list-style-type: none"> ■ It was estimated that growth of cleaner was not possible as the demand for cleaner matured like rice cooker and iron. <ul style="list-style-type: none"> • New market opportunities arise from steam cleaner <ul style="list-style-type: none"> - Korea's cleaner penetration rate reached 50% making it urgent to develop a new market. • When the export was planned, "removing carpet" movement was spread socially in Europe. The interest in sterilization increased with rapid increase in skin diseases. • 1-2 similar products were released a month from many large companies and foreign brands.

<p style="text-align: center;">Strategies for Entry into Overseas Markets</p>	<ul style="list-style-type: none"> ■ Thorough market research <ul style="list-style-type: none"> • Local market was analyzed thoroughly for 2 years <ul style="list-style-type: none"> - Invested US home appliance market, consumers and culture thoroughly. - Selected home shopping as a first distribution channel. - Sold out in 6 minutes in QVC in 2007 - Selected as a Rising Star of QVC in 2009 • In China, steam iron was an innovative product. ■ Localization strategies <ul style="list-style-type: none"> - Emphasized that there is a bactericidal function for carpet in a steam cleaner • Changed the company name into HAAN to overcome the reluctance to accept foreign brand in the local market. • Maintained the policy of hiring 100% local employees for local subsidiaries. ■ Market/consumer orientation <ul style="list-style-type: none"> • HAAN made 10,000 products for its first export to the US in 2004 but its quality inspection results showed that there was some problem with the angle of pipe tilt. The US buyer said it was ok as the angle is within the margin of error but CEO Han Kyeong-hee disposed all 10,000 pipes. • After being recognized that 10% of products are flawed after 3 years of use, HAAN disposed the whole products. • Produce products that other housewives want <ul style="list-style-type: none"> - Products that satisfy 100% consumers should be delivered upon exploring new markets. - That is because consumers select perfect product with good quality even though there are many similar products. - Provided the necessary products at a reasonable price. - Advanced products from initial steam cleaner reflecting consumers' opinion thoroughly. ■ Technology and implementation power <ul style="list-style-type: none"> • Recognized its excellence in the world with patented technology <ul style="list-style-type: none"> - Anion generation with steam upon cleaning. - Control part designed ergonomically. - Easy to check visually with pre-heating sensor color. - Remove old dust by separating dust from floor with 100°C high temperature steam and removing it with microfiber pad. - With sprayed steam, old dust, oily dust can be removed and house dust and mites that can cause cough and asthma in children and the weak can be removed. • Implementation of idea <ul style="list-style-type: none"> - Started with brave that puts idea into action. - After listening to the news from the US that aluminum fraying pans are harmful, the company found a new material of magnesium in Posco and commercialization of the product with the new material was successful.
<p style="text-align: center;">Results</p>	<ul style="list-style-type: none"> ■ Export to many countries <ul style="list-style-type: none"> - Selling steam cleaner in many countries including Thailand, Indonesia, Taiwan, Hong Kong, Canada and Australia. - Making entry into overseas home shopping and offline markets in China, Japan and the US. - Well recognized by displaying products in overseas home appliance fair (Germany, US, Japan). • The share of sales in US accounts for 70% of sales of HAAN.

3.1.2.2. Smartphone Industry

a) Korea Circuit

<p>Company Introduction</p>	<ul style="list-style-type: none"> ■ SME established in 1972 specialized in smartphone parts <ul style="list-style-type: none"> - Market pioneer of Korean printed circuit board (PCB) - PCB for home appliances such as digital TV, and computer, PCB for mobile communications device including mobile phone with sophisticated function and PCB to be included in semiconductor, which is the core of IT industry - Part supplies for Samsung Electronics
<p>Core Products and Services</p>	<ul style="list-style-type: none"> ■ HDI <ul style="list-style-type: none"> • Smartphone/Tablet PC <ul style="list-style-type: none"> - Apply Build up Stack-via, Staggered via, Filled via and Fine Pitch providing ultra small and slim highly concentrated and high quality build-up PCB. • IC module <ul style="list-style-type: none"> - PCB that is to assemble memory semiconductor used in PC. It plays the role of data input and output as well as storage - The company responds to customer demand not only for DDR(Double Data Rate), DDR2, DDR3 and DDR 4 used in memory board and provides customized product for server or workstation. • SSD, LCD <ul style="list-style-type: none"> - SSD is an emerging secondary storage device for PC as the eco-friendly and next generation storage device with lower power consumption and fast processing speed. It provides multi layer, high quality PCB up to 14-layer SSD. - The company is making an effort to provide an excellent PCB to leading LCD manufacturers home and abroad to contribute to high resolution and high definition LCD ■ Package Substrate <ul style="list-style-type: none"> • CSP, BOC, PBGA, SIP, Flip Chip ■ Rigid-flex <ul style="list-style-type: none"> • Smart phone / Smart pad / Wearable device <ul style="list-style-type: none"> - It is possible to have 3-dimensional design with bending structure making the product compact. - It is suitable for the latest smart devices that requires high speed signal as there is no signal loss thanks to shortening of wiring length and contact resistance. - The company provides high-density, high-quality rigid flexible PCB that can be applicable to various products including Smartphone, Wearable device, Tablet PC. • It provides UI algorithm optimized for various electronics equipment.
<p>Situation at the Time of Entry into Overseas Markets</p>	<ul style="list-style-type: none"> ■ PCB industry in Korea <ul style="list-style-type: none"> • The PCB industry in Korea is in the middle between advanced products from the US and Japan and low price products from China, Taiwan and Southeast Asia. <ul style="list-style-type: none"> - China and Taiwan show their willingness to overwhelm South Korea with price competitiveness based on low wages and adoption of new technology. - Domestic companies' position is getting weaker. - Korea's PCB industry stands at the 5th position in the world being surpassed by China. • While Korea's PCB industry technology is in the middle position with Taiwan, price competitiveness is weak due to low priced products of China <ul style="list-style-type: none"> - Even external growth continued, quality growth has been weak. - It is necessary to have a business structure that can compete with advanced countries' companies or secure price competitiveness based on localization strategy in China

<p>Strategies for Entry into Overseas Markets</p>	<ul style="list-style-type: none"> ■ Differentiated technology <ul style="list-style-type: none"> • In the HDI part, the supplies for premium smartphone of Samsung Electronics were expanded based on our technology different from competitors. <ul style="list-style-type: none"> - RF PCB, produced by Korea Circuit, does not bend wholly, but connection part is bendable so that it can be used for flexible devices. - As PCB to be used in wearable device requires high specification HDI, Korea Circuit's RF PCB is more competitive than flexible PCB (FPCB) companies. - As there is affiliated company that produces FPCB, the know-how is applied to the connection part to produce partially flexible RF PCB. It is applied to Samsung Gear and Gearfit. - Lead the demand for table PC and evolve into rigid-flex board responding to initial wearable devices preemptively. - Rigid-flex board for wearable devices is led by Samsung Electro-Mechanics and our company. ■ Production and customer base diversification <ul style="list-style-type: none"> • Blanced the HDI business and non-memory package business, which was 7:3 <ul style="list-style-type: none"> - For a company to growth continuously HDI part and non-memory package part should strike a balance. - In particular, if it is possible to diversify customers based on strengthening of overseas business of non-memory package, the concern over high proportion of business with Samsung Electronics may be removed. • In the new package plant, ultrathin and ultra concentrated chip scale package (UT-CSP) which was hard to be produced in existing plant, 3-layer NAND with higher profitability are produced. <ul style="list-style-type: none"> - This products are supplied to existing customers including SK Hynix as well as overseas non-memory customers. - Customers are being diversified based on delivery contract with non-memory customers in North America including Broadcom. ■ Overseas network <ul style="list-style-type: none"> • Cooperation with the US and Singapore through network • Entered US PCB market for the first time in Mar. 1992 by successfully establishing subsidiary in LA called Korea Circuit America. <ul style="list-style-type: none"> - The industry was skeptical regarding Korea Circuit's entry into US market but it continued aggressive investment and yield improvement strengthening local sales and producing phenol since 1994. In the meantime, situation of KCA improved by supplying products to companies in the US and companies which entered the US market. - Success story of KCA serves as an inspiration to other PCB companies which delay overseas entry plan caring only about large companies.
<p>Results</p>	<ul style="list-style-type: none"> ■ Realized higher than expected performance based on position improvement and customer diversification. <ul style="list-style-type: none"> • Successful considering industry condition and elevated the operating income estimate for the third quarter from 11.5 billion won to 13.6 billion won. <ul style="list-style-type: none"> - Operating income is expected to record the highest figure with 58% increase from previous year to 51.6 billion won. - Concentration level of a single customer has been reduced.

b) CrucialTec

<p>Company Introduction</p>	<ul style="list-style-type: none"> ■ SME specialized in smartphone parts established in 2001. <ul style="list-style-type: none"> - Total solution company that possesses hardware solution and software solution. - It specializes in mobile input solution which has a patent and technology for optical track pad (OTP) for smartphone and mobile phone. - It dominates 80% of global OTP market and sells parts to many global companies including
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	<p>RIM.</p> <ul style="list-style-type: none"> - After starting transaction with overseas smartphone manufacturer, the demand for our products from domestic smartphone manufacturers including Samsung Electronics increased.
<p>Core Products and Services</p>	<ul style="list-style-type: none"> ■ Various input devices are provided in the solution format with UI and software. <ul style="list-style-type: none"> • Ultracompact input device OTP(Optical TrackPad) <ul style="list-style-type: none"> - Main input solution for non-touch device and complementary goods for Touch product. - Applied PC environment with which general consumers are familiar to mobilephone platform. - Perfectly implemented mouse cursor with all the functions of PC mouse including move, navigation, click, scroll and drag. - Implemented various graphics from GUI perspective • Biometric TrackPad (BTP) that is optimized to mobile device <ul style="list-style-type: none"> - Added CrucialTec's OTP technology to existing fingerprint sensor. - Provide HW as well as optimized solution connected. • Developed Matrix Switching-Touchscreen Panel (TSP) with power saving type for the first time in the world. <ul style="list-style-type: none"> - Input Solution with touch type based on know-how of Modulation & Packaging - Compact navigation module using existing touchpad and being specialized for mobile device. - Can control navigation conveniently with working based on touch. - Possible to apply it to various products including Phone, Remote Solution, Digital Imaging Device. • LED flash module and PL lens <ul style="list-style-type: none"> - LED flash module products provide auxiliary light on camera of mobile devices including mobile phones. - PL lens distributes light generated by flash module efficiently even in low light and evenly distributes light by maximizing the quality of image. • Provides UI algorithm optimized for various electronic devices.
<p>Situation at the Time of Entry into Overseas Markets</p>	<ul style="list-style-type: none"> ■ Reliance on large companies <ul style="list-style-type: none"> - SMEs which have relatively weak capital, information, marketing and management capability, depend on OEM system rather than market entry under their own brand. - Existing OEM system faced its limitation with cost structure and provision of low price product. • SMEs are responsible for large companies' outsourcing <ul style="list-style-type: none"> - SMEs are manufacturers or suppliers of the parent company. In case of transaction with parent company, the parent company demand price reduction aggravating profitability of SMEs and contributing to reduction of competitiveness ■ Atmosphere of strengthening security worldwide <ul style="list-style-type: none"> • Emphasis on strengthening security through bio-recognition technology.
<p>Strategies for Entry into Overseas Markets</p>	<ul style="list-style-type: none"> ■ Successful development of SMEs' own technology <ul style="list-style-type: none"> • Technology management based on patent <ul style="list-style-type: none"> - The number of employees responsible for R&D in the company is more than 300, the number is not usual in a medium sized companies. - Invested near 100 billion won in facility and R&D for the 14 years since its foundation securing excellent technology. - Established strong access barriers by making more than 694 patent applications on otp and btp. - It is a manufacturing company but only company in the world that can provide btp integrated solution of ic, algorithm and packaging.

	<ul style="list-style-type: none"> - Developed otp, which has the same function of pc mouse in mobile device for the first time in the world and commercialized. - Grew rapidly by supplying 90% of OTP to BlackBerry - It possesses ic and algorithm optimized for mobile and in case of packaging, it has high yield and patent based on mass production know-how for producing 300 million units of otp. • Falldown of BlackBerry as the input method for smartphone was changed to touch type. <ul style="list-style-type: none"> - Developed btp(biometric trackpad) for the first time in the world by adding finger print recognition technology to otp by accelerating the development of product that uses otp from different perspective. - btp was selected as world's best product as well. ■ Successful marketing and selling products to overseas companies <ul style="list-style-type: none"> • Delivery of technology to BlackBerry <ul style="list-style-type: none"> - BlackBerry is well recognized with its excellent security and popular among the government, public institutions, companies and securities companies for business purpose. - CrucialTec has a patent for OTP and OTP has the same function as optic mouse. - The controller located in the middle of BlackBerry phone keyboard is OTP. - Originally the company tried to make Apple adopt OTP, but targeted BlackBerry rather than iPhone as iPhone has already track ball type mouse. - The company becomes very successful because OTP is adopted in main BlackBerry model. ■ After the success with BlackBerry, the product began to be supplied to many overseas companies. <ul style="list-style-type: none"> • OTP is provided to mobile phones of BlackBerry, SEC, HTC as well as of HP, Motorola, Sony and Sharp. • BTP is embedded in Huawei's Ascend Mate 7. ■ Technology development through government support <ul style="list-style-type: none"> • Private-public joint investment for technology development <ul style="list-style-type: none"> - The government and company jointly invest in the technology development of SMEs. After obtaining the support fund (cooperation fund) the company identifies and proposes tasks and the government selects the SMEs suitable for the development of technology (localization or new product development) and provides the development cost. ■ Utilization of technical deposit system <ul style="list-style-type: none"> • This is the system operated by technology deposit center under Large companies-SMEs Cooperation Foundation of Joint Growth Committee. Core technology source of a company is deposited in a reliable organization and is issued to a certain party. <ul style="list-style-type: none"> - SMEs can remove the concern over leakage of core technology and large companies can use the technology stably even though partner company closes its business. - CrucialTec deposits all BTP core technologies in the technology deposit center so that core technologies can be certified and protected providing BTP solution more stably to customers.
<p>Results</p>	<ul style="list-style-type: none"> ■ More than 1 million units of Huawei's Ascend Mate 7 to which CrucialTec's BTP is embedded were sold in the first month of selling it and many units are being sold up until now. ■ It has already subsidiaries in the US, China and Vietnam and started mass production after plant expansion by purchasing additional site. ■ In Mobile World Congress (MWC) held in Barcelona, Spain in 2013, it was selected as "companies to be noted", as only domestic company.

