Chapter 1: Introduction

1.1 Research Motive and Background

Korea's foreign direct investment (FDI) into other countries has quickly grown as a part of a strategy to enhance the competitiveness of its enterprises in the era of globalization. China, in particular, has become one of South Korea's largest destinations for FDI as well as one of the largest trading partners. While there are cases where business has failed to meet expectations in China, the global trend of "investing in China" has become one of the most significant standard practices for multinational corporations (MNCs).

The Korean display industry was ranked number one in terms global market share (45.9%) with a domestic production of 44 billion USD, accounting for 3.2% of total GDP, seventh in exports (34 billion USD) and third in total number of employees (127,000) in 2013[1]. In short, the display industry is a central pillar of the Korean economy. The display industry, which is one of the major export industries for Korea, has high level of dependence, more than half, on China. In other words, the largest market for the Korean display industry, which is extremely important for the Korean economy, is in China.

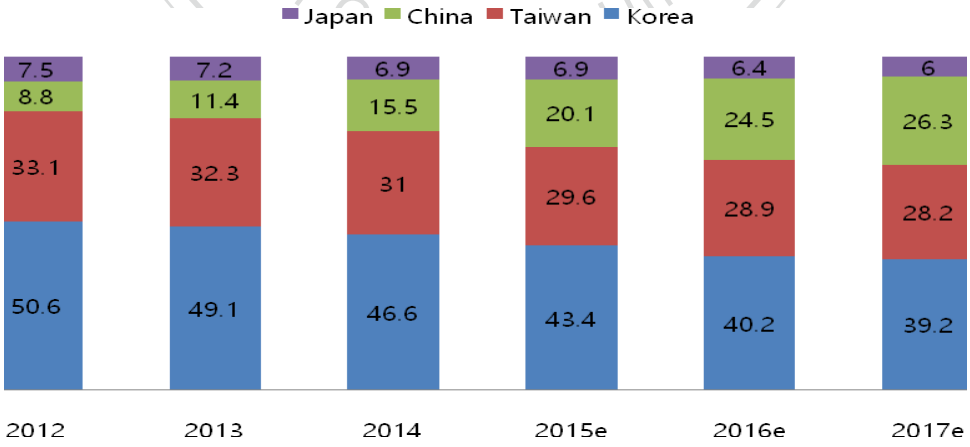


Figure 1-1: Ratio of LCD panel capacity by country (Unit: %)
Source: IHS[2]

[1] 이강은 (Lee, Kang-en), "디스플레이 산업 '위기에서 기회로'" (Display Industry 'From Crisis to Opportunity), *산업일보* (San-up Ilbo), October 7, 2014.
[2] 성현희 (Sung, Hyun-hee), "中 정부 주도 디스플레이 산업 신화, 이제 한계인가" (Display

Furthermore, production in the display panel industry is mostly concentrated in the Asia-Pacific region, especially in Korea, Taiwan, China and Japan, and comepetition between them has become increasigly fierce in recent years.

Among the many types of displays, as Figure 1-2 shows, Thin Film Transistor Liquid Crystal Display (TFT-LCD; hereafter, LCD) is the most popular major display type, making up about 90% of the overall market.

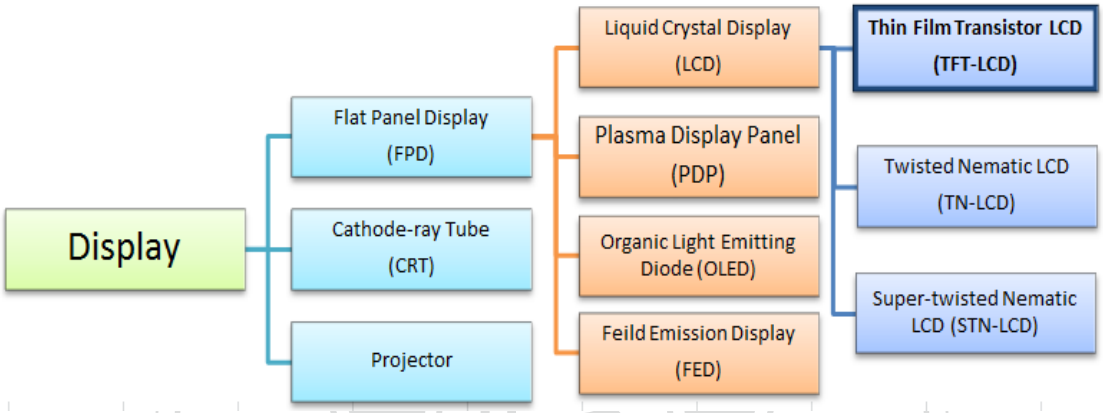


Figure 1-2: Type of display

Source: Author

According to the research institute Display Search's recent data, Samsung Display (SDC) and LG Display (LGD) lead the Korean LCD panel industry and are the top two players in the global LCD industry, where the two companies alone account for about 22.6% and 28.2% of global market share by volume or 20.7 and 25.9 billion USD in revenue, respectively.[3] Since investment in China is one of the most crucial factors for the two companies' success, both have increased investment amounts gradually and implemented diverse strategies for investment there since the 2000s. However, the rise of the Chinese LCD industry, which was spurred by the rapid growth of the domestic market and government support policies since the mid-2000s, and the rise of the Chinese LCD market as the single largest market since 2011 have

Industry Led by the Chinese Government has Reached its Limit?), *전자신문* (Et News), April 12, 2015.

[3] 홍승완, "세계 LCD 시장 절반은 LG, 삼성 … 더 강해지는 韓 디스플레이" (LG and Samsung Accounts for Half of Global Market…The Korean Display Industry is Getting Stronger), *헤럴드경제* (Herald Economy), 2013.02.08.

impacted the investment strategies of the Korean LCD panel industry in China. Moreover, China's reduction in incentives for inward FDI and increases in labor and land costs, coupled with the effects of the global recession, have not only led to stagnation in the industry but also led the Korean companies to modify their competitive strategies. In addition, with more external factors such as the free trade agreement (FTA) between Korea and China and the Economic Cooperation Framework Agreement (ECFA) between China and Taiwan in place, a reexamination of the TFT-LCD industry and modification of strategies is necessary.

1.2 Research Purpose

As of the end of 2013, Asia was ranked the largest investment region in terms of Korea's cumulative outward FDI by an overwhelming margin, showing ratios of 67.6% of cases and 43.4% in terms of amount. This resulted from the rapid growth of Korean businesses' investment in China since the 1990s. In particular, the establishment of diplomatic relations between Korea and China and China's official entry into the World Trade Organization (WTO) have facilitated this process. As a result, the overall importance of Korean companies strategies for investment in China has grown.

Table 1-1: Korea's outward FDI status by Region (Cumulative as of the end of 2013)

Region (Unit: K USD)	Status		Ratio(%)		Amount per case
	Cases	Amount	Cases	Amount	
Asia	38,440	109,752,044	67.6	43.4	2,855
North America	12,154	59,015,810	21.4	23.3	4,856
Europe	2,457	43,534,820	4.3	17.2	17,719
Central and South America	1,429	22,012,280	2.5	8.7	15,404
Oceania	1,439	11,342,557	2.5	4.5	7,882
Middle East	546	4,014,479	1.0	1.6	7,353
Africa	399	3,304,322	0.7	1.3	8,282
TOTAL	56,864	252,976,312	100.0	100.0	4,449

Source: Korea Eximbank[4]

[4] *Ibid.*, p. 13.