3.1.2.3. Semiconductor

a) Jusung Engineering

<p>Company Introduction</p>	<ul style="list-style-type: none"> ■ Semiconductor company established in 1995. • Expanded market continuously from semiconductor manufacturing apparatus to organic light emitting diode (OLED). <ul style="list-style-type: none"> - HSG LP CVD(hemispherical silicon grain low pressure chemical vapor - Deposition: Started to sell products with successful development of hemispherical silicon low
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	<p>pressure chemical vapor deposition equipment and LP Nitride & Oxidation System.</p> <ul style="list-style-type: none"> - Produce IoT, future display and lighting, solar pane, etc. • Listed at the highest prices in IPO history as of Dec. 24, 1999 when it was listed at KOSDAQ market. • In Nov. 1997, the company exported its semiconductor front-end processing equipment to other countries for the first time.
<p>Core Products and Services</p>	<ul style="list-style-type: none"> ■ Semiconductor <ul style="list-style-type: none"> - World's first/best technology - New concept semiconductor manufacturing equipment that can respond to all vapor deposition processes. - World's first/best semi-batch equipment to maximize the production per unit hour. ■ Display equipment <ul style="list-style-type: none"> - The world's first/best mass production of large-area ALD - World's first CVD type IGZO equipment - World's best mobility ■ Solar equipment <ul style="list-style-type: none"> - World's best Flexible a-Si:H/μc-Si:H dual connection solar cell technology - World's best flexible solar cell durability and environment resistance test
<p>Situation at the Time of Entry into Overseas Markets</p>	<ul style="list-style-type: none"> ■ The semiconductor industry is the most advanced high added value industry that has a big technical ripple effect on the nation's backbone industry. <ul style="list-style-type: none"> • Technology intensive industry with short life cycle <ul style="list-style-type: none"> - It requires large scale equipment investment and R&D and is connected closely to the world economy. - The global semiconductor market experiences relatively big changes due to imbalances between demand and supply due to cyclical reduction of computer industry including PC. - Element companies are sensitive to equipment investment plan • The share of semiconductor industry is growing in the electronics products with convergence and application of technology. <ul style="list-style-type: none"> - The volatility of supply and demand is expected to reduce gradually. ■ Display industry is a large-scale equipment industry with its application to PC, laptop, TV, game device and industrial device. <ul style="list-style-type: none"> • It has a high growth potential with continuous formation of new market. <ul style="list-style-type: none"> - Korea, Japan and Taiwan are competing most fiercely. - It requires high level of technology and economies of scale. ■ LED industry is a forward industry for industries that require lighting. <ul style="list-style-type: none"> • If the general lighting market is replaced by LED light source, it can be developed as a new market that goes beyond the memory semiconductor market. <ul style="list-style-type: none"> - High access barriers set by overseas companies which have core technology and patent - The company is expected to grow as a company that can form a new market based on convergence with other industries including lighting, LED, emotion and display and presenting people friendly new industry that combines emotion and IT. ■ When it was a SME, it experienced suspension of business with Samsung Electronics, which was a major customer. <ul style="list-style-type: none"> - Experience of not being recognized due to the failure of transaction with large companies. - Risk is reduced by diversifying customers overseas including the US, China, Japan and Europe.
<p>Strategies for Entry into Overseas Markets</p>	<ul style="list-style-type: none"> ■ Business structure focusing on R&D <ul style="list-style-type: none"> • 65% of employees are involved in R&D sector. <ul style="list-style-type: none"> - R&D employees are supported to conduct research continuously. - R&D is important considering the characteristics of semiconductor, display, solar cell, LED

	<p>and OLED equipment industry.</p> <ul style="list-style-type: none"> - Creation and creativity are emphasized to make a creative product. - Based on this, about 1,500 patents and core technologies are secured. - Organization is structured suitable for each business group. - In the development division, a team is assigned at the product level focusing on technology development and research. <ul style="list-style-type: none"> ■ Competitiveness based on excellent technology <ul style="list-style-type: none"> • Jusung Engineering is the only company that is able to build a production line of thin film and crystalline solar cells in a turnkey basis. What made possible for Jusung to enter overseas market was excellent technology. <ul style="list-style-type: none"> - The technology of Jusung Engineering is regarded as one of the best in the world. • Key technologies include TF(thin film) and c-Si Turnkey Solution. <ul style="list-style-type: none"> - As the only technology in the world Jusung Engineering conducts pre-processing based on consumer order and transfers product. - Customer can reduce the cost for equipment and operation and receives A/S in a prompt and continuous manner. - There are many benefits including precise processing technology, large scale and mass production facility and adoption of next generation technology. - TF has high efficiency using Turnkey Solution, production capacity of 150MW, lowest CoO release and world's best efficiency and process. - c-Si is used for solar cell improving efficiency by 22% and having production capability of 100MW. • It has a unique technology as it has the highest global market share in the HSG LP-CVD and ALD process in the film deposition equipment sector by overseas market research firm. • It obtained an capability to produce next-generation display with the technology that can freely adjust the individual ratio of each raw material and fuse chemically. ■ Strategy for the diversification of innovation <ul style="list-style-type: none"> - It holds a favorable position by lowering cost based on mass production and supply. - It expands the front-end areas by converging existing technologies focusing on vertical integration of equipments based on semiconductor in value chain and functional diversification. - The customized system process is one of the major process of Jusung Engineering and the company develops the technology that customer wants by listening to customer's voice and continuous A/S.
<p>Results</p>	<ul style="list-style-type: none"> ■ Selected as a Hidden Champion <ul style="list-style-type: none"> - Hidden Champion refers to a company which is included in top 3 in the global market with sales of less than 4 billion dollars and not well known in the public. ■ In 2011, Jusung Engineering signed a strategic partnership on the establishment and operation of facilities for high efficient solar cell production with MEMC, leading company in photovoltaic field in the US. <ul style="list-style-type: none"> - Planned to combine both companies' technology and utilize the combined technology in the high efficient solar power generation business through MEMC's subsidiary SunEdison. ■ Signed an MOU with Morocco to nurture solar and OLED industry <ul style="list-style-type: none"> - Laid the foundation for entry into European and African market in 2011.

b) PSK

<p>Company Introduction</p>	<ul style="list-style-type: none"> ■ Semiconductor equipment manufacturer established in 1990. <ul style="list-style-type: none"> • It supplied mainly to Samsung Electronics but became a small but strong company. <ul style="list-style-type: none"> - Developed Korean equipment for the first time in the domestic semiconductor industry.
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	<ul style="list-style-type: none"> - Grabbed the largest global market share in Asher field in 2010 - Developed a photoresist remover jointly with Samsung Electronics and selected as a small but strong company in 2011.
<p>Core Products and Services</p>	<ul style="list-style-type: none"> ■ Semiconductor and PR-Strip <ul style="list-style-type: none"> • It has grown continuously through aggressive R&D investment <ul style="list-style-type: none"> - Major equipment is PR-Strip with global market share of higher than 20%. - It has 7 non-listed affiliates such as Kumyoung. - In addition to Samsung Electronics it has business with overseas companies including Micron, Nanya, TSMC and Chartered.
<p>Situation at the Time of Entry into Overseas Markets</p>	<ul style="list-style-type: none"> ■ It didn't realize the globalization as stable sales were coming from long-term cooperative relationship with Samsung Electronics. <ul style="list-style-type: none"> • As Samsung requested the company to grow into small but strong company, it became to have a perspective on globalization and competitiveness in GVC. <ul style="list-style-type: none"> - At first, it was a show-off and follower approach to be a small but strong company as Samsung, major customer requested. - As pointed out by the executive director Lee Jae-ho of the Samsung Electronics Partner Management Advisory Group that a company can be lagged behind soon in a rapidly changing corporate ecosystem without one's own capability to survive, the company began to chase with sense of urgency.
<p>Strategies for Entry into Overseas Markets</p>	<ul style="list-style-type: none"> ■ Established equipment verification device as part of the small but strong company activities. <ul style="list-style-type: none"> - Reduced manufacturing period with systemized equipment verification at each manufacturing stage. - Successfully reduced the number of parts by 261% by making many parts into modular form. - Reduction in assembly period contributed not only to PSK but also to Samsung Electronics. • Now PSK transfers knowledge obtained from Samsung Electronics to 29 partners of PSK. <ul style="list-style-type: none"> - PSK supports five areas including HR strategy, management innovation, manufacturing innovation, management administration and development innovation for partner companies which want support. - The company promotes information exchange among excellent manufacturing sites home and abroad and operate quality and management advisory group for partner companies. - With the help of Samsung electronics, the globalization of the primary vendor as well as the partner companies of the vendor are accelerated. ■ Excellent technology <ul style="list-style-type: none"> • Successfully localized Asher for the first time in Korea in 1997 through continuous R&D since its establishment and in 2001, developed the 300mm asher, which is widely used in the current semiconductor industry for the first time in the world. <ul style="list-style-type: none"> - It obtained not only international certification including ISO 9001 and ISO 9002, SEMI of US, CE of Europe and ISBP. • Not only technology and quality at the timing of selling but also post management are important. <ul style="list-style-type: none"> - Thorough thorough prior preparation and post management, the company increases customer satisfaction attracting additional sales. - "Customer service staff" is assigned to each plant to respond promptly to customer demand. • Continued R&D even in the financial crisis <ul style="list-style-type: none"> - Semiconductor companies, which are the customer of PSK, faced management difficulties due to financial crisis and actually stopped the investment in new equipment. Accordingly PSK faced rapid reduction of sales and restructuring. - Even during the financial crisis, PSK developed 300mm asher which would be the next generation leader. - In the early 2000s when equipment market was in downturn, PSK invested more than 10% of

	<p>sales in R&D.</p> <ul style="list-style-type: none"> - PSK makes an effort to make equipment with higher performance and reliability than existing foreign made equipment based on creative and leading ideas. <p>■ Diversified customer base</p> <ul style="list-style-type: none"> - PSK secured source of sales around the world which is distributed evenly across comprehensive semiconductor companies as well as foundry companies. - With the capex trend of a certain company, companies in the industry experience volatility in actual performance. But PSK has relatively high stability. <p>■ Selection and concentration strategy</p> <ul style="list-style-type: none"> • PSK judged that it is important to secure a certain level of technology in main field more than anything else. - The success factor is that PSK selected asher equipment and focused its research and development on asher equipment. <p>■ It was supported by SME World Class 300</p> <ul style="list-style-type: none"> • A policy to support R&D expenses by selecting companies every year from 2011 by Small and Medium Enterprises Agency and KIAT. - The number of overseas patent application increased from 0 before selection of world class 300 to 29 in 2013. - Strengthened competitiveness with technology development and overseas patent application
<p>Results</p>	<p>■ Became the number 1 company in the world</p> <ul style="list-style-type: none"> - It recorded accumulated sales of 180 million dollars for the past 3 years in the Dry Strip market. - In 2012, it secured global market share of 19% with sales of 42 million dollars. - In the Dry Strip market, the technology and sales capability are the best. - Obtained the largest global market share in asher field in 2007 and 2010. - Explore to enter a new business area. <p>■ Overseas subsidiary</p> <ul style="list-style-type: none"> • In charge of services for product by installing subsidiaries in many countries. - In the united states, PSK Tech. America Inc. in charge of parts sales and technology service to local customers and SEMIgear.Inc. in charge of manufacturing and sales of semiconductor packaging equipment are in operation. - In Southeast Asia, PSK Asia Inc. in charge of marketing, parts sales and technical service for Taiwan and Singapore and PSK Asia Inc. for Singapore business are in operation. - In Japan Japanese branch in charge of marketing, parts sales and technical service for Japanese customers is in operation. - In China, there are two subsidiaries: one is located in Xi'an and one located in wuxi, which are responsible for semiconductor equipment sector marketing, parts sales, technical services in China.

3.1.2.4. SW/Contents

a) R Support

<p>Company Introduction</p>	<p>■ Company specialized in remote control solution</p> <ul style="list-style-type: none"> • Commercialized the patented technology for the first time in the world using web and icon. • Global standard on remote support and remote control technology
<p>Core Products and Services</p>	<p>■ Remote API</p> <ul style="list-style-type: none"> • Products that enables real-time access to customer PC • Remote Call - PC remote control solution that diagnoses error and solves problem in real time by remotely accessing customer PC.

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	<ul style="list-style-type: none"> - Customer can be connected easily with one click or inputting PIN on access page - It can be utilized in various works not only for customer support but also for maintenance of internal computers and work sharing. • Remote View <ul style="list-style-type: none"> - Remote control of PC utilizing remote call. - Execute all works through internet under the same environment anywhere. • Remote Meeting <ul style="list-style-type: none"> - Various sharing functions including high-definition video conference, PC screen sharing, document sharing and application sharing. - Multi-party video conference service is provided optimized for mobile environment through smartphone and tablet anywhere. • Mobizen <ul style="list-style-type: none"> - Manipulate my smartphone with PC's mouse and keyboard in a easy and convenient manner beyond sharing just screen. - Send file conveniently with Drag & Drop function between PC and mobile device. - It is possible to check the call record or mobile messenger without smartphone held with Mobizen. - With Mobizen, it is possible to multimedia including video, music and picture and various mobile apps on PC screen. ■ LightCam HD <ul style="list-style-type: none"> - Professional computer screen recording program that records anything on the computer screen like a recording by professional. - Select recording area with drag function easily. - The audio setting for recording sound from computer is done automatically. - With intuitive user interface, all people can use it easily.
<p>Situation at the Time of Entry into Overseas Markets</p>	<ul style="list-style-type: none"> ■ Recession in the domestic market <ul style="list-style-type: none"> - Piracy of domestic software companies - So called price gouge of large companies - Many companies want to find a new driving engine for growth not in Korea but in other countries. ■ On the contrary there is a huge software market in other countries <ul style="list-style-type: none"> • The overseas software market scale amounts to 1.3 trillion dollars. • With better treatment for software personnel in other countries in some cases, there is a brain drain to other countries.
<p>Strategies for Entry into Overseas Markets</p>	<ul style="list-style-type: none"> ■ Foreign investment with recognition of company's technology <ul style="list-style-type: none"> • In 2012, NTT DoCoMo, a large communications company in Japan invested 15 billion won in R Support. <ul style="list-style-type: none"> - It read the future trend earlier than competitors and adopted business models including cloud model. - R Support proposed smartphone remote control project to NTT DoCoMo making the company attract 6 million users. - R Support attracted 55% of NTT DoCoMo equity to establish a joint venture company. • Strategic partnership <ul style="list-style-type: none"> - Signed a strategic partnership with Tmax Soft to hel overseas entry each other. - R Support is in a partnership with global smartphone manufacturers or mobile communications providers including Samsung Electronics, OnePlusOne and Huawei. ■ Strategy of selection and concentration <ul style="list-style-type: none"> • R Support selected companies that need Remote Call, a major product and concentrated resources to make a best practice.

	<ul style="list-style-type: none"> - Made an effort to include word, menu as well as culture of local people. - As it is the first service for Chinese, R Support established real-time response system for trial and errors and many potential questions. ■ Technology <ul style="list-style-type: none"> • Patent <ul style="list-style-type: none"> - Patent was obtained for a remote control method among mobile devices. As both convenience and security in the process of remote control among mobile devices are secured, the technology can be utilized for product enhancement and development of new products related to C2C in the future. - Patent is registered for the technology that controls smartphone from PC remotely. • Network reliability <ul style="list-style-type: none"> - As indirect access method is used upon access to device through relay server, the power to maintain network connection is stronger than that of other companies. • Differentiated access <ul style="list-style-type: none"> - It shows differentiated technology for access by using not screen and mouse control method but access through middle ware within device. • Versatile platform <ul style="list-style-type: none"> - It enables a operation of all commercialized OS providing service under mobile environment.
<p>Results</p>	<ul style="list-style-type: none"> ■ Entry into overseas markets <ul style="list-style-type: none"> - It holds the largest market share in Japan. - It has grown into a global service company by signing a partnership with best companies in the world with the establishment of corporation in the US and China. - Half of the sales come from overseas markets. - Planned to develop China as a new strategic base. - The number of Mobizen download exceeds 5 million people - Established Game Duck, a subsidiary for game play storage and sharing service.

b) East Mob

<p>Company Introduction</p>	<ul style="list-style-type: none"> ■ Developer of mobile application Send Anywhere <ul style="list-style-type: none"> - Korea start-up company on which Silicon Valley crushed. - Company led by CEO Oh Yoon-sik, who is a veteran developer with 12-year experience. - The reason for developing the application is that he felt difficulties in sending file while working for the software industry. - In particular, he wanted to solve the problem of inconvenience of time required for file transmission between different types of devices.
<p>Core Products and Services</p>	<ul style="list-style-type: none"> ■ Send Anywhere <ul style="list-style-type: none"> • Service with a new concept that finds the fastest and most efficient network transmission route between two devices and sends file directly and safety. - It supports safe transmission of data by searching for the fastest and the most efficient network transmission route. - It is possible to send file directly without saving data in a separate space or cable connection. - File sharing is possible regardless of network type and format and equipment without requiring complicated authentication or sign-up process. - It is possible to send a file just by selecting file to send and inputting 6-digit numbers in other device.
<p>Situation at the Time of Entry into Overseas</p>	<ul style="list-style-type: none"> ■ Many young people started start ups with innovative ideas and technologies. <ul style="list-style-type: none"> - As global investors gave high marks on the competitiveness of newly born domestic venture companies, industry was encouraged.

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<p>Markets</p>	<ul style="list-style-type: none"> - Korean companies are active in entering overseas markets. - In 2014 alone, Korean start-ups attracted 400 billion from foreign capital. ■ Inconvenient file sharing method <ul style="list-style-type: none"> • There were many ways to send files including attachment in mail, messenger, cable connection in the past but most of the ways were not convenient and simple. <ul style="list-style-type: none"> - Sending a file through messenger faces limitation to size and sending a file to oneself ends up with dual log-in. - It was not convenient to bring cable. everywhere. • In the PC era, production and consumption of contents are done in PC making the use of mobile device like USB enough. <ul style="list-style-type: none"> - However, it is necessary to have a new file transmission method as contents are created in consumed in various devices including smartphone and tablet PC.
<p>Strategies for Entry into Overseas Markets</p>	<ul style="list-style-type: none"> ■ Investment <ul style="list-style-type: none"> • It attracted 1 million dollar investment from Japanese IT company Rakuten. <ul style="list-style-type: none"> - Rakuten acquired Vicky, US venture company, which was established by Korean Ho Chang-seong and Moon Ji-won and established Rakuten Ventures in Singapore investing new start-ups in Asia actively. - First investment of Rakuten in Korean start-up - Rakuten thinks that the service can be used anywhere in the world without language barrier upon expansion into overseas markets. - Exploration of local sales channel for data solution. ■ Troubleshooting of vulnerable problems <ul style="list-style-type: none"> • Vulnerable to security as it is convenient to use. <ul style="list-style-type: none"> - Reduced the likelihood of leakage by adding the use of one-time password. - Made an effort to solve security problems with tying up function through log-in during constant use period. - Basically, SSL is applied to all protocols and the information that identifies device that is stored in DB is saved in hash value making it impossible to identify the information even by server developer or administrator. • Server extension <ul style="list-style-type: none"> - Technologically, we made an effort to achieve scalability and failover functions. - It is designed to operate with simple work based on current architecture and human resources even with the increase of users by dozens of times. ■ Application of core technology <ul style="list-style-type: none"> • Application of P2P technology <ul style="list-style-type: none"> - Technology that sends original file by identifying the fastest transmission route between the two devices. - Upon file transmission, a certain server plays the role of relay. As the Send Anywhere application has server in many locations across the world, it tracks the server located mostly close to users and send the file. • Utilization of underwater communications cable <ul style="list-style-type: none"> - File can be transmitted rapidly in location where underwater communications cable is established even there is a certain distance between server and user. - The core technology is to send file after identifying global network structure and finding the shortest route. • Establishment of database that differentiates network. <ul style="list-style-type: none"> - Network environment is one of the factors that influence transmission speed. - File transmission route may be differ depending on whether it is LTE, WiFi or 3G. - There is an IP that allows P2P and does not allow P2P depending on global communications

	<p>provider.</p> <ul style="list-style-type: none"> - As East Mob established the database that distinguishes many factors, it is possible to realize the optimized P2P technology. <ul style="list-style-type: none"> ■ Customer-oriented service <ul style="list-style-type: none"> • Users do not need to think about what is the best way to send a file. - The app sends file in the best possible way under various environments based on the data accumulated in the process of development and providing service. - It is easy for a user to select the file when he/she wants to send a file. • This is the service that has an experience of giving up or failing the file transmission due to difficulties with existing methods. -
<p>Results</p>	<ul style="list-style-type: none"> ■ Plan to secure 300,000 active users around the world. <ul style="list-style-type: none"> • Currently, Send Anywhere can be used without log-in. But there is a limitation to accumulate user data. Therefore they added my device function that links various devices to user account. - It is possible to use the app as a kind of cloud server by registering devices like desktop, smartphone and tablet to his/her own account. - Plan to add file sharing function. ■ Plan to cooperate and make a strategic partnership with many global companies. <ul style="list-style-type: none"> - Planning to establish an overseas corporation and subsidiary in other countries including the US. - Planning to attract 5 billion won scale Series A investment to make the service grow rapidly.

c) Keyeast

<p>Company Introduction</p>	<ul style="list-style-type: none"> ■ Center of global cultural contents <ul style="list-style-type: none"> - Established in 1996 specialized in artist management, drama, movie, music production/entertainer management business. - A company that presents a new vision for global cultural contents industry creating values. - Export and import of various contents
<p>Core Products and Services</p>	<ul style="list-style-type: none"> ■ Contents business <ul style="list-style-type: none"> • Identify cultural entertainment contents and enter overseas markets <ul style="list-style-type: none"> - MD/licensing, image contents planning/production, event/performance, investment, media platform - Develop and distribute cultural contents - Research and invest in cultural contents • Entertainer management <ul style="list-style-type: none"> - Management of entertainers in Korea
<p>Situation at the Time of Entry into Overseas Markets</p>	<ul style="list-style-type: none"> ■ Korean wave in Asia <ul style="list-style-type: none"> - The demand for Korean contents in Asia increases with the popularity of Korean dramas. - Not only the popularity of drama, but also items related to drama heroes and heroines increases. - In particular, Korean contents are in high demand in China. ■ Explosive growth of direct purchase market in China <ul style="list-style-type: none"> • The Chinese government increases customs barrier to protect its own industry and products and applying strict standards for cosmetics and foods.
<p>Strategies for Entry into Overseas</p>	<ul style="list-style-type: none"> ■ Overseas investment with other companies <ul style="list-style-type: none"> • Invested in Panda Korea.com, a reverse direct purchasing online shopping mall. <ul style="list-style-type: none"> - Panda Korea.com is an online shopping mall that directly sells Korean products intended for

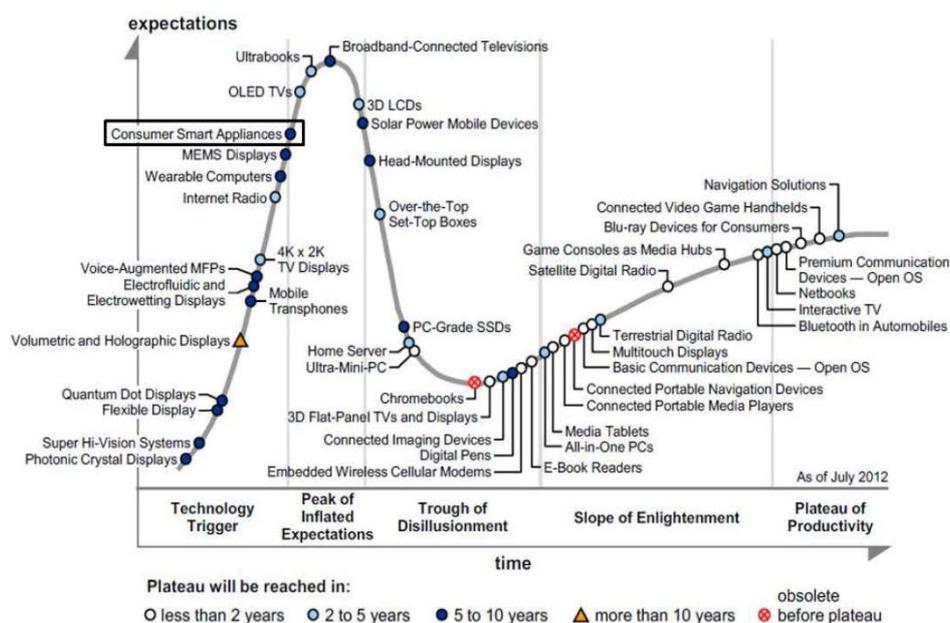
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<p>Markets</p>	<p>Chinese consumers.</p> <ul style="list-style-type: none"> - It was recognized as the first export company by Chinese customs for the first time among Korean e-commerce companies. - Chinese developer was hired and server was relocated to China making localization succeed. - It sells various kinds of products including cosmetics, baby products and fashion items and more than 90% of products sold are product of Korean SMEs. - It secured thousands of products by analyzing Korean products preferred by Chinese people and all services are provided in Chinese. - Grew into a company that provides one-stop service from marketing, contents production, Korean product certification, sales and logistics for Korean companies which want to sell their products online to China. - Panda Korea.com signed an MOU with UnionPay Card, the biggest card company in China and Chinaway which monopolizes Korean section of UnionPay Mall. <ul style="list-style-type: none"> ■ Tremendous contents such as actor, culture and IP <ul style="list-style-type: none"> • Explore sales channel for SMEs in addition to cultural contents <ul style="list-style-type: none"> - Advertise SMEs' products and shopping mall utilizing Korean stars - Develop their own label product linked to Korean star - Partnership for promotion and marketing with Chinese IT company - Korean contents marketing including game and drama ■ Support for the distribution of Korean contents with Future Global Start-up Support Center <ul style="list-style-type: none"> • Take the lead in contents distribution through Contents N. <ul style="list-style-type: none"> - Play a pioneering role in identifying cultural entertainment contents and entering overseas markets based on diversified businesses. - Possible to combine items of start-ups with Contents N of Keyeast. - It is possible to invest in idea or conduct business based on partnership relationship. - In the past, it selected mobile game "Master of Sushi" to start business. - Some operational fund is invested in the operation of start-ups. ■ Overseas network <ul style="list-style-type: none"> • Close network with China <ul style="list-style-type: none"> - Successfully completed the investment in Sohu.com, which is one of the largest portal sites in China. - As there are many companies intending to invest, it is possible to support start-ups which want to go China. - Large companies dominate the mobile service like Taobao. As it is in the initial stage, mobile service can be vitalized based on marketing capability of Contents N.
<p>Results</p>	<ul style="list-style-type: none"> ■ Stepping stone to the global market <ul style="list-style-type: none"> • Stepping stone utilizing Panda Korea <ul style="list-style-type: none"> - It serves as a stepping stone for excellent Korean SMEs to enter Chinese market easily. - Keyeast and Panda Korea jointly won the gold award in the "2015 International Electronic Commerce Innovation Award". - Millions of Chinese consumers flow into Panda Korea growing the site as the representative reverse direct purchase shopping mall. • Stepping stone utilizing Contents N <ul style="list-style-type: none"> - Entering overseas markets through start-up support activities. ■ Various MDs <ul style="list-style-type: none"> - It is in the process of negotiation with many companies which can handle production to packaging of cosmetics to conduct cosmetics business. - Panda Korea will be the main distributor. ■ Panda Korea plans to expand its business to Vietnam and East Asia.