“We should remember the survival strategy of Samsung is equivalent to its strategy for the Chinese market（중국 대응 전략과 삼성의 생존전략이 함께 한다는 사실을 명심해야 한다）.” These are the words of Samsung Group Chairman Lee, Gun-hee speaking at an executive meeting in Shanghai in 2001 and reveal the significance of its strategy in China. China’s position as the world’s factory and its potential for enormous domestic demand has put the TFT-LCD industry into a highly competitive market. As a result, investment in China has become the survival strategy for many businesses, especially LCD companies.

Therefore, this research first explores the outward FDI of Korean businesses facing globalization and then narrows its focus to discussing the investment strategies of Korean businesses in China. It then analyzes the investment and competitive strategies of Korean TFT-LCD panel companies in China under globalization to enhance their competitive advantage, especially when facing an emerging China as the biggest potential competitor and the biggest customer (or market) at the same time.

In brief, the content of this study includes the following:

1) Literature reviews on theories of globalization, industry analysis, strategy, and FDI

2) Analyses of the investment strategies of Korean businesses in China in terms of company size, purpose, region, and industry (e.g., characteristics, transition, trends, and status)

3) Analyses of the global LCD industry and market

4) Analyses of the Korean LCD panel industry’s development, competitive advantages, and its success factors

5) Analyses of the competitive strategies of the Korean LCD panel industry’s investment in China

6) Forecasts of Korean companies’ investment in China and the global LCD panel industry and market

7) Suggestions for Korean companies’ investment strategies considering FDI, the Korean LCD industry and the Korean government

1.3 Research Scope and Limitations

1.3.1 Research Scope

With the Chinese economic reforms since the 1990s, the establishment of diplomatic relations with Korea in 1992, China's official entry into the WTO in 2001, and the revision of the 1992 Korea-China Bilateral Investment Treaty (BIT)[5] in 2007, Korea–China relations have deepened and expanded, especially economically. In particular, trade and investment between the two countries has improved systematically and dramatically since the 2000s. Moreover, China has become one of the largest FDI and export destinations for Korea. Investment by the Korean TFT-LCD panel industry in China started in the early 2000s and increased gradually as the Chinese market expanded. Therefore, this research mainly focuses on the Korean TFT-LCD companies' investment strategies from 2000–2014.

1.3.2 Research Limitations

This analysis of the Korean LCD panel companies' investment strategies in China has aimed to use the most accurate and up-to-date information available. As with all research, however, it is constrained by several limitations, which include the following:

1. Much of the information and data are from Korean sources. Data sources from other countries (e.g., China) may lead to slightly different findings.
2. There may be gaps in information or data produced differently by multiple research institutes.
3. Because the information comes from sources written in different languages, there may be minor discrepancies or inevitable differences in meaning created by the translation process.
4. Due to business confidentiality considerations, interviewees' information may be based mainly on subjective or personal experiences.

[5] The revised treaty is expected to accelerate investment and trade between the two countries since it provides more protections for investors in order to create a business-friendly environment.

Chapter 2: Literature Review

The purpose of this study is to analyze Korean businesses strategies for investment in China under globalization, including their motives, competitive advantages and disadvantages, as well as Korea-China investment trends and related regulatory guidelines in the TFT-LCD industry. In particular, it aims to assess the implications of these development for TFT-LCD panel businesses. In order to provide a background for the study, this chapter reviews four major theories or concepts: globalization, industry analysis, strategy, and foreign investment.

2.1 Globalization

The term "globalization" came into popular usage in connection with the huge surge in foreign direct investment (FDI) by multinational corporations (MNCs) since the mid-1980s and especially in the aftermath of the Cold War. This process was catalyzed, in part, by advances in information technology (IT) that made it easier to complete international trade and financial transactions. Since there are different perspectives on and interpretations of globalization in different fields, it has been given a number of definitions. Several of these are discussed in the section below.

2.1.1 Definition of Globalization

Samuel Kim defined globalization as "a series of complex, independent yet interrelated processes of stretching, intensifying, and accelerating worldwide interconnectedness in all aspects of human relations and transactions – economic, social, cultural, environmental, political, diplomatic, and security – such that events, decisions, and activities in one part of the world have immediate consequences for individuals, groups, and states in other parts of the world."[6] He also emphasized that "globalization is on a continuum, with the local at one end – as in North Korea and Somalia – and the global at the other – as in many countries that are heavily dependent on foreign trade, foreign capital, and foreign direct investment (FDI) inflows."[7] David Held also argues that, in its simplest sense, globalization refers to

[6] Samuel S. Kim, edited, *East Asia and Globalization*, (Rowman & Littlefield Publishers, Inc., 2000), p 10.
[7] *Ibid.,* p. 5.

the widening, deepening and speeding up of global interconnectedness.[8] Given the different perspectives and uses in various fields, globalization has been given a variety of definitions as shown in Table 2-1.

Table 2-1: Definitions of globalization

Anthony Giddens: Globalization can thus be defined as the intensification of worldwide social relations which link distant localities in such a way that local happenings are shaped by events occurring many miles away and vice versa.[9]
Peter Dicken: Globalization is 'qualitatively different' from internationalization … it represents 'a more advanced and complex form of internationalization which implies a degree of functional integration between internationally dispersed economic activities.[10]
Roland Robertson: Globalization refers both to the compression of the world and the intensification of consciousness of the world as a whole.[11]
OECD: Globalization is understood as the phenomenon by which markets and production in different countries are becoming increasingly interdependent due to the dynamics of trade in goods and services and the flows of capital and technology.[12]
IMF: Globalization is a historical process as the result of human innovation and technological progress. It not only refers to the increasing integration of economies around the world, particularly through trade and financial flows, but also refers to the movement of people (labor) and knowledge (technology) across international borders. In other words, it broadly covers culture, political and environmental dimensions. (Four aspects of globalization: trade, capital movements, movement of people, and spread of knowledge (and technology).[13]
George Modelski: Globalization is a process along four dimensions: economic globalization, formation of world opinion, democratization, and political globalization. This was rounded off with the assertion that changes along one of these dimensions (such as economic globalization) elicited changes among the other dimensions.[14]
Robert Gilpin: The integration of the world economy.[15]
UNESCO: Globalization can be defined as a set of economic, social, technological, political and cultural structures and processes arising from the changing character of the

[8] David Held, Anthony McGrew, David Goldblatt and Jonathan Perraton, eds., *Global Transformations: Politics, Economics, and Culture* (Oxford: Polity Press, 1999), p.16.
[9] Anthony Giddens, *The Consequences of Modernity* (Cambridge: Polity Press, 1990), p. 64.
[10] Peter Dicken, *Global Shift: The Internationalization of Economic Activity* (London: Guilford Press, 1992), p. 1.
[11] Roland Robertson, *Globalization: Social Theory and Global Culture* (London: Sage, 1992), p. 8.
[12] OECD, Intra-Firm Trade (Paris: OECD, 1993), p. 7.
[13] IMF Staff , "Globalization: Threat or Opportunity," April 12, 2000, accessed July 19, 2015, http:www.imf.org/external/np/exr/ib/2000/041200to.htm#II
[14] Indian Political Science Association, *The Indian Journal of Political Science* (2007), Volume 68, p.260.
[15] Robert Gilpin, *Global Political Economy* (New Jersey: Princeton University Press, 2001), p. 36

production, consumption and trade of goods and assets that comprise the base of the international political economy.[16]

Source: Author

2.1.2 Economic Implications of Globalization

The end of the Cold War provided the crucial political conditions necessary for the creation of a global economy. Political and technological developments were the most important driving forces for economic globalization.