3.1.3. GVC by Product Life Cycle (PLC)

3.1.3.1. Home appliance Industry

Figure 21. Hyper Cycle for Consumer Devices



Source: Gartner (2012),

Generally companies optimize revenue and profits during the whole product life cycle. However, companies need to consider market life cycle and service life cycle from the planning stage through product warranty period, parts and existing products' upgrade capability because the life of home appliances increased. Moreover, the home appliance market is matured and more and more home appliances sold in Europe and the US are produced by developing countries due to acquisition of technologies by developing countries, low wage and stagnation of export drive. Accordingly, direct investment increased to protect market that is secured from export in case of labor-intensive industry with low production cost.

In the product maturity period, the export activities peak and at the same time, companies' entry into other markets increased significantly. Continuous evaluation is required as time goes by as production cost is low and if product and industrial competitive advantage is lowered, the market which can be explored successfully, is lost. The companies which experienced competitive advantage make an effort to keep the competitive advantage of product and industry and move to new product market which presents relative advantage to them.

The domestic production of home appliance industry has slowed down compared to other electronics industry since mid 1990s due to utilization of cheap labor and expansion of overseas investment to avoid import regulation. As a result, the share of home appliance in the manufacturing industry continued to decrease until 1999. However, with the significant increase in the production of

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high added value digital image device and expensive premium white good in the 2000s, the share in production volume and share in employment began to increase again.¹⁷ In 2005, the share of home appliance industry in the production volume decreased from the previous year but the share in added value increased implying that the structure of home appliance is becoming high added value. In particular, digital home appliance has a potential to create a large-scale market with creation of new demand continuously on the back of short product life cycle led by technology development and the position of the digital industry is expected to increase further.

As digital home appliances with a new concept and complex product emerged based on the adoption of new digital technology and life style changes, the scope of home appliance industry has been expanded blurring the line between home appliance sector with other electronics sector. The existing home appliances converged with computer, communications and broadcasting technology gave birth to digital home appliance group equipped with digital features, network and intelligent element leading the digital revolution. Digital home appliance refers white goods that can share information including image, sound and data through digital signal. Digital TV, DVDP, MP3P, digital set top box, digital camera, digital camcorder and internet refrigerator are included in this category.

In addition, many companies compete each other to develop multi-function products as the integration of functions advances. With the improvement of functions and technologies of existing products, it becomes possible to use them for new purposes. Camera phone that combines digital camera, which is a home appliance, with mobile phone, which is a communications device, and MP3P, which combines mobile phone with sound related products emerged. In addition, the LCD monitors which have been mainly used for mobile phone and PC has become a major display item for digital TV as it becomes possible to produce large digital TV bigger than 60 inches with the rapid development of production technology.

The home appliance industry is a technology, capital and labor intensive technology. The R&D and parts production is a technology and capital intensive process and assembly is a labor and capital intensive process. Due to its characteristics, it becomes possible for developing countries to make products utilizing simple assembly and work that does not require high technology by adopting relevant technology resulting in active international division of labor compared with other industries. Moreover, the relocation of production base from advanced countries to developing countries to reduce production cost accelerates the process of globalization in the home appliance industry.

The home appliance industry is a technology-driven industry that creates a new market through continued innovation to meet consumer needs. Due to the nature of the technology innovation industry, the life cycle of white goods is becoming shorter. That is because the replacement of home appliance is not determined by product life cycle but by the emergence of a new product that makes existing products not necessary. In addition, price continues to decrease compared with performance due to the development of design and new parts making price competitiveness is a determining factor in securing competitive advantage in the home appliance industry.

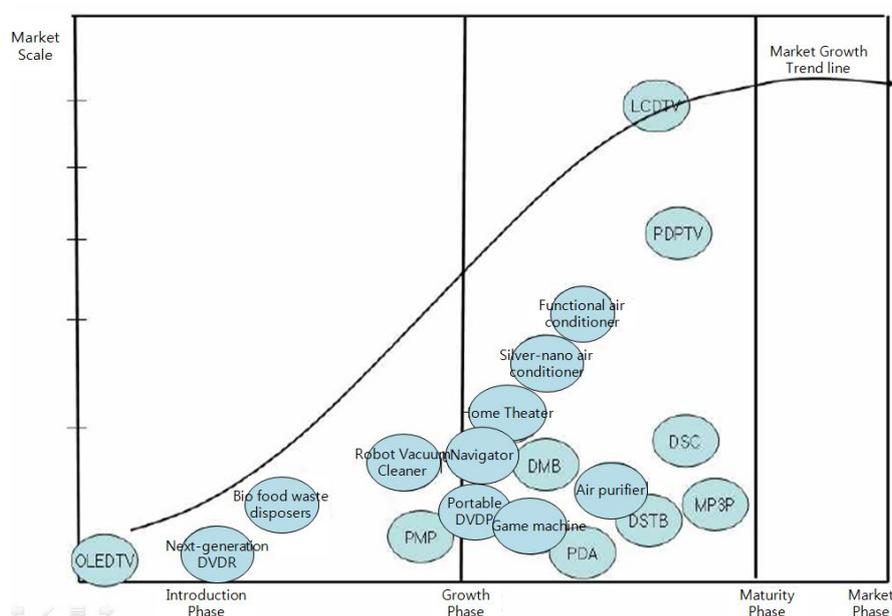
Households can possess more home appliances without increasing the consumption ration to household income because price is decreased or maintained at the same level as a result of technology advancement and fierce price competition. The home appliance industry plays a strategic role in the

¹⁷ The share of production volume in the domestic manufacturing industry increased from 2.55% in 1999 to 2.91 in 2005 and the share of added value increased from 2.11% to 2.91 and the share of employment increased from 3.16% to 3.44%.

development of the electronics industry and is an industry with very high production concentration dominated by a few multinational companies. Japanese companies including Sony, European companies including Philips and Korean companies including Samsung Electronics and LG Electronics account for more than 80% of production in the world.

Digital home appliance industry can replace the analogue home appliances that experiences market saturation and has a potential to create a massive market thanks to continuous creation of demand as a result of short life cycle led by technology development. As such, digital home appliance industry may provide a breakthrough to existing analogue home appliance industry. The product life cycle of analogue industry is usually 5 to 10 years but it is shortened to around 3 years thanks to digital home appliances that become more complex, multi-functional and high performance.

Figure 22. The Development Stage of Digital Convergence Home Appliance Products



Source: KEIT

Currently, many companies release smart home appliances among digital home appliances and the smart home appliances market is expected to grow significantly in the advanced markets due to aging, recognition of energy saving and various values provided by the products. In addition, it is expected to gradually replace the traditional home appliance market by the situation where they need to create high added value and meet the consumers' demand for more efficient and convenient products. Therefore, the home appliance industry is expected to launch expensive products focusing on markets that prefer premium functions of smart home appliances and gradually spread the smart home appliances and expand market. In particular, the industry is expected to grow rapidly in connection of intelligent power grid projects and communications network projects that are being implemented by many countries around the world from the perspective of energy saving and environmental protection, which have emerged as major global issues.

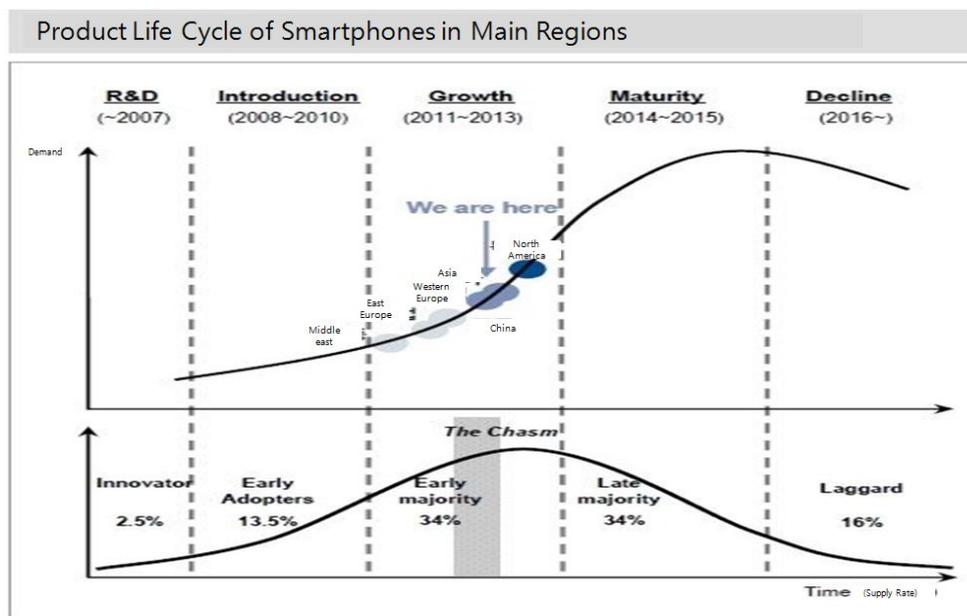
Moreover, the smart home appliances will be led by Asia Pacific, Europe and North America. Currently, smart home appliances grows rapidly in advanced markets including the US and high-

income groups in emerging markets. The scope of using smart home appliances has been widened including communications at home and link between smart home appliances and smart phones in some emerging markets including China while the use of smart home appliances is at the basic level including lighting, heating and security in advanced markets.

3.1.3.2. Smartphone

The product life cycle has shortened significantly in the 2000s unlike the supply-driven market in the 1980s. Time to market meeting the requirements of customers has become a major element for successful business. The technology development and shortening of product life cycle have been pursued assuming competition in the market where a certain level of demand exists.

Figure 23. Product Life Cycle of Major Regions



Source: Woori Investment & Securities Research Center

However, as smartphone era starts, the situation different from existing competition is occurring. The products released make people experience a new environment one can imagine in the science fiction and new requirements are identified and specified among smartphone users with the gradual increase of customer experiences. The market that is so called “new ecosystem”, which didn’t exist before, is created.

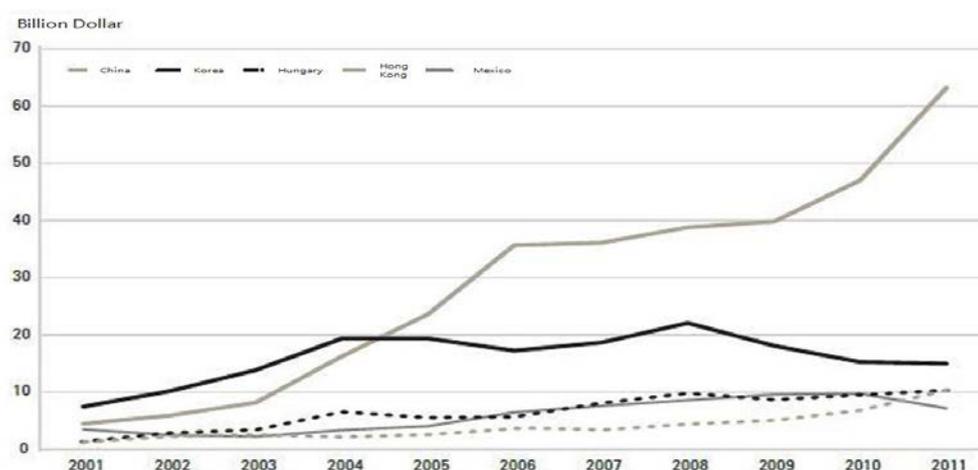
What is attractive in the mobile phone (smartphone) industry is short product life cycle. Many people purchase new mobile phones every 2 years. The shorter the life cycle is, the higher the demand for a new product. In particular, mobile phone is a personal device. All members of a family have at least one mobile phone. The price of smartphone is not also cheap. The price of new smartphone is nearly 1 million won, which is similar to middle level TV, refrigerator and washing machine.

As the product life cycle in the smartphone market continues to shorten, a newly coined word

“Android Law” appeared. The term is originated from “Moore’s Law” in the semiconductor market and refers to the reduction of product life cycle due to new operating system comes out frequently. Android Law is named as the cycle of Smartphone based on Google Android OS becomes shorter. Gordon Moore, the co-founder of Intel defined Moore’s Law in 1965 explaining that the speed of chip doubles every 18 months in the semiconductor market.

However, as the smartphone market, which has driven the home appliances and IT growth for the past few years peaked and is preparing for the downturn. Market maturation (saturation), slow-down of high-end model sales, growth of app market, which is stronger than HW market growth, reduction of excitement over smartphone and interest in the market after smartphone market were pointed out as the evidence of smartphone industry reaching its peak in 2013. According to Forbes, the smartphone’s penetration rate in the world in the first half of 2013 was 51.6%. The major factor in the outlook on the slowdown of smartphone market growth is market maturation (saturation). In the US smartphone market, over half of the smartphone owners use smartphone making demand potential begin to decrease and it is pointed out that all smartphone markets showed slowdown in growth in the second half of the year. The sales growth rate of European smartphone market is 12%, which is the lowest growth rate in the past 9 years.