Economic globalization has brought some developments in trade and finance as well as FDI by multinational corporations (MNCs). For example, international trade has not only grown more rapidly but also diversified from trade in goods (e.g., agricultural and manufactured products) to trade in services (e.g., investment and finance). As a result, international competition has greatly increased and many businesses have had to confront competition with foreign firms. During the 1980s and 1990s, trade competition became even more intense with the boosting of industrialization in East Asia and the export-led growth strategies of countries in the region. Underlying the expansion of global trade has been a number of developments. During the last half of the twentieth century average tariff levels of the United States and other industrialized countries lowered from about 40 percent to only 6 percent. Technological advances in communications and transportation also reduced costs and thus significantly encouraged trade expansion.[17] Taking advantage of these changes, more and more businesses are pursuing global economic strategies and operations.

In addition, deregulation and privatization not only accelerated the opening of national economies but also contributed to economic cooperation and integration. For example, the volume of foreign exchange trading (buying and selling national currencies) in the late 1990s reached approximately $1.5 trillion per day, an eightfold increase compared to 1986. In contrast, the global volume of exports (goods and services) for all of 1997 was $6.6 trillion, or $25 billion per day. In addition, the amount of investment capital seeking higher returns has grown enormously; by the

[16] United Nations Educational, Scientific and Cultural Organization, accessed July 19, 2015, http://www.unesco.org/most/globalisation/Introduction.htm

[17] Robert Gilpin, *Global Political Economy: Understanding the International Economic Order* (New Jersey: Princeton University Press, 2001), pp. 5-6.

mid-1990s, mutual funds, pension funds and the like totaled $20 trillion, ten times the 1980 figure. Moreover, the significance of these huge investments is greatly magnified by the fact that a large portion of foreign investments is leveraged. It is obvious that international finance has a profound impact on the global economy.[18] It might be true that as the volume increased, so did the risks; however, as a result of these developments, the market orientation of the global economy has increased. As deregulation and other reforms have reduced the role of the state in the economy, many believe that markets have become the most important mechanism determining both domestic and international economic and even political affairs.[19]

2.2 Industry Analysis

Hill and Johnes (2002) defined an industry as a group of companies offering products or services that are close substitutes for each other. Close substitutes are products or services that satisfy the same basic customer needs. A nation's wealth depends on industrial development, and a national economy can be tightly linked to many different industries. Therefore, the economic development of a nation is greatly impacted by the type of industries present in that country. The business landscape is the crucial first step for the basis of industry analysis because it determines the strategic competitiveness of a nation.

2.2.1 Meaning of Industry Analysis

Industry analysis is defined as research analysis of a specific industry, and its approaches differ depending on the context. Traditional industry analysis is based on microeconomics. The purpose is to utilize society's resources effectively, and therefore, it studies how to use public power in order to prevent monopolies and provide standardization and a platform for fair competition. However, competitiveness in industry analysis is based on the differentiation of the characteristics, industrial guidelines, and game rules to discover the opportunities and threats and to design business models according to strategies which fit the business environment.

[18] *Ibid.*, pp. 6-7.
[19] *Ibid.*, pp. 7-8.

2.2.2 Industrial Analysis

There are many ways of performing industrial analysis to analyze the competitive advantages or strategies of individual businesses. This study incorporates three of them, including Porter's five forces model, industry life cycle, and the value chain.

(1) Porter's five forces analysis for industry structure[20]

Industry structure not only has a strong influence on the whole industry and the rules of competition but also affects the competitive strategies of businesses. Thus, companies have to analyze and understand the target industry before making competitive strategies. Porter introduced the five forces model in his book *Competitive Strategy* (1980) and is a framework for industry analysis and business strategy development. The framework analysis combined industries and business management, and argued that being competitive is the key to a business unit's success.

The five forces framework analysis includes five competing factors, which are the five basic competitive forces in an industry's structure. Although not all of the five forces will be equally important and the importance of each factor differs depending on the industry, the collective strength of these forces and factors determines the ultimate profitability or long-run return on investment. The five forces include (1) the threat of new entrants (potential entrants), (2) rivalry among existing firms (industry competitors), (3) the threat of substitute products or services (substitutes), (4) the bargaining power of buyers (buyers), and (5) the bargaining power of suppliers (suppliers) as shown below in Figure 2-1. The five forces determine industry profitability because they influence the prices, costs, and required investment of firms in an industry – the elements of return on investment. For example, buyer power not only influences the prices that firms can charge as does the threat of substitution, but it can also influence costs and investment because powerful buyers demand costly service. In addition, the bargaining power of suppliers determines the costs of raw materials and other inputs.

[20] Michael E. Porter, "Ch. 1: The Structural Analysis of Industries," *Competitive Strategy-Techniques for Analyzing Industries and Competitors*, (New York: The Free Press, 1980), pp 3-33.

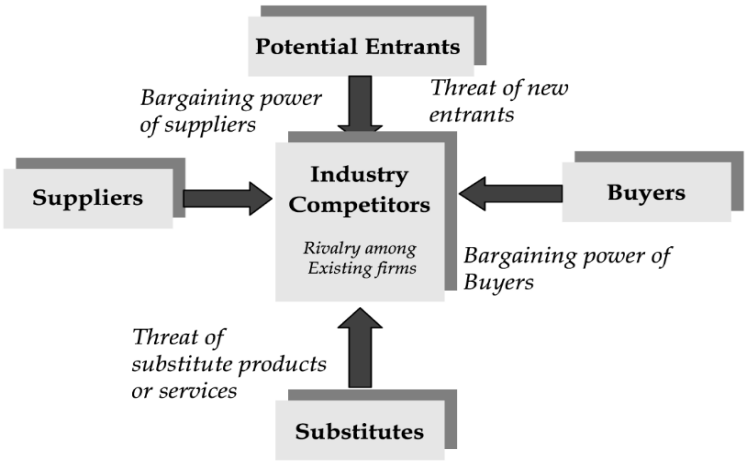


Figure 2-1: The five competitive forces that determine industry profitability

Source: Porter, M.E., 1980[21]

The intensity of rivalry influences prices as well as the costs of competing in areas such as manufacturing, product development, advertising, and sales force. The threat of entry places a limit on prices, and shapes the investment required to deter entrants.[22]

In other words, the five forces framework allows a firm to see through the complexity and pinpoint those factors that are critical to competition in its industry, as well as to identify those strategic innovations that would most improve the industry's profitability.[23]

1. Threat of new entrants (Potential Entrants)[24]

The threat of entry into an industry depends on the barriers to entry that are present, coupled with the reaction from existing competitors that the entrant can expect. If barriers are high and/or the newcomer can expect sharp realization from entrenched competitors, the threat of entry is low. Porter highlights six sources that could influence barriers to entry: economies of scale, product differences, capital requirements, switching costs, access to distribution channels, cost disadvantages independent of scale, and government policy.