Figure 24. Major Mobile Phone Exporting Countries (2001~2011)



Source: Economic and Social Advancement of Mobile Phones in the Global Value Chain, Joonkoo Lee

The most dramatic changes in the mobile phone for the past 10 years are shown in developing countries. Thanks to the relocation of production base, some developing countries have emerged as major mobile phone production base. In 2001, the world’s top 5 mobile phone exporters were Germany, Britain, Korea, Us and Finland, all of which belong to advanced country group. However situation is different these days. In 2011, countries in East Asia including China, Korea and Hong King accounted for the half of the global mobile phone exports showing the sudden emergence of Asia in the mobile phone GVC. China alone accounts for 43% of global mobile phone export. The Apple’s iPhone designed in the US is assembled mainly in China and half of the Nokia’s mobile phone is produced in China and India.

3. GVC Structure and Changes in the ICT Industry

Similarly what should be noted is that 7 out of 10 mobile phone users currently live in developing countries. In case of sub-Saharan Africa, the number of mobile phone subscribers increased by more than 32 times for the past 10 years. The growth rate is much higher than average for low income countries. The low-price smartphone is positioning itself as a tool for internet access among low-income people including people in Africa. In contrast, the growth of the number of mobile phone users has generally slowed.

As the location of mobile phone production and consumption is relocated, mobile phone GVC influences the employment in developing countries significantly. In the regions so-called “hot spot” of mobile phone manufacturing witnessed the unprecedented increase in the number of jobs. For example, the number of jobs in the electronics goods and communications device doubled between 2002 and 2008 employing about 3 million workers in the sectors in China, which is the world’s largest mobile phone exporter. With the increase in mobile use, jobs are being created in airtime vending service and mobile phone repair parts in poor countries. In Kenya, 39400 jobs are created in the branches of M-Pesa, which is the money transfer service using mobile phone. As is the case of Samsung in Korea and India, joint development of mobile software is being conducted generating innovation through network. Mobile application (app) development amount and scope have been expanded to create new start-up items not only in existing center of software like India but also in new centers like Nairobi in Kenya.

3.1.3.3. Semiconductor

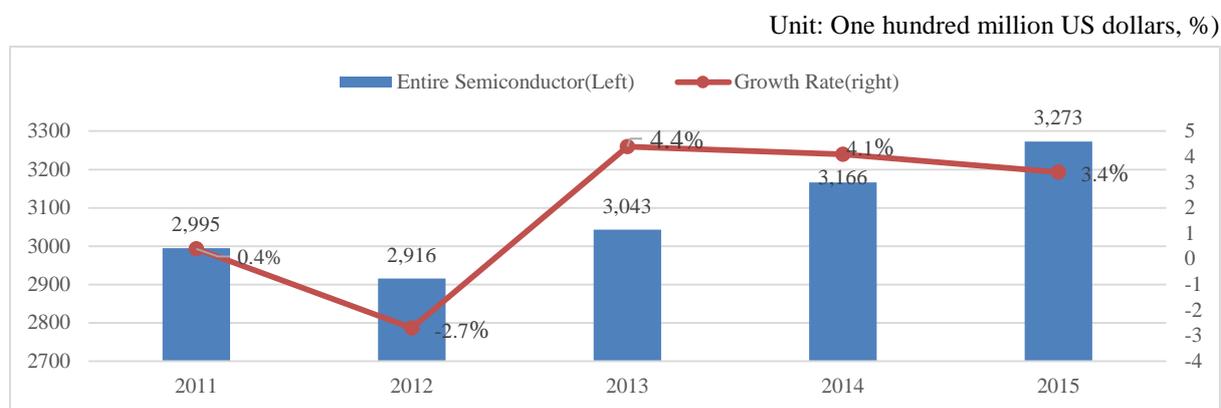
The speed of technological innovation is very fast in the semiconductor industry. The speed of developing state-of-the-art technology is becoming faster with the informatization and advance into digital society and the demand of customer is changing very rapidly. For this reason, even a new generation of semiconductor becomes obsolete in many cases after a few years after release making the product life cycle very short. The semiconductor industry has a characteristic of first comer advantage because companies which have advanced technology and launch new products earlier than competitors enjoy huge benefits. Therefore, companies with high competitive advantage can secure significant profits and strengthen competitiveness again creating a virtuous cycle. In addition, not only technology development but also mass production timing are very important as the product life cycle and technology development cycle are very short. Even though a company succeeds the development of the new generation, it cannot generate profits to recover investment if the timing of mass production is too late.

The technology innovation is occurring more rapidly and R&D investment is becoming important as the semiconductor industry is being matured and more competitive. Semiconductors are being used in most modern electronic goods including home appliances as well as equipment, network and communications equipment for industrial and military purpose. In addition, continued increase in the demand for digital equipment is expected to accelerate growth and innovation of the semiconductor industry. Recently the application scope of semiconductor has been expanded to automobile and airplane making diversification and demand continue to increase.

The semiconductor industry grows rapidly in accordance with the scope of semiconductor application. The electronics industry that requires semiconductor has achieved continued growth in line with trend of becoming intelligent, informatized and compact and the trend is expected to continue. The semiconductor has a characteristics of becoming parts dedicated to a product. Depending on the usage, semiconductor can be divided into one for common use for which mass production is emphasized and one for special purpose. Recently, the demand for the latter application

specific integrated circuit (ASIC) is on the increase. The scope of semiconductor application is also expanding with growing functions and roles even though the size of semiconductor chip is becoming smaller.

Figure 25. Growth Rate of Semiconductor Market



Source: Korea Semiconductor Industry Association

The semiconductor equipment industry was slightly vitalized in 2014. In particular, semiconductor industry has a global market scale and the share of Korean semiconductor companies is high. In 2013, the growth rate of memory semiconductor, which led the whole semiconductor industry, was more or less limited, but the demand is created continuously by smart devices or mobile devices. The demand for corporate PC replacement, termination of Window XP service, increase in the demand for ultramobile PC that combines the function of tablet and existing PC will reduce the shipment of PC that requires semiconductor, but the semiconductor will continue to grow as smart devices will have upgraded functions and capacity.

The conventional centralized power grid that we are using these days is being converted to so-called smart grid. Smart grid is a system that generates, saves and consumes largely distributed energy, which may be linked together as a system or assembly of small grids. For the time being, large power plants will play a leading role in smart grid and ultimately, fossil fuels and nuclear power plant will not be used anymore. These changes are related to the power generation, delivery, energy storage, communications and security. Therefore, semiconductor manufacturing in all these areas will be a core element in this new structure.

Electronic device for power is not well represented in the existing supply chain in both module type and discrete design. Smart grid requires innovative ways to produce smaller electronics device by increasing power density to increase efficiency. In particular, mobile and electronic vehicle applications require lightless and compact size and even in the private place like home, excessive space is regarded as unnecessary. In particular, supply chain will have very long life cycle compared to traditional home appliances. The soundness and long life cycle are the basic requirements to be met first. Therefore, the development of new semiconductor materials and technology for mutual connection is expected.

3.1.3.4. SW/Contents

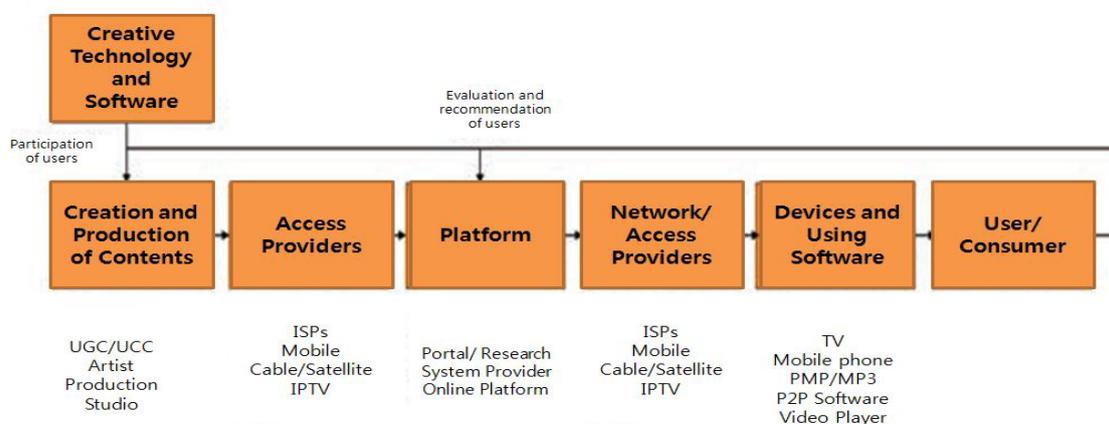
The SW industry is knowledge-intensive and high value-added industry and has emerged as a new driving force for growth with the arrival of ubiquitous and smart era and trend of convergence among industries. It is expected that the convergence between existing products with SW will be accelerated with the advancement of digital convergence ecosystem based on convergence between industries and between devices. It expands to strategic area in the traditional industry classification. The technology and application scope have been expanded to system SW, public SW, intelligent interfaces, embedded SW, the next generation Web and immersive media SW. In addition, SW industry has been changed as a service SW and business oriented SW improving scalability and integration of SW. In short, the technology centered SW industry is becoming business centered SW industry.

Contents as a industry have shorter life cycle compared to other products. As the position in the contents industry value chain is different, open type innovation in addition to user innovation shows very different aspects including motivation, type selection and management issues. Internet portal usually takes open-type innovation in the form of partnership with venture company or acquisition of the venture company. In this case, managing relationship with the venture company is an important issue. Online game industry takes various open-type innovation including purchase of a certain technology, acquisition of companies, outsourcing development and user innovation. It has the management issue of contents producers.

The recent contents market can be summarized as digital, mobile-based and convergence elements. In fact, these have been talked much since the 2000s, but serious changes tend to be visualized recently through the infrastructure spread sufficiently to the public. With the rapid increase in smart device penetration rate, pillar of using contents including newspaper, cartoon, book, music, game, broadcasting and information is moving from offline to online and mobile. The type of contents is also restructured in accordance with the trend. Digital contents can be lost and volatile unlike written record and they are easily changed or damaged. However more serious issue than lost, deformation and damage is the fact that the life span of the storage system including hardware and operating system that contains information and reads information in the media is not guaranteed.

The changes in value chain as a result of digital convergence are horizontal structure or relationship. In the integrated platform environment where all types of contents are provided through various networks as a result of digital convergence, service providers who have been limited to each area in the value chain can cross over to other areas competing each other. As such, horizontal relationship among similar market participants in the value chain is more outstanding than vertical relationship of individual media.

Figure 26. The Value of the Content Industry Chain in Integration Platform Environment



Source: KEIT (2014)

Under this environment, the ways of creating value from existing vertical value chain may hamper the economic efficiency. On the contrary, horizontal diversification can increase added value by distributing contents not through single channel but through many channels.

3.2. GVC Types and Status by Value Chain Control Model

3.2.1. Types of Value Chain Control Model

It is necessary to consider the relationship between business model and value chain as core elements that pass through the entire industrial value. Poul Timmers said that business model is a framework of thinking that connects the flow of products and services and role and potential profitability and source of income of many stakeholders who conduct business within the framework of thinking are included in it. Based on this logic, the concept had been expanded to 1) center for operating organization and foundation for value creation, 2) story telling that shows how does organization work and 3) business that connects supplier, distributor and service provider, infrastructure provider and customers. As such, business model has gone through dynamic changes as a core value of industrial element, In particular, the relationship with value chain has been developed continuously by defining value chain beyond the verticalization of value chain. This chapter will look at the changes in process that may occur in the ICT industry with changes in model as a result of integration, fragmentation and redefinition of value chain.

3.2.1.1. VC Integration Type

A company needs to go through many processes from raw material procurement to sales of product to make a product. Many companies do not perform all processes internally. Rather they outsource some processes like raw material procurement, processing, production and distribution. Vertical integration of process means a company performs and controls all value chains from raw

3. GVC Structure and Changes in the ICT Industry

material procurement to final product production and sales to improve efficiency of corporate activities. Under this model, companies can respond rapidly to fast changing flows. There might be a different opinion in this model, that reverses the flow of our times even though it can be an important model for the ICT industry sensitive to market change in terms of recognition of market flow and customer satisfaction. In particular, ZARA, a famous SPA brand increased its efficiency with rapid decision making and time saving by operating this model from planing to distribution compared to other companies in the clothing industry. The principle of rapid circulation of items that lead the latest fashion at cheap price is applied based on the system that commercializes product within 2 weeks for timeliness. Based on this principle, may popular items are distributed at a rapid pace minimizing the inventory. However, give the characteristics of ICT industry, it is not easy for the industry to use the integration model because cooperation and functional roles are important. But anyway, it can be used in the form of mixed model where integration model serve as the basis for understanding market and business.

3.2.1.2. VC Segmentation Type

Giffgaff, a virtual mobile network operator in the US, is a good example of building and utilizing a business model with good understanding of changes in ICT environment. Giffgaff is a virtual mobile network operator that only manages U-sim card and borrows communications network from mobile communications network provider. But as other communications company, the company exists online without any customer center or agents. Under the model, corporate activities of Giffgaff are supported by a customer who brings other new customers or technical support provided by own community. In turn, the company provides the voucher that can be turned into cash or deducted from usage fee. Customers are induced to manage marketing and customer directly and the company returns the cost saved through this system to customers. As such, the company spends minimum amount for advertisement without maintaining agents. In the business service, the company defines customer as a member and mutual communication and opinion of customers are reflected in the corporate activity. Based on the community, technical support can be provided serving as a role of customer center or proposes a new promotion or ways for service improvement. The community also receives a new idea and reflects it into business based on voting or comments in the community.

The segmentation VC model is easy to be adopted in the ICT industry market expansion strategy efficiently. In particular, the companies which growth based on the vitalization of community led by technology define and segment roles and link the role to business based on this segmentation. It is beneficial to expand loyalty to companies and increase in efficiency. The expansion of business based on segmentation in the ICT GVC, which is hard to define, may be considered seriously. In addition, the importance of value chain combination and segmentation will growth with the emergence of new value chain structure including “collective intelligence”.