[21] Michael E. Porter, *Competitive Strategy-Techniques for Analyzing Industries and Competitors*, (New York: The Free Press, 1980), p. 4

[22] *Ibid.*, p. 5.

[23] *Ibid.*, p. 7.

[24] *Ibid.*, p. 7.

2. Intensity of rivalry among existing competitors (Industry Competitors)[25]

Rivalry among existing competitors takes the familiar form of jockeying for position, using tactics like price competition, advertising battles, product introductions, and increased customer service or warranties. Intense rivalry is the result of a number of interacting structural factors including numerous, equally balanced competitors, slow industry growth, high fixed or storage costs, lack of differentiation or switching costs, capacity augmented in large increments, diverse competitors, high strategic stakes, and high exit barriers. As these factors increase, competition becomes increasingly intense.

3. Threat of substitute products or services (Substitutes)[26]

Identifying substitute products is a matter of searching for other products that can perform the same function as the product of the industry. Substitute products that deserve the most attention are those that (1) are subject to trends improving their price-performance tradeoff with the industry's product or (2) are produced by industries earning high profits.

4. Bargaining power of customers (Buyers)[27]

Buyers compete with the industry by forcing down prices, bargaining for higher quality or more services, and playing competitors against each other. Porter proposed that a buyer group is most powerful in the following circumstances: (1) it is concentrated or purchases large volumes relative to the seller's sales; (2) the products it purchases from the industry represent a significant fraction of the buyer's costs or purchases; (3) the products it purchases from the industry are standard or undifferentiated; (4) it faces few switching costs; (5) it earns low profits; (6) buyers pose a credible threat of backward integration; (7) the industry's product is unimportant to the quality of the buyers' products or services; and (8) the buyer has full information.

[25] Michael E. Porter, *Competitive Strategy-Techniques for Analyzing Industries and Competitors*, (New York: The Free Press, 1980), p. 17.
[26] *Ibid.*, p. 23.
[27] *Ibid.*, p. 24.

5. Bargaining power of suppliers (Suppliers)[28]

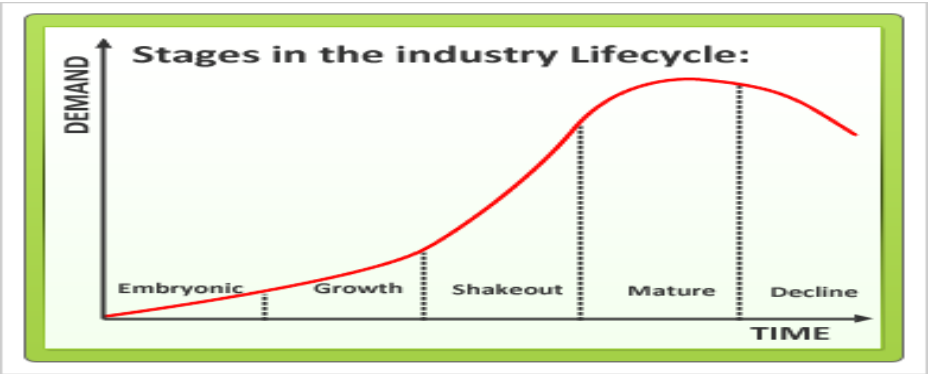
Suppliers can exert bargaining power over participants in an industry by threatening to raise prices or reduce the quality of purchased goods and services. Their power to do so is maximized under several conditions: (1) the industry is dominated by a few companies and is more concentrated than the industry it sells to; (2) it is not obliged to contend with other substitute products for sale to the industry; (3) the industry is not an important customer of the supplier group; (4) the suppliers' product is an important input to the buyer's business; (5) the supplier group's products are differentiated or it has built up switching costs; and (6) the supplier group poses a credible threat of forward integration.

Michael Porter's five forces theory can help to clearly identify an enterprise's business environment and systematic understanding of the key factors for competiveness. In other words, the framework is a good tool for identifying useful resources within an environment, and this tool provides managers a system for strategic thinking. Most importantly, competitiveness influences all competitors; therefore, when deciding a competitive strategy, all forces must be considered.

(2) Industry Life Cycle Analysis

Hill and John (2002) suggested that the industry life cycle model is a useful tool for analyzing the effects of industry evolution on competitive forces. It also can identify five industry environments each liked to a distinct stage of an industry's evolution: (1) an embryonic industry environment, (2) a growth industry environment, (3) a shake-out environment, (4) a mature industry environment, and (5) a declining industry environment. These stages are shown below in Figure 2-2.[29]

[28] *Ibid.*, p. 27.
[29] C. W. L. Hill, and G. R. Jones, *Strategy Management*, (Boston: Houghton Mifflin Company, 2001), p. 100.



Embryonic	Growth	Shakeout	Mature	Decline
• Slow Growth • High Prices • Significant Investment • High risk	• Rapidly increasing demand • Improving profitability • Falling prices • Low competition	• Slowing growth • Intense competition • Declining profitability	• Little or no growth • Industry consolidation • High barriers to entry	• Negative growth • Excess capacity • High competition

Figure 2-2: Stages in the industry lifecycle

Source: C. W. L. Hill and G. R. Jones, "Strategy Management Theory" (2002)

1. Embryonic Stage: An embryonic industry is one that is just beginning to develop, such as personal computers (PC) in the 1980s. Growth at this stage is slow because of such factors as buyers' unfamiliarity with the industry's product, high prices due to the inability of companies to reap any significant scale economies, and poorly developed distribution channels. Barriers to entry at this stage in an industry's evolution tend to be based on access to key technological know-how rather than cost economies or brand loyalty.[30]

2. Growth Stage: Once demand for the industry's product begins to take off, the industry develops the characteristics of a growth industry. In the industry, first-time demand expands rapidly as many new consumers enter the market. Typically an industry grows when consumers become familiar with the product, when prices fall because experience and scale economies have been attained, and when distribution channels develop.[31]

[30] *Ibid.*, p. 101
[31] *Ibid.*

3. Shakeout Stage: In this stage, demand approaches saturation levels. In a saturated market, there are few potential first-time buyers left. Most of the demand is limited to replacement demand. In this stage, rivalry between companies becomes intense. As an industry approaches maturity, however, demand no longer grows at historic rates. Therefore, companies often cut prices in order to resolve excess capacity. The result can be a price war, which drives some companies into bankruptcy and deters any new entry.[32]

4. Mature Stage: In a mature industry, the market is totally saturated and demand is limited to replacement demand. During the stage, growth is low or zero. As an industry enters maturity, barriers to entry increase and the threat of entry from potential competitors decreases.[33]

5. Decline Stage: Eventually, most industries enter a decline stage. In the stage, growth becomes negative for a variety of reasons, including technological substitution, social changes, demographics, and international competition. Within the declining industry, the degree of rivalry among established companies usually increases. The main problem in the industry is that falling demand leads to the emergence of excess capacity. In trying to utilize this capacity, companies begin to cut prices, thus sparking a price war.[34]

(3) Value Chain Analysis

Porter (1985) introduced the concept of a Value Chain with the explanation that "Every firm is a collection of activities that are performed to design, produce, market, deliver, and support its product, and the way it performs individual activities are a reflection of its history, its strategy, its approach to implementing its strategy, and the underlying economics of the activities themselves."[35] The value chain displays total value and consists of value activities and margin. Among them, value activities can be divided into two broad types, primary activities and support activities. [36] The general framework is shown below in Figure 2-3.