3.2.1.3. VC Redefinition Type

Most companies deliver values to customer through the sales of their products and services. However, in case of Hilti, which is well recognized by its innovation in the construction market, it moves away from selling common tools to customers through retailers to define business model to be “tool rent and management service”. As a result, they change the business model to provide high added value service to customers in addition to product sales. As such, Coway creates a new value

chain by changing their business to management service for their water purifiers and bidet products. During the product life cycle, ownership to product is held by company and consumers are not responsible for the management of product (repair, replacement, disposal, etc.). In stead, consumers pay a fee for service in return for stable service. As the disposal process is conducted by a company, unnecessary disposal of product may be prevented increasing the ratio of recycling. In the business profit model, the model changes from sales to rent service. In particular, the company redefined value chain based on the exact identification of final consumers' needs and linked the needs to business model creating a new value chain.

3.2.2. Issues Related to Changes in Value Chain Control Structure

The value chain process of the ICT industry is largely related to business model. Compared to other industries the level of change is significant and changes are occurring at a rapid pace. The integration/segmentation/redefinition as a result of changes in value chain control structure mentioned above cannot determine characteristics of all industries. However, the ICT industry has a business model with communication with the market. In particular, companies can take advantage of innovation through changes in value chain. In this industry, many issues may arise in the real business world rather than academic influence of GVC. In particular, start-ups which create new business based on ICT or companies that lead new business development strategy need to have an interest and try the business control structure of value chain. It could be an issue that can change a business model of a company beyond the hardware innovation including relocation of production base and operation system.

It is expected that issues related to integration/segmentation/redefinition or another strategic issues will be shown in the global value chain by defining and presenting direction to go for value chain.

4. Promoting SMEs' Participation in GVC

4.1. Challenges and Strategies by the Person Concerned in the GVC

4.1.1. Basic Directions

Table 8. Global Value Chain Approach Challenges

Area	Explanation
Improving understanding of the GVC	Improving understanding of the need to approach the global value chain so as to create significant added value by enhancing competitiveness through 'Rationalization of Resources', targeting a large number of SMEs which have focused on the domestic market activities
International Co-marketing	Encouraging configuration of the consortium for the joint marketing of SMEs in overseas markets or that for overseas government procurement joint bidding of SMEs
Development of Advanced Financial Techniques	Developing and improving a financial technique, 'Factoring' to support smooth cash flow, by doing so, to ensure that liquidity problems do not occur through all payments of SMEs that provided products and services to be done on time
Industry Cluster Development	Developing industry clusters that can take advantage of economies of scale and integration and be helpful for building networks with skilled labor and complementary-cooperating companies
Intellectual Property Protection	Establishing standard authentication procedures that protect intellectual property rights within the extent that SMEs do not have an excessive burden and receive unfair treatment in the global value chain
Legal Advices	Creating a legal and institutional environment that attracts foreign direct investment (FDI) to ensure that multinational companies(hereafter, referred to as 'MNCs') can transfer technology and knowledge to local suppliers and subcontractors
New Tech Development	Supporting SME's new technology development to expand the added-value within the GVC and to create partnerships with foreign organizations that have extensive experience in technology transfer-product-process-management
Development of International Production Network	Building industrial and service network for developing countries to effectively link with international production networks by encouraging entrepreneurship through technology and business links and by improving the company's competitiveness

Source: Deloitte Anjin Management Institute (2013)

4.1.2. Strategies for SMEs

There are some differences between industries, but, in general, SME's understanding of the GVC is high in export manufacturers while manufacturers engaged in domestic consumption and service tend to be low. Especially, there is a significant difference between primary and secondary subcontractors in level of understanding of the need of the GVC, due to manpower, time, and limited resources and limitations of competencies. To integrate an enterprise into the GVC, SMEs should firstly obtain competencies that can comply with industry standards and quality control

standards. As for MNCs, transparent and quantifiable information about standards and certifications are important.

As for electrical & electronics and transport machinery industry, industry-leading companies can be a foundation for active FDI and GVC integration. However, it is weak in components and materials industry that is professional supplier-driven and consumer-driven products such as clothing, machinery, chemicals in which SMEs take the lead.

As for the professional supplier-driven industry which focuses on economies of scale and export routes, upgrading the level of the enterprise by integration of GVC and SMEs which lack the internal innovation capability can be one of important strategies. Once such industries are fostered, SMEs can create a high entry barrier through stable growth and enjoy the dominant position in maintaining competitiveness, despite the fact that rapidly developing countries are catching up fast. In addition, the rise of BRICs economies which adversely affect existing countries can be an opportunity for SMEs that specialize in unique production activities of the GVC.

4.1.3. Strategies for Large Enterprises and MNCs

As for large enterprises and multinational companies that have already participated within the area to strengthen their position in the GVC, strategies that can review the position and added value that can be generated and can improve values should be implemented. For this, small, medium, and large enterprises should have competitiveness through a variety of links among them and strengthen the international competitiveness together with suppliers.

Especially, global enterprises have much more merchandise trades and technological exchanges, and the division of labor between regions are done by strategic motives. In this regard, a high level of technical skills and functionally extended activities with participating companies can be continuously expanded, and active participation in development is possible. In other words, strategic GVC participation is possible as production demands in the GVC of leading companies are matched with capability of local companies.

Suppliers should have the capability to meet cost performance ratio in value chain centered industries led by consumers. As for the GVC that utilizes economies of scale, internal capability of companies that can respond to standards and quality requirements of global companies comes before anything else. In case of value chain that considers technology based researches the most important, it may not be easy to pioneer a new market due to lack of credibility and promotion even if technology development was successful. In this case, strategies for enhancing functions in value chain are available by attracting local production and expanding to local markets through integrating importers into the GVC and by attracting R&D and design functions.

4.2. Challenges and Strategies for the Government

4.2.1. Basic Directions

As the GVC is expanded, changes in international trade and business environment have become significant, and there has been a need for new policy perspective which is different from existing one, regarding national and regional trade, industry, innovation, policy, etc. In this regard, the government should suggest an alternative plan by recognizing tasks, further directions and problems to understand interests of each participant engaged in the GVC and to ensure that participants can keep up their end in each industry area and phase by playing one of important roles in the GVC.

4.2.2. Challenges for the Government

4.2.2.1. Challenges for Converting Policy Thinking

Spread of the GVC means that a turning point in ways of thinking, so-called a country's foreign trade or globalization and internalization of a company is required. As it is not easy for SMEs to follow internationalization trends due to limitations of human and material resources, the persons in charge of national policies should predict and recognize changes in industrial environment that becomes international and support relevant policies in response. Especially, internalization strategy for SMEs, which has been traditionally implemented towards supporting direct exports of SMEs can be changed and applied in various ways through GVC participation strategy.

To begin with, high value added industries within the GVC are much more distributed in service chains than simply assembly or production parts. Therefore, there is a need to change policy thinking so as to ensure that local SMEs can promote global activities in sectors creating high value at a national level.

In addition, as various standards for being integrated into relevant value chain are required for companies controlling GVC, policy makers should correctly understand necessary requirements to integrate local SMEs into GVC and support relevant policies based on this.

4.2.2.2. Challenges for Implementing Policies

Given that it is difficult to determine a standardized policy direction due to different characteristics by industry, identifying the GVC of each industry in advance and thoroughly analyzing positions of small, medium, and large enterprises at a government level should come before anything else. Through this, it is possible to verify what kind of added value is created by industry at national and corporate level. This can be an opportunity to review national industrial strategies in a comprehensive manner and to identify which way local companies should approach in the GVC.

In addition, spread of the GVC emphasizes the importance of policies to enhance the competitiveness of service industries, it links with the need for policy support to activate the convergence of various services and traditional manufacturing technologies based on ICT competitiveness which Korea has the advantage. This can promote fostering small and flexible knowledge-based SMEs in that they have relatively less initial fixed cost compared to manufacturing industry. The mutual cooperation between large enterprises and SMEs needs to be supported to maintain and strengthen the network competitiveness between Korean companies in a relevant industry in respect of maintenance of national industrial competitiveness. There needs to put priority on enhancing the competitiveness for SMEs and providing incentives for large enterprises that cooperate with SMEs.

4.2.2.3. Challenges for Implementing Business

The majority of SMEs lacks information about the GVC which they belong to. Exactly recognizing the position of individual company in GVC helps each company to know its need and future direction. Therefore, education and public relations at the government level are urgent. There needs to develop various FTA education and promotion programs as well as similar programs and to provide them to SMEs. For this, "GVC Forum" focusing on large enterprises that can create the GVC

and information exchange between large enterprises and SMEs needs to be hold, and field trip programs among various participants should be conducted. Platforms or tools that differentiate information necessary for global leading companies that oversee the GVC by industry and item are required, too. Through such information sharing, it can be a significant guideline for setting the future direction for SMEs. Global large companies have currently been accelerating the competition to form the most competitive value chain in the world. In this regard, portals for selecting SMEs that want to enter the GVC by industry, identifying the condition of GVC entry, and connecting these SMEs and GVC should be established.

GVC not only focuses on global large companies, but small and midium sized GVC consisting of midsize and small companies also exists. To support this, a plan for operating incubation programs to form and support small and midium sized GVC that focuses on Institute of Technology together with companies, organizations, and nations can be considered. The government should check relevant small and midium sized markets, set strategies for controlling GVC in relevant markets, and make an ecosystem that connects funds, etc. for developing and supporting technologies and strategies necessary for supply chain and distribution chain of relevant GVC. In addition, the government should take a heavy responsibility for encouraging participation of global large companies at home and abroad that oversee relevant GVC on a regular basis, checking if functions and technologies necessary for GVC are reflected properly.

4.2.3. Response Strategies for the Government

4.2.3.1. Implementation of Strategic FDI

Favorable FDI(Foreign Direct Investment) support measures are designed to promote the integration of SMEs within the GVC and to transfer technologies and knowledges of MNCs to local suppliers and subcontractors at the same time. Therefore, in case foreign MNCs having willingness to invest in Korea connect their GVC to Korean SMEs, there needs to pay attention to FDI strategies such as mitigating R&D investment criteria of foreign-invested enterprises or supporting taxes on R&D investment of Korean SMEs that supply parts to foreign-invested enterprises.

Generally, FDI has both advantages and disadvantages. From the company's perspective, it can be seen as benefit while its effect be seen as double-edged sword from the nation's perspective. Advantages on production factors such as the expansion of employment, the acquisition of foreign technology, and improvement of productivity exist while disadvantages such as temporary capital outflows and reduced employment of a particular hierarchy exist. Increase in market development and export may also indicate a temporary decrease in demand as the opposite benefits, that is to say, a decrease in exports. However, such advantages should be maximized through strategic FDI, and efficient strategy that meets the GVC phase should be expanded through utilizing the benefits of trade and investment. In order to do this, there needs to evaluate adequacy such as checking the indicator for the degree of foreign investment compared to exports and to form a foundation to enter the GVC through balance of export and direct investment. The necessity to create and maintain an environment that is helpful for trade and export considering that SMEs associated with foreign FDI or FDI in the domestic large enterprises and global corporations have risen. The Korean companies need to induce upgrades of the GVC as a whole company by discovering the creative core competencies that the company does the best and by implementing foreign investment that the company's competency can

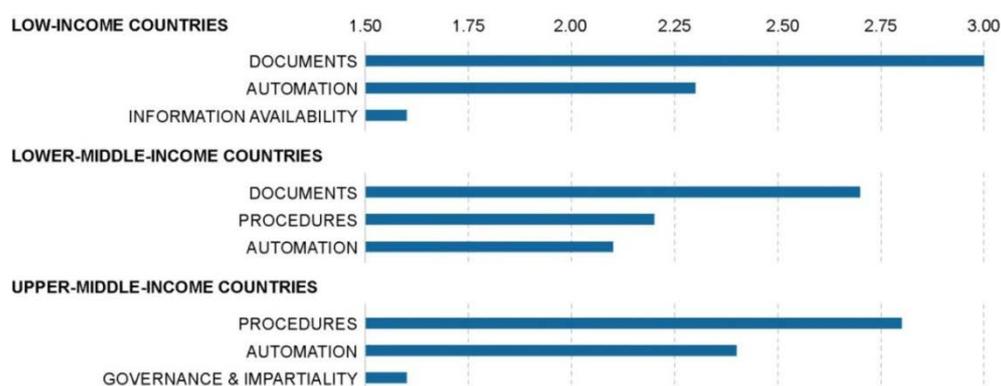
be expanded. In addition, companies should try a policy approach in value chain dimension to check the core value chain of domestic companies and to expand the domestic investments and employment.

4.2.3.2. Measures for Trade facilitation

Trade facilitation has emerged as a key economic agenda in all regions. Eliminating key obstacles that charge low-income developing countries with the responsibility of long delays and high trading cost would bring increased bilateral trade, diversification of greater export, enhanced foreign investment, and strengthened national competitiveness.

The Organization for Economic Co-operation and Development (OECD) identified regions that can do relevant activities and developed trade facilitation indicators which enables potential effects of reformation. This indicator includes all areas of border procedures, ranging from origin pre-scanning to transportation commitment of 133 countries covering income level, geographic area and development stage. This indicator can be useful for all countries when they are taking the role of importers or exporters in that the indicator is used to ensure that GVC participants and their products can make good use of the input.

Figure 27. Activating Trade Method: Cost Savings Potential in Merchandise Trade (%)



source: Inclusive Global Value Chains: Joint OECD and World Bank Group Report

In order to implement such trade facilitation policy, the following efforts are required.

- Implement a reform plan for trade facilitation as comprehensive settlement of hard/soft infrastructure
- Facilitate information about prices, benefits and implementation tasks which are helpful to low-income developing countries and SMEs in a critical and practical manner, and provide practical guidelines for technical support for reformation and the establishment of capacity building
- Reinforce cooperation and harmony among development partners, multinational, regional and bilateral levels to prevent reproductions and support local activities related to trade promotion and programs from the national and regional perspective
- Identify practical meaning of utilizing private sector's contribution to trade promotion implementation
- Conduct analysis work to monitor and evaluate policy design and performance

4.2.3.3. Active Introduction of FTA

The GVC has become an inevitable trend in global trade regardless of developing and developed countries. The whole process of good production, ranging from raw material to final products, has been done anywhere that provides the qualified technologies and raw materials at a competitive cost.