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[32] *Ibid.*, p. 102.
[33] *Ibid.*, pp. 102-103.
[34] *Ibid.*, p. 103.
[35] Michael E. Porter, *Competitive Advantage-Creating and Sustaining Superior Performance*, (New York: The Free Press, 1985), p. 36.
[36] *Ibid.*, p. 38.

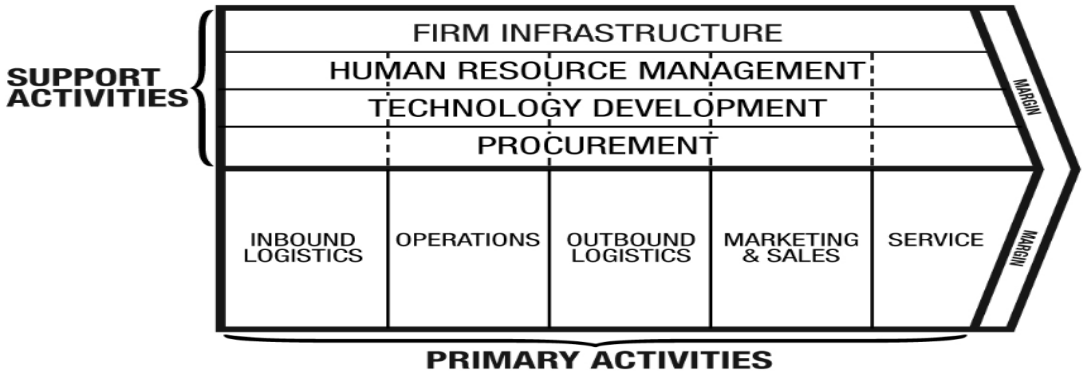


Figure 2-3: The generic value chain

Source: Michael Porter[37]

An industry is structured out of many valuable activities which form an industrial network chain. The basic activities may be the upstream activities of materials, transportation, production, assembly, logistics, sales, and support services, and the supporting activities can be human resource training, transportation infrastructure, communication and equipment. An enterprise structures its business based on the position of its industrial analysis to map out the research, material purchases, production, distribution channels, and after sales support with necessary activities and human resources. In addition to its basic positioning in the industrial chain, the enterprise also needs to network with the businesses in the upper and lower part of the production chain.

2.3 Strategy Theory

2.3.1 Definition of Strategy

According to Webster's Universal Dictionary, the definition of strategy is "the science and art of employing the political, economic, psychological, and military forces of a nation or group of nations to afford the maximum support to adopted policies in peace or war." It is a high-level plan or a method to achieve one or more goals under uncertain conditions and also very important since available resources for achieving those goals are usually limited.

The concept started to show up in business literature in the 1950s. Alfred Chandler (1962) mentioned strategy is "the determination of the basic long-term goals and

[37] *Ibid.*

objectives, and the adoption of courses of action and the allocation of resources necessary for carrying out goals" in his book "Strategy and Structure".

Table 2-2: Definitions of strategy

Strategy is analyzing the present situation and changing it if necessary. Incorporated in this is fading out what one's resources are or what they should be. (Peter F. Drucker, 1954, *The Practice of Management*, p. 17)
Strategy can be defined as the determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals. (Alfred Dupont Chandler, 1962, *Strategy and Structures: Chapters in the History of the Industrial Enterprise*, p. 13)
Strategy is defined as the basic goals and objectives of the organization, the major programs of action chosen to reach these goals and objectives, and the major pattern of resource allocation used to relate the organization to its environment.(Dan Eldon Schendel and Kenneth J. Hatten, 1972, *Business Policy or Strategic Management: A Broader View for and Emerging Discipline*, p. 4)
Strategy is a unified, comprehensive, and integrated plan designed to assure that the basic objectives of the enterprise are achieved. (William F. Glueck, 1976, *Business Policy: Strategy Formation and Management action*, p. 3)
Strategy is a mediating force between the organization and its environment: consistent patterns of streams of organizational decisions to deal with the environment. (Henry Mintzberg, 1979, *The Structuring of Organizations*, p. 25)
Competitive Strategy is a combination of the ends (goals) for which the firm is striving and the means (policies) by which it is seeking to get there. (Michael Porter, 1980, *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, p. 16)
Strategy is creating fit among a company's activities. The success of a strategy depends on doing many things well and integrating among them. (Michael Porter, 2011, *HBR's 10 Must Reads on Strategy*, p. 28)
Strategy is the direction and scope of an organisation over the long term, which achieves advantage in a changing environment through its configuration of resources and competences with the aim of fulfilling stakeholder expectations. (Johnson, Scholes, and Whittington, 2005, *Exploring Corporate Strategy: Text and Cases*, p. 9)

Source: Author

After Chandler's book was published, the concept gradually started to be taken seriously in the business and management field. Basically, strategy is a decision-making principle for an organization's behavior. Strategy has been an important research topic in the field of business management and has evolved over the past several decades. In Table 2-2 above, we can find that each scholar has different perspectives on the definition of strategy. Some scholars place emphasis on actions or planning while other scholars focus more on environmental factors.

2.3.2 Level of Strategy

According to Hill and Jones, strategy can be divided into three different levels: corporate strategy, business or competitive strategy, and functional strategy.

(1) Corporate Strategy

The principal concern of corporate strategy is identifying the business areas in which a company should participate in order to maximize its long-run profitability.[38] It should also add value to a corporation, enabling it, or one or more of its business units, to perform one or more of the value creation functions at a lower cost or in a way that allows differentiation and brings a premium price.[39]

(2) Business Strategy

Business-level strategy refers to the way strategic managers devise a plan of action for using a company's resources and distinctive competencies to gain a competitive advantage over rivals in a market or industry.[40]

(3) Functional Strategy

Functional-level strategies are strategies directed at improving the effectiveness of basic operation within a company, such as production, marketing, materials management, research and development and human resources.[41]

[38] C. W. L. Hill, and G. R. Jones, *Strategy Management*, (Boston: Houghton Mifflin Company, 2001), p. 312.
[39] *Ibid.*, p. 339.
[40] *Ibid.*, p. 203.
[41] *Ibid.*, p. 159.

Most importantly, these three types of strategies are interdependent and thus, in order to have a cohesive impact, must be comprehensively utilized.

2.3.3 Form of Generic Business-level Strategy

According to Hill, at the heart of developing a generic business-level strategy are choices concerning product differentiation, market segmentation, and distinctive competency. The combination of those three choices results in the specific form of generic business-level strategy employed by a company, and the three pure generic competitive strategies are cost leadership, differentiation, and focus.[42]

(1) Porter's Three Generic Strategies:

In coping with the five competitive forces that are mentioned earlier, there are three potentially successful generic strategies for outperforming other firms in an industry.