According to the OECD(2013a), in case an intermediate good with 5% tariff goes through 5 countries before being finally consumed, the price of final product increases by 10.5%. On the other hand, in case the intermediate good goes through 10 countries, its final price grows by 25.8%. If tariff rate increases, its amplification effect becomes even greater. For instance, if an intermediate good with 20% tariff goes through 5 and 10 countries, the price of final product increases by 48.8% and 159.6% respectively. This shows a tendency that foreign added value is much more included as GVC becomes more established. Given that intermediate goods currently cross borders, production steps are increasing, and economic cost of protective trade that exporters feel a substantial burden is further increased, trade liberalization at a global level should be promoted in order to effectively utilize the GVC.

Especially, as the GVC is intensified, regional value-added criteria in bilateral FTA should be alleviated. The regional economic integration that includes several countries in the production network should be implemented to contribute to facilitating the movement of parts or technologies and to saving trade cost and time.

In addition, the phenomenon of production fragmentation that is done beyond the borders made many countries become more open, predictable and form transparent trade and trade norms. This is because measures that interfere with tariff or non-tariff barriers and the flow of other trade have an impact not only on foreign producers, but on domestic producers. More active trade and industrial policies are also required to achieve growth and employment by increasing the participation in the GVC that has been activated globally.

In order to do this, 'clear organization support system depending on the GVC' that can identify the value chain of companies taking advantage of FTA and support the system when performing relevant global strategies needs to be established. Efforts to ease the M&A regulations between borders for pursuing strategic asset, utilize intellectual property clause of FTA, and to strengthen R&D cooperation between countries are also required. Furthermore, FTA creates a bigger market in horizontal relationship as well as efficient vertical integration of a company's value chain. Particularly, strategies that can extend the scope of the industry based on its utilization are required, and to do this, easing relevant regulations is necessary.

a) Active Participation in FTA

From the perspective of Korea which takes a full advantage of the GVC, there is a need to expand FTA to strengthen this. At this point, it is required to review various possibilities of utilizing GVC as an exporting country of final products through procurement of raw materials and intermediate goods. However, standards to minimize "Spaghetti Bowl Effect"¹⁸ which can occur during the process of FTA extension and overlapping should be established, too.

¹⁸ This expression was firstly used by Jagdish Bhagwati, a professor at Columbia University, describing that the antipathy effect may appear when it takes a long time to identify different procedures, customs and rule of many countries if FTA between many countries are signed simultaneously like noodles in a plate of spaghetti.

b) Establishing a Role as a Mediator in a Large-Scale FTA

As a trade environment changes, comprehensive and large-scale FTA has been observed as one of significant changes in the global trade system out from the traditional perspective of economic activities and trade terms that were once considered the most important matter. Looking at the currently signed FTAs such as TPP(Trans-Pacific Partnership), EPA(Economic Partnership Agreement), RCEP(Regional Comprehensive Economic Partnership), FTA(trilateral FTA among Korea, China and Japan), TTIP(Transatlantic Trade and Investment Partnership), it is possible to predict that large-scale FTA would play an important role globally. However, as the conclusion of the large-scale FTA has regional obstruction, possibilities of abnormal growth of supply chain within a certain region cannot be understated. Therefore, it is difficult in reality to create international trade norms in the true sense if a harmony between relevant countries is not done. Furthermore, an adverse effect of FTA may appear due to conflicting trade norms.

TPP and RCEP have currently shown signs of discord due to re-balancing forces of the United States and China and re-balancing forces of China and Japan within the region. If Korea carries out its duties faithfully not only as a participant but as a mediator, it appears to have a significant contribution to the GVC activation and creation of added-value.

d) Conclusion of International Supply Chain Agreement(ISCA)

The active discussion about establishing a new global trade norms is in progress as various large-scale FTAs are currently promoted and GVCs are activated between countries. Hoekman and Jackson (2013) suggested “ISCA(International Supply Chain Agreement)”¹⁹, a comprehensive approach for dealing with challenges related to the GVC, attracting worldwide attention as it was introduced by World Economic Forum and National Board of Trade in 2013²⁰. However, efforts for researches on such movement or policy responses in the international community are still insufficient. Therefore, additional researches and efforts are required.

e) Participation in the GVC in New Areas

Participation in new fields from the GVC perspective is to find an opportunity to establish a new GVC through developing independent new products and entering into new product fields. In fostering new industries for the entry into new areas, it should consider procurement of raw materials and intermediate products and potential exports to utilize the GVC all the time. Therefore, industrial and trade policy should be considered at the same time.

f) Improving GVC Sector Participation

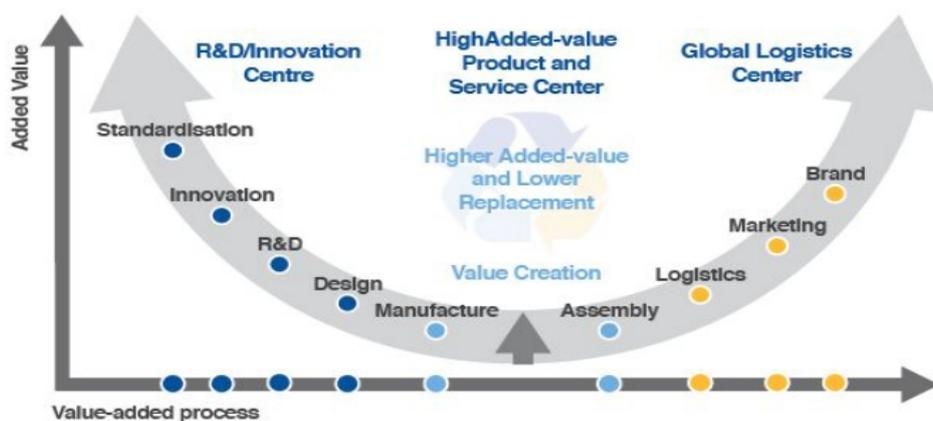
The efforts of industry improvement through technology innovation in the currently participating GVC are required. Particularly, looking at final product export in China from the GVC perspective in East Asia, Japan’s contribution is high in sectors such as capital goods, materials, and parts which technical content is high whereas Korea’s contribution to added-value is gradually decreased.

¹⁹ Hoekman, Bernard and Selina Jackson (2013), “Shifting Focus in Trade Agreements-From Market Access to Value Chain Barriers,” <http://blogs.worldbank.org/trade>

²⁰ World Economic Forum (2013), Enabling Trade: Valuing Growth

Especially, it is necessary to improve high value added sectors such as product development, planning, R&D, distribution and service.

Figure 28. The Smile Curve and the Distribution of Added-Value in the Value Chain



Source: *Business Week International online extra*, May16, 2005, Stan Shihon Taiwan and China

g) New Market Development

With regard to exports of final goods, a differentiation strategy by product and quality is required to extend developed markets such as U. S. or Japan and to make its way into a resource-rich country. As for developed countries among the GVC member countries, there is high probability of exports in final product and service sector. On the other hand, developing countries have a high potential in export market of final products as well as procurement market of raw materials. In this regard, final products specialized by region needs to be differentiated. It is expected that Vietnamese market where a manufacturing production base is being equipped plays a role as a new market for exports of intermediate goods.

As for Korea, the GVC contribution by intermediate goods export in Chinese market has declined gradually, and possibility of exporting final products made in Korea is wide open as consumption becomes more high-end with the increase of income in China. Japan also shows potential for export market of final products as the export of final products increased significantly.

Regarding the development of final product market, there is an alternative plan for direct export and local investment of final products. As there is an alternative relationship in economic theory, the conclusion of FTA may show a possibility of domestic production rather than local production. However, the results of empirical analysis shows that both grow together.²¹ In this respect, FTA

²¹ According to KIEP analysis, FTA significantly affects both Korean investment on foreign countries and foreign investments on Korea. Korean investment on foreign countries are increased by FTA, vertical foreign investment on manufacturing parts are promoted in developing countries, whereas horizontal foreign investment on service parts are promoted. In addition, empirical analysis shows that FTA greatly increases the developed countries' investment (Chankwon Bae and Hyeyoon Keum (2013, May 6), "The Impact of FTAs on FDI in Korea," *World Economy Update*, Vol. 3 No. 19, KIEP

certainly contributes to economic growth, but there is a possibility to have a negative impact on job creation, distribution issue with micro-enterprises, etc.

h) Access to Countries with Rich Natural Resources

If developed countries in the GVC directly enter a local raw material procurement market, it can be used as an opportunity for enhancing its contribution to “Aid for Trade” and the GVC and for creating added-value. There are many successful examples of private companies or enterprises such as management of vineyards in Chile, direct or indirect management of rice, garlic, and sesame farms in China, the entry into wood and furniture industry in Indonesia, excavation of minerals in countries with rich natural resources like China, etc.

i) Taking Measures for Risk Management according to GVC expansion

As size and range of GVC expands, global environment changes such as economic crises or natural disasters in certain countries have been affecting the economy of individual country more rapidly. Given that the instability of economy due to high national debt in major countries leading the global economy, currency wars between countries, political and diplomatic dispute, wars, and terrors, demands for running an emergency response and warning system and countermeasures to mitigate its impact are rising more than before.

In some cases, the FTA performance does not directly affect individual country. This happens by market dominance of the countries directly involved in domestic market. To prevent such a problem, individual country should make political efforts to mitigate market power through enforcement of competition policy and expanding the range of FTA conclusion.

There is also a possibility of worsening income gap by industry, company, and social status through expansion of GVC and large-scale FTAs. In case of existing FTAs signed with other countries, enormous social costs incurred from conflicts between social status. In this case, the government should execute an aggressive distribution policy to compensate for the industry and the social classes sacrificed for national interests caused by FTA conclusion.

4.3. Strategies for Participation in the GVC by Sector

4.3.1. Sectoral Participation Strategy

4.3.1.1. Home Appliance Industry

Home appliance industry has various items and its convergence with other industries has been progressing quickly, so it is difficult to characterize it as a general GVC type. It needs classification by the item within the industry, but its general trend is scale intensive type of the GVC, and global strategies of leading companies are defining characteristics of the GVC. As for home appliance industry, the importance of competition and cooperation among MNCs, source/core technology, foreign investment, and global outsourcing were highlighted first, and East Asian countries including Korea emerged as the mainstay of the GVC. The globalization of home appliance industry goes through the process of strategic alliance and M&A among MNCs, expansion of foreign investment,

localization of global production, establishment of global R&D, and global outsourcing.

The effects of decline of uncertainty, increasing economies of scale, strengthening of strategic industries, forming a new competition of new technology and product development, and seeking competition mitigation can be obtained through strategic alliance between companies. As digitization and globalization progress, it is difficult to obtain managerial resources required for global competition by implementing an independent strategy only by individual company. Therefore, efforts of investment and production in core-original-new technology are factors of globalization.

As the launch of new technology and products in home appliance industry has a faster rate compared to other industries, the industry has accelerated with new technology and products. The industry has a pattern that the convergence and composition between products are generalized. Therefore, life cycle of product is rapidly shortened and the production flexibility is emphasized, deepening technology competition between companies for standard occupancy.

As the modulization of home appliance parts progresses rapidly, the ODI is significantly increasing, and its competitiveness is influenced by the adjustment of global production networks and possession of core technology. Local production has been done along with foreign investment in the form of outsourcing such as parts procurement from South East Asian countries with inexpensive price and assembly and marketing in the US and Europe which are demand markets. It also complements comparative disadvantage of companies through establishing cooperation structure between companies, promotes its market and sales channel. At the same time, it can enhance production technology and skills of relevant local companies and hold a dominant position in price competitiveness. In global production division of labor, not only simple outsourcing, but outsourcing in IT service area, R&D, and design area has been activated. As for R&D, there is a tendency to avoid offshoring to protect individual country's own core technology, but R&D becomes a target for outsourcing due to disappearance of geographical constraints, decline in cost, the need for localization of product development, the short lifetime of technical innovation, etc.

In this home appliance industry, the expansion of GVC production system is an inevitable trend, but there needs to make sure that its accompanying risk management is prepared. To solve difficulties in the process of GVC participation, companies entering overseas markets should firstly solve their funding problem and proceed with local investment procedures based on this.

As difficult factors are closely related to each other and appear cyclically in the process of manufacturing and parts procurement, companies entering overseas markets should strengthen their own capability to respond to problems by identifying such problems.

Companies should conduct a pre-feasibility study including current issues when entering foreign countries. For instance, in China, the most serious problems include sharp increase in labor costs, vague management of legal system, and ambiguity of intellectual property protection. In Vietnam, mal-maintenance of infrastructure (power, communications, transportation, etc.), rising labor costs, and un-development of relevant local industry are emerging as pending issues.

Establishing an international cooperation structure that covers governments, society organizations, and research institutions between both countries by selecting them as strategic target countries to ensure that many companies can actively participate in creating the GVC can be another method. In other words, it is to select areas that can participate in the GVC and create an environment which can cooperate with relevant countries through various organizations mentioned above. For instance, GVC forum in which major people concerned from industry, academy, and government can participate can be held to find measures for various business support so as to enable large enterprises and SMEs to form networks and promote inter-regional partnerships.

4.3.1.2. Smartphone Industry

Thanks to rapid commoditization of Smartphone, its volume growth is expected to be concentrated in emerging markets. Demand of China led its growth in 2013 and 2014 while, in the following two years, ultra-low income countries such as India, Middle Asia, and Africa are expected to grow. As super-cheap Smartphones are launched, price competition of OEM will worsen, eventually becoming a factor that inhibits the profitability of the whole industry.

Therefore, Chinese companies that were once considered the second group focusing on home market are promoting enhancement strategies such as advanced market, premium products, and profit maximization based on technical skills accumulated in its home market. In other words, Chinese companies are accelerating as the future generic manufacturer to gain supremacy in global market by breaking through “slowdown domestic market growth→fierce competition between local companies→deteriorating profitability” and become a global company. However, it is expected to see polarization between performances of companies depending on the capability to meet the requirement level of global telecommunication companies such as delivery time, Smartphone price, and product lineup by company.