1. Cost Leadership

Cost leadership requires aggressive construction of efficient-scale facilities, vigorous pursuit of cost reductions from experience, tight cost and overhead control, avoidance of marginal customer accounts, and cost minimization in areas like R&D, service, sales force, advertising, and so on.[43] Achieving a low overall cost position often requires a high relative market share or other advantages, such as favorable access to raw materials.[44] A cost leader must achieve parity or proximity in the bases of differentiation relative to its competitors to be an above-average performer, even though it relies on cost leadership for its competitive advantage.[45] Thus, cost leadership is a strategy particularly dependent on preemption, unless major technological change allows a firm to radically change its cost position.[46]

2. Differentiation Strategy

In a differentiation strategy, a firm seeks to be unique in its industry along some

[42] *Ibid.*, p. 205.
[43] Michael E. Porter, *Competitive Strategy-Techniques for Analyzing Industries and Competitors*, (New York: The Free Press, 1980), p. 35.
[44] *Ibid.*, p. 36.
[45] Michael E. Porter, *Competitive Advantage-Creating and Sustaining Superior Performance*, (New York: The Free Press, 1985), p. 13.
[46] *Ibid.*, p. 14.

dimensions that are widely valued by buyers such as design, brand image, technology, features, customer service, and so on. A firm must truly be unique at something or be perceived as unique if it is to expect a premium price.[47]

3. Focus strategy

Focus strategy is focusing on a particular buyer group, segment of the product line, or geographic market. As with differentiation, focus may take many forms. It has two variants. In cost focus a firm seeks a cost advantage in its target segment, while in differentiation focus a firm seeks differentiation in its target segment. The strategy rests on the premise that the firm is thus able to serve its narrow strategic target more effectively or efficiently than competitors who are competing more broadly. As a result, the firm achieves either differentiation from better meeting the needs of the particular target, lower costs in serving this target, or both.[48]

These two basic types of competitive advantage (cost advantage and differentiation) combined with the scope of activities for which a firm seeks to achieve them lead to three generic strategies for achieving above-average performance in an industry such as cost leadership, differentiation, and focus. The focus strategy has two variants: cost focus and differentiation focus. The generic strategies are shown in Figure 2-4.[49]

Figure 2-4: Three generic strategies

Source: Porter (1985)

[47] *Ibid.*, p. 14.
[48] Michael E. Porter, *Competitive Strategy-Techniques for Analyzing Industries and Competitors*, (New York: The Free Press, 1980), p. 38.
[49] Michael E. Porter, *Competitive Advantage-Creating and Sustaining Superior Performance*, (New York: The Free Press, 1985), p. 11.

Each of the generic strategies involves a fundamentally different route to competitive advantage, combining a choice about the type of competitive advantage sought with the scope of the strategic target in which competitive advantage is to be achieved. "Porter has described a category scheme consisting of three general types of strategies that are commonly used by businesses to achieve and maintain competitive advantage."[50] Important to generic strategies are that competitive advantage is at the heart of any strategy, and achieving competitive advantage requires a firm to make a choice. There are several common implications of the generic strategies in the three different areas, as shown in Table 2-3.

Table 2-3: Common implications of the generic strategies

Generic Strategy	Commonly Required Skills and Resources	Common Organizational Requirements
Overall Cost Leadership	Sustained capital investment and access to capital. Process engineering skills intense supervision of labour. Products designed for ease in manufacture. Low-cost distribution system.	Tight cost control. Frequent, detailed control reports. Structured organization and responsibilities. Incentive based on meeting strict quantitative targets.
Differentiation	Strong marketing abilities. Product engineering. Creative flair. Strong capability in basic research. Corporate reputation for quality or technological leadership. Long tradition in the industry or unique combination of skills drawn from other businesses. Strong cooperation with channels.	Strong coordination among functions in R&D, product development, and marketing. Subjective measurement and incentives instead of quantitative measures. Amenities to attract highly skilled labour, scientists, or creative people.
Focus	Combination of the above policies directed at the particular strategic target.	Combination of the above policies directed at the particular strategic target.

Source: Michael E. Porter[51]

[50] Wikipedia, Porter's generic strategies, http://en.wikipedia.org/wiki/Porter's_generic_strategies

[51] Michael E. Porter, *Competitive Strategy-Techniques for Analyzing Industries and Competitors*,

The generic strategies also imply differing organizational arrangements, control procedures, and inventive systems. As a result, sustained commitment to one of the strategies as the primary target is usually necessary to achieve success. In other words, each has advantages and disadvantages. A company must constantly manage its strategy; otherwise, it risks being stuck in the middle, which is an extremely bad strategic situation.

2.3.4 Industry Environment and Development of Competitive Strategy

Hill mentioned that one of the main factors influencing the investment attractiveness of a generic strategy is the stage of the industry life cycle. Each life cycle stage is accompanied by a particular industry environment, presenting different opportunities and threats. Therefore, each stage has different implications for the investment of resources needed to obtain a competitive advantage. Table 2-4 summarizes the relationship among the stage of the industry life cycle, the competitive position, and the investment strategy at the business level.

Table 2-4: Choosing an investment strategy at the business level

	Strong Competitive Position	Weak Competitive Position
Embryonic	Share building	Share building
Growth	Growth	Market concentration
Shakeout	Share increasing	Market concentration or harvest/liquidation
Maturity	Hold-and-maintain or profit	Harvest or liquidation/divestiture
Decline	Market concentration or harvest (asset reduction)	Turnaround, liquidation, or divestiture

Source: C. W. L. Hill and G. R Jones[52]

2.4 Foreign Investment Theory

In general, a business's foreign investment could be divided into foreign direct investment (FDI) and foreign portfolio investment (FPI). FDI "is defined as cross-border investment by a resident entity in one economy with the objective of

(New York: The Free Press, 1980), pp. 40-41.

[52] C. W. L. Hill, and G. R. Jones, *Strategy Management*, (Boston: Houghton Mifflin Company, 2001), p. 222.

obtaining a lasting interest in an enterprise resident in another economy. The lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence by the direct investor on the management of the enterprise."[53] Therefore, in general, it will be regarded as FDI when ownership is higher than 10%. FPI is more passive investment in the securities, bonds, or financial assets of another economy to get return without entailing active management or control of the securities' issuer. Generally, FPI is short-term investment compared to FDI.

FDI is one of the most important elements of international economic integration and globalization because it creates direct, stable and long-lasting links between two or more economies. It encourages the transfer of capital, resources, technology and management/manufacturing know-how to the host economy, and it also allows the host economy to promote its products more widely in international markets.[54] Therefore, this research focuses on FDI because it has a bigger influence on and importance for economies than FPI. FDI can be divided 100% wholly-owned investment and joint venture. Wholly-owned investment could be further divided into greenfield and mergers and acquisitions while joint venture could be divided into majority ownership, equal ownership and minor ownership as shown below in Figure 2-5.