At the same time, existing large enterprises and global companies should make efforts to adopt new materials and be equipped with innovative UI and UX in order to release differentiated Smartphone both in function and design that it is difficult for emerging companies to copy.

As there is a demand for products with high price performance ratio in emerging markets, individual company have been preparing for fierce price competition in emerging markets by strengthening economies of scale through utilizing foreign production position in Vietnam, China, India, and Brazil. To surpass emerging competitors in market, the government should expand R&D investment in original technology development to widen a technology gap and strengthen international cooperation for standardization. Moreover, the government should play a central role in ensuring that SMEs, universities, and national research centers have one goal in the process of creating competitive advantage.

Diversification of delivery destinations should be improved through the GVC participation of emerging markets. For instance, companies that could not find an opportunity to do business with Apple and Samsung should spare no efforts to find other emerging companies. These companies should seek for Smartphone companies that can enter emerging markets such as Vietnam, China, etc. Especially, it is desirable to find a market focusing on emerging countries including China where domestic brand ratio is high, but its parts competitiveness is poor through strategic alliance. For instance, companies can promote a market by developing waterproof parts and materials which enhance the waterproof function for countries with high humidity.

There needs to establish the foundation for international industrial cooperation to find a market for foreign investment SMEs. The object is to find a demand market by establishing joint research institute between its own country and partner country. In addition, it will play a central role in developing a new technology by encouraging demand and supply companies with an option to purchase between both countries to participate in such development.

In addition, companies should thoroughly review in what level the company will utilize their own strengths(technology, process, finance, etc.) in business management in case of entering ASEAN countries. For instance, a company should identify the following matters; core technology level, what

technology would be used to produce when entering overseas markets, and whether countries that the company want to enter match up with its own business management strategy or not. In case of overseas production, it is common to be forced to lower prices due to fierce competition with companies such as China and Taiwan, if general-purpose technology is exported.

However, transferring core technology to ASEAN countries can bring a dangerous situation making the technology compete with its own country's production. Particularly, technology leakage is becoming a big issue. Given that China has an environment which does not respect intellectual rights, a lot of preparation is required in advance.

4.3.1.3. Semiconductor Industry

The added-value of upstream such as R&D and design and downstream such as service and marketing is increasing while that of production such as manufacturing and assembling is decreasing. There needs to focus more resources on upstream and downstream area in order to increase its added-value.

Active business strategy to integrate into the GVC is required to be established. In case of integrating into GVC, companies should lower outsourcing cost cheaper than the production unit cost, resulting in lower production unit price of products. However, what is more important thing than the reduction of production unit price is the efficiency of the production such as overseas corporate strategy and product quality which is based on thorough market research. In other words, strategies to induce investment based on superior technology, production processes and high brand and quality awareness should be conducted at the same time.

To maximize profits, it is critical to utilize the GVC in business-to-business supply network competition rather than competition between single companies. Particularly, SMEs need to make continuous efforts to actively participate in the GVC through licensing, subcontracting, strategic technology alliance, overseas acquisition, and the production by partner brand.

Korean overseas investment firms need to make proactive efforts to prevent technology leakage in local capital of the company. For this, it is required to minimize the dependency on local companies and promote joint overseas expansion together with Korean part makers to maintain quality stability. In addition, in inevitable cases, it is desired that they clearly define the scope of technology transfer to protect core technology and maintain business management rights through equity investment in case of transferring to a local company.

Furthermore, emergency situations should be prepared in advance through a prior feasibility review. For instance, in case technology leakage occurs, whether to continue to produce in order to obtain market share or to strengthen R&D investment within Korea to enable technology innovation should be reviewed in advance.

Key analysis details are to diagnose the long-term growth outlook through the maturity and competitiveness analysis of IT sector and to suggest future directions for corporate-wide strategies through improvement of financial and tax related difficulties. large enterprises and organizations should actively promote real mutual growth of large, medium, and small sized enterprises through this.

4.3.1.4. Software/Contents Industry

As for China, as increase in production costs and substitute of imports are accelerated due to

increase of labor costs in factories around the world, the paradigm has been changing from high growth strategy focusing on exports and investment to domestic demand and consumption centered strategy. Additionally, ASEAN countries including Vietnam and Indonesia are expected to grow in contents distribution and consumption market due to the rising middle class as well as becoming a supply base for global manufacturing industry which substitute for China.

Firstly, foreign market penetration strategy is the most traditional method that penetrates the market through direct and indirect investment of capital and strategic alliance. Steps for entering overseas market vary as follows; First, foreign office establishment. Second, method of intervening like licensing and production. Third, direct entry. Fourth, expanding in another country. The strategy depends on the benefits of market, the potential for future growth, whether to exist existing competition, etc. The market may exist or be developed.

Secondly, the strategy for vertical integration and complementary assets. The vertical integration is one of important strategies. This vertical integration enhances the synergy integrated throughout each phase of value chain within a large enterprise, making a relevant enterprise more efficient and creative. Global media companies have currently accepted the philosophy of such vertical integration in strategic planning and operations as a new phase. In addition, a complementary strategy is to diversify platforms or services. The best example is many media companies diversifying their platforms in sectors like TV, radio, movie, publication, internet, etc.

Thirdly, convergence and broadband residential services are to respond to current situations where boundaries distinguishing broadcast, cable, phone and internet are gradually becoming blurred. The most significant driver of convergence is the digitization of the media and information technology. If increase of strategic alliances between global media companies and IT companies makes a way to convergence caused by the strategic need to obtain both contents and transfer, this market will grow on a much larger scale.

The relevant measures should be established and implemented in order to establish a competitive base for producer service in Korea. If the producer service in Korea does not meet the needs or expectation of company, the producer service from developed countries would be more purchased, making value chain throughout the industry more dependent on developed countries' services and increasing vulnerability of value added trade. In this regard, it is required to concentrate on policies fostering the currently used producer services.

Fostering excellent service personnel must be accompanied. The contents industry in developed countries has a high ratio of its own country's added-value input. If more quality service personnel is input, the ratio of added value will increase in current input structure. The reason why many services from developed countries are imported in sectors like information service and advertisement despite the fact that its own nation has enough service professionals is that the country lacks in industry-leading professionals that companies require. Therefore, educational institutes and programs to foster industry-leading service professionals should be introduced and implemented. There also needs to have consistent interest for granting efficient qualifications and establishing management system.

Finally, the plan to integrate more of its own country's contents into the GVC in S/W and contents industry of other countries is required. The government should closely link foreign and domestic production activities by activating super-developed countries' investment focused on industries that are closely linked to domestic ones. In addition, the government should attract key functions such as R&D center, design center of foreign companies in Korea, along with encouraging foreign service companies to enter Korea by establishing and implementing service-friendly foreign direct investment policies.

5. Conclusion

5.1. Strategies in Different Perspectives

When looking from the SMEs' perspective, the direct interest party, the necessity to enter GVC is very high due to a lack of capacity and resources such as labor, time and capital. For this, transparent and qualified information and capacity for industrial standard and quality management are important in order to enter GVC. Large companies need strategies to re-identify the added-value they can obtain from GVC and improve the existing value. Therefore, the efforts to enhance international competitiveness with cooperating companies by various links is required

Changes in management environment and international trade increases as GVC expanding. Policy is also a part of it, so a new perspective on trade, industry and innovation is needed. Therefore, the government should understand each interest group in GVC and provide suggestions or tasks for participants to play their role in each industry and phase. Especially, policy makers should understand the limited resources of SMEs which have a difficulty tracking the trend of economic changes in the world, therefore, they should first predict and acknowledge the changes in the international industry and trade, and then provide the corresponding policies.

GVC according to industries and position of domestic large, medium and small sized enterprises should be precisely acknowledged at governmental level since providing a uniformed policy direction is difficult with the different characteristics of each industry and enterprise level. Moreover, the kind of added-value as a national/company level in each industry should be reviewed. It is important to enhance network competitiveness within the industry and to enhance the competitiveness as remaining national-level of industrial competitiveness of SMEs by win-win cooperation between large and small businesses. Win-win cooperation should prioritize and provide incentives for large companies to enhance cooperation with domestic SMEs.

Many of the SMEs lack the information about the GVC they want to participate, so they require education and in-depth market information provided by the government to overcome the informational gap. Also, the government should provide information that the global leading companies need divided by item or industry, and prepare platform or tool they can utilize. Through this, active information exchange can serve as a guideline for SMEs.

There is also a relatively minimal-scale GVC that is formed mainly around mid-sized companies and small and medium-sized enterprises. To support this, policy programs which support the formation of small and medium sized GVC focused on technology research institute with cooperative role of the nation and various organizations should also be considered. Strategies to manage the GVC of a certain market by checking small and medium sized markets are also required. Linked ecosystem such as technology and funding that are needed in the value chain and distribution chain of GVC should be formed. Government should attract the participation of companies that controls the GVC of a certain industry regularly, and take the role of advertising and ensuring whether the technology or functions that GVC need are correctly reflected.

Again, regardless of the developing countries and developed countries, GVC has become an

inevitable flow in the world trade. However, as more intermediates are crossing borders and the production phase has increased, the economic cost of the protectionism that the exporters face also increase, therefore global free trade needs to be promoted in order to efficiently utilize the GVC. As the value chain deepens, the standards for added-value within the nation should be loosened in the bilateral FTAs. The regional economic integration with inclusion of more countries should be promoted to easily transfer components or technology and save trading time and cost.

Fragmentation of production that is crossing borders made many countries to open information, to predict production and to have regulations for transparent trade and investment, because measures that interrupt the flow of trade, such as tariffs and non-tariff barriers also affect not only the foreign manufacturers, but also domestic manufacturers. This made participation of GVC, which is active between many nations to increase, and lead to the necessity of more active trade and industry policy in order to achieve growth and employment. For this, identifying value chain of a company that can utilize FTAs and a 'clear institutional support system in accordance with the global value chain' that can support global strategy is necessary.

Also, mitigation of M&A regulation between countries, utilization of intellectual property terms in FTAs and enhancement of cooperation in R&D between countries to pursue strategic assets should be promoted. Moreover, FTAs create a bigger market not only in efficient vertical integration but also formation of horizontal relationships. In particular, strategies are required to increase industry utilization and the mitigation of related laws and regulations.

Additionally, in the participation of new area in GVC perspective, industrial policies are required to find opportunities to pursue utilization of new GVC through unique new product development and utilization of the existing product areas. Lastly, strategy to diversify new perspectives such as entering natural resource-rich countries is also necessary as the strategies to respond to the various risks that can be potential to global business activities of SMEs.

5.2. Further Challenges for Development

ICT industry is continuously changing all over the world, through that, the members of the ecosystem and leading companies are also changing rapidly. Majority of the companies are aware that the past strategy is no longer effective in the new market trend, and GVC is becoming a dominant strategy for the location construction of fusion and world economic integration of the various industries. The aim of this study is to present a strategy and direction of each industry.

First, the home appliance industry is difficult to characterize as a particular type of general GVC because its items are diverse, and the fusion with other industries has progressed rapidly. So, the product category typology within the industry is needed, but the overall trend has the characteristics of scale-intensive types of GVC, thus, global strategies of the leading companies are defining the characteristics of the GVC. The home appliance industry is the fastest industry that the importance of competition and cooperation between multinational enterprises, the source/core technology, of foreign investment, global sourcing emerged, and East Asia, including South Korea has emerged as the central axis of the GVC. Globalization of the home appliance industry has been developed in the course of acquisitions and strategic alliances between multinational companies.

The globalization of home appliances industry is done in the process of partnership through acquisitions, expansion of foreign investment and localization of global production, global R&D building and global outsourcing. As emergence rate of new technologies and new products becomes faster by being accelerated in the new technology and products product life cycle is sharply reduced, the flexibility of production is important.

Accordingly, this technology competitive for standard occupancy between companies has been intensified. GVC expansion of production systems in the home appliance industry is an inevitable trend, but the risk management associated with this should be taken into consideration. In order to solve the problems in the process of GVC participation, international expansion companies have to solve the problem of financing first and foremost, and then the local investment process should proceed based on this. Expansion companies need to enhance the response capability to identify the problem, because difficulties in parts procurement, manufacturing factors are closely related to each other and have shown cycles.

The Smartphone industry is making efforts by adopting a new material or equipped with the innovative UI and UX. for making a unique Smartphone that is difficult to be imitated by new companies and differentiated in function and design. Emerging markets have a high demand for products with high price-performance ratio; there is a need to prepare for that price competition being intensified in emerging markets by economies of scale through overseas production bases with advantages such as Vietnam, China, India and Brazil.

In the semiconductor industry, added-value of downstream industry such as service and marketing and upstream industry such as R&D and design are increasing; however, the added-value of manufacturing (assembling) is decreasing. So, for the increase of value-added, there is a need to focus resources in the downstream and upstream sector. In addition, the need to actively promote from large companies and organizations for mutual growth of large, medium and small sized companies has been raised more than any other areas.

Software / contents sector requires an actively corresponding strategy to changes in the global value chain of high-speed SW and the content industry. There is a need to explore measures to ensure that domestic content industry can be incorporated more in the GVC of S / W and content industries in other countries. Also, it is necessary to closely link the foreign production activities and domestic production activities by promoting investment of developed countries focused on industries that are closer to domestic industries. In addition, by establishing and enforcing a service friendly foreign direct investment attraction policy, the government should induce key features of foreign companies, such as R&D centers and design centers well as foreign service-companies to enter Korea more.

Thus, this study reviewed the strategy and development tasks focused on industry-specific characteristics, and strategies that can utilize the in-depth study under real business management. Each interest parties need a strategic approach that can be internalized deeply in the stable network relation more than anything else, and plans for strategic PR or forum is also required.

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