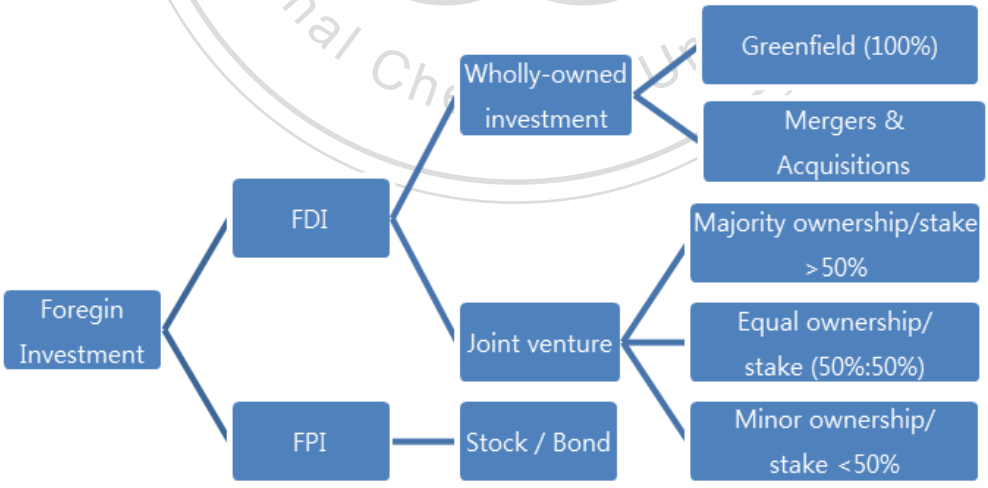


Figure 2-5: Types of foreign investment
Source: Author

[53] OECD iLibarary, http://www.oecd-ilibrary.org/sites/factbook-2013-en/04/02/01/index.html?itemId=/content/chapter/factbook-2013-34-en
[54] *Ibid.*

There are various theories of foreign investment with their own theoretical backgrounds. However, it could be divided into three categories. First, augmentative foreign direct investment is an investment behavior with the purpose of expanded operations/sales, profit growth, diversified investment and operational risks, access to new technologies, control of resources and tax incentives. Relevant theories include monopolistic advantage theory (Hymer, 1960), financial theory (Aliber, 1970), transaction cost theory (Williamson, 1991), and internalization theory (Buckley and Casson, 1976).

Secondly, defensive foreign direct investment refers to companies that establish overseas factories for using the cheaper production resources, such as cheap labor, land, and raw materials, in the host country in order to reduce the costs and maintain competitiveness when they have lost comparative advantage gradually or because of changing the economic environment. Relevant theories include the product life cycle theory (Vernon, 1966) and the macroeconomic approach (Kojima, 1973).

Lastly, Dunning (1981) introduced an integrated theory called eclectic theory, which is a combination of three theories: monopolistic advantage theory, product life cycle theory, and internalization theory.

Each theory has a different perspective on and emphasizes different aspects of FDI. However, there is no inherent conflict between them, and they can instead serve as mutual theoretical bases for analysis. Among them, eclectic theory is more comprehensive and is inclusive of both augmentative FDI and defensive FDI. Therefore, this research uses Dunning's eclectic theory as a basis for exploring the investment strategies of Korean TFT-LCD panel businesses in China.

2.4.1 Eclectic theory

According to Dunning (1981), eclectic theory is supported by three factors: ownership advantage, location advantage, and internalization advantage. This is also called OLI theory. The theory has become the dominant analytical framework for accommodating a variety of operationally testable economic theories of the determinants of FDI and the foreign activities of MNEs over the past few decades.[55]

[55] John H. Dunning, *Theories and Paradigms of International Business Activity*, (Edward Elgar

OLI theory states that the entry mode decisions are determined by the composition of three advantages of a business. Firstly, ownership advantage refers to the competitive advantages of the business in monopolistic advantage theory such as brand power, production techniques/skills, know-how, and patents seeking to engage in FDI. Secondly, location advantage arises from the fact that different locations have different factors such as resources, low wages, taxes, or regulation affecting revenue and the cost of production. It also could provide a large domestic market in the host country in strategically beneficial locations. Lastly, internalization advantages emphasize the advantages of a company's own production rather than through a partnership agreement with a external agent or foreign firm, such as licensing or a joint venture, since these are risky and require higher transaction costs.

Table 2-5: Form of market entry depends on categories of advantages

		Categories of Advantages		
		Ownership Advantage	Internalization Advantage	Location Advantage
Form of Market Entry	Licensing	**Yes**	*No*	*No*
	Export	**Yes**	**Yes**	*No*
	FDI	**Yes**	**Yes**	**Yes**

Source: Dunning (1981)

2.5 Research Methods and Research Framework

2.5.1 Research Methods

This study will predominantly involve the analysis of secondary data and documents and be supplemented by interviews with key officials. The literature will include publications, economic data, investment/trade data, and official records from Korea, Taiwan, and China.

(1) Primary Data: The primary data for the study comes from interviews with key actors in the industry. Specifically, in-depth interviews were conducted with business

Publishing, 2002), p. 408.

leaders and other officials in order to fill the gaps between empirical findings and theoretical hypotheses. (See Appendix.)

(2) Secondary Data:

The secondary data, including fundamental literature reviews and analysis of trade and investment data, will serve as the basis for preliminary interviews with key officials.

Table 2-6: List of sources

	Source	Type
Interview	KDIA Director, Former C.E.O. of Samsung China, Managers of LG Display and a equipment company	Interview
Government Institute	Korea Trade-Investment Promotion Agency, The Export-Import Bank of Korea	Market Report Statistical Data
Research Institute	KDIA, Display Search, Display Bank, Samsung Economic Research Institute	Research Report, Market & Industry Report
LCD Company	Samsung Electronics, Samsung Display, LG Electronics, LG Display	Financial Statements, Public News, Announcement, Investment News
Academia	Universities	Dissertation/Magazine
Other	Newspaper, Media, Magazine, Books	News, Article, Report

Source: Author

2.5.2 Research Framework

This resarch analyzes the investment strategies of Korean businesses in China, especially focusing on the TFT-LCD panel industry. It gradually narrows its focus from Korea's outward foreign investment under globalization to Korea's investment in China. It analyzes both the internal factors and external factors involved, including domestic (Korean) factors, local (Chinese) factors and international factors (i.e., exchange rates) to find out the investment strategies. The framework is summarized in Figure 2-6.

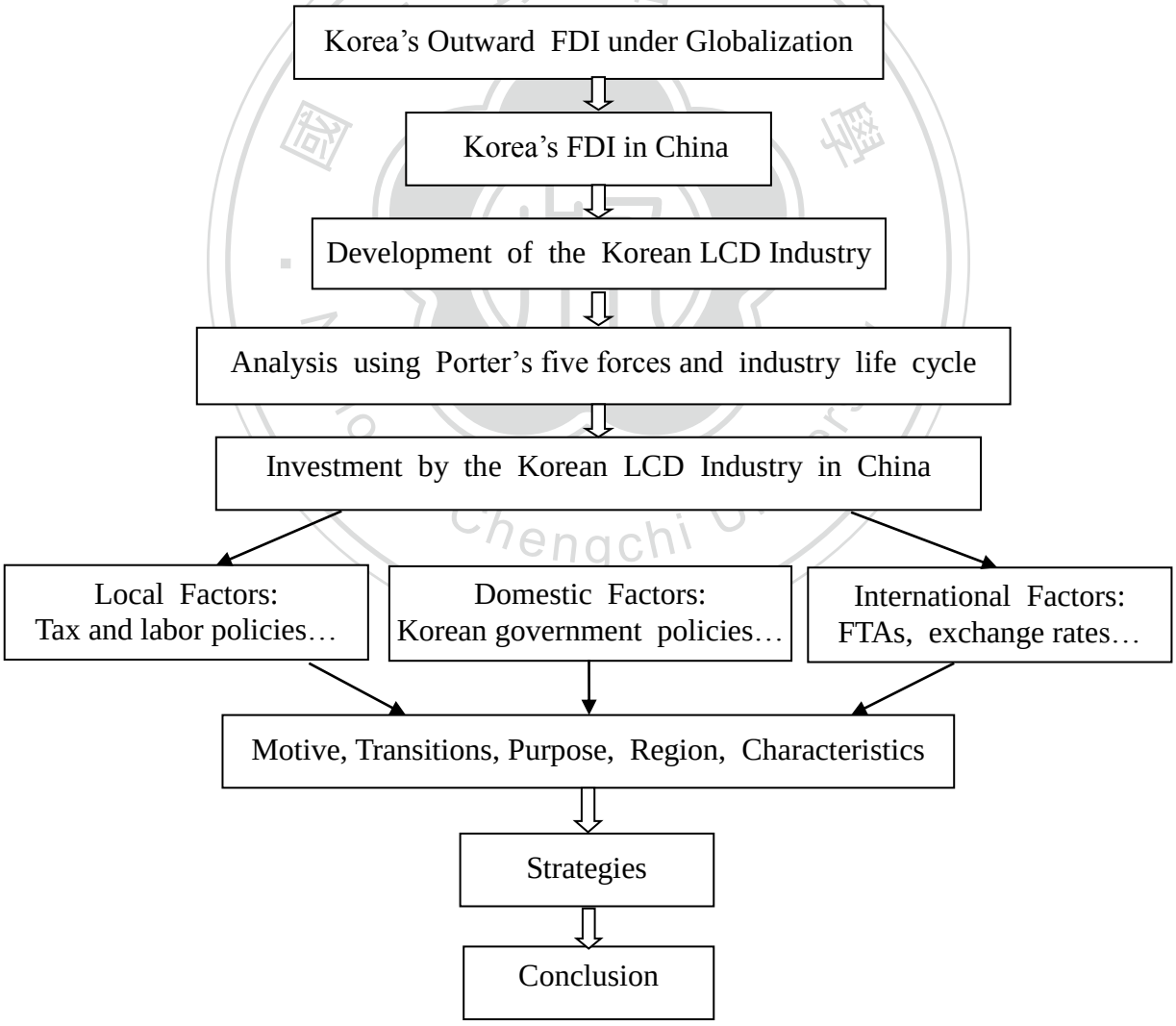


Figure 2-6: Research Framework
Source: Author

Chapter 3: Investment Strategies of Korean Businesses in China under Globalization

3.1 Transition of Korea's Outward FDI in Korea under Globalization

3.1.1 Overview

Outward FDI from Korea first began in 1968 when the 'Foreign Investment' Chapter was newly established under the Foreign Exchange Management Regulation. As of 2014, cumulative investment reached 280 billion USD and involved 59,650 cases. For the past 40 years, FDI by Korean companies has continuously expanded with the government's liberalization of foreign exchange, increased domestic production costs, increased trade surplus, increased inflow of foreign currency and increased demand for advancement into foreign markets.

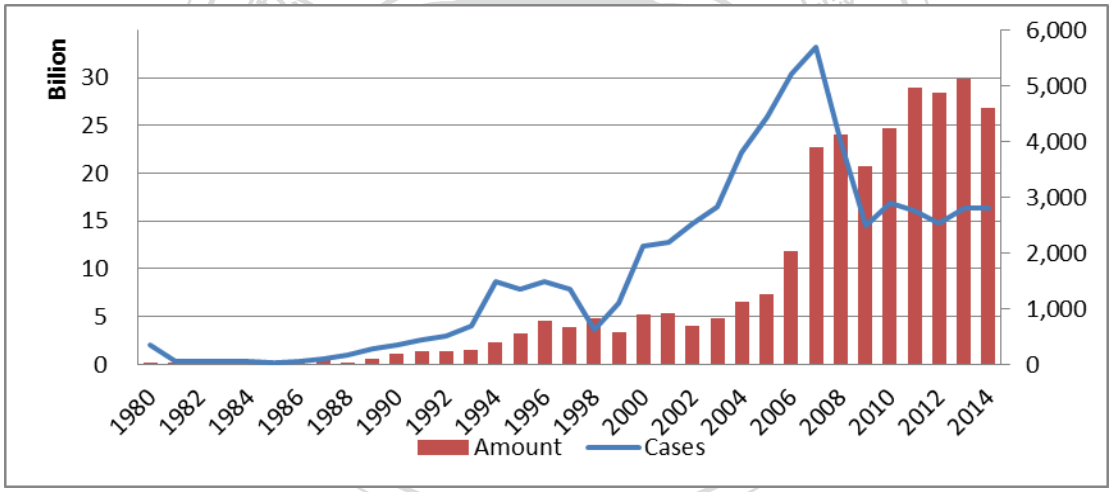


Figure 3-1: Yearly trend of outward FDI from Korea

Source: Korea Eximbank[56]

The Korean economy has quickly grown with a rapid increase in exports resulting from the three slumps (low oil prices, low interest rates and low exchange rates) after the mid-1980s, and this economic growth made room for foreign investment by companies. Also, as wages increased due to the pro-democracy fight during the late 1980s, companies started to make foreign investment focused on labor-intensive industries such as shoe manufacturing in order to overcome increased pressure on production costs.

[56] 해외경제연구소 (Overseas Economic Research Institute), http://211.171.208.92/odisas.html

Table 3-1: Yearly status of Korea's outward FDI (Unit: USD in thousands)

Year	Cases	Growth Rate	Amount	Growth Rate
1980*	352	-	145,196	-
1981	50	-86%	56,995	-61%
1982	50	0%	115,837	103%
1983	57	14%	168,913	46%
1984	45	-21%	50,186	-70%
1985	39	-13%	112,966	125%
1986	51	31%	316,105	180%
1987	91	78%	409,616	30%
1988	172	89%	231,374	-44%
1989	271	58%	571,422	147%
1990	345	27%	1068,749	87%
1991	450	30%	1319,882	23%
1992	502	12%	1351,700	2%
1993	694	38%	1449,638	7%
1994	1,491	115%	2364,406	63%
1995	1,347	-10%	3228,019	37%
1996	1,481	10%	4553,367	41%
1997	1,356	-8%	3906,929	-14%
1998	614	-55%	4798,813	23%
1999	1,104	80%	3401,762	-29%
2000	2,118	92%	5286,626	55%
2001	2,180	3%	5366,047	2%
2002	2,521	16%	4056,950	-24%
2003	2,823	12%	4770,128	18%
2004	3,795	34%	6552,091	37%
2005	4,450	17%	7282,619	11%
2006	5,207	17%	11876,395	63%
2007	5,689	9%	22687,241	91%
2008	4,037	-29%	24024,291	6%
2009	2,475	-39%	20710,237	-14%
2010	2,890	17%	24642,601	19%
2011	2,756	-5%	29002,744	18%
2012	2,538	-8%	28426,552	-2%
2013	2,813	11%	29843,733	5%
2014	2,796	-1%	26769,019	-10%
Total	**59,650**	**-**	**280,919,149**	**-**

*1980 is a cumulative value representing 1968–1980.

Source: Korea Eximbank[57]

In the beginning of the 1990s, the Kim, Young-sam government set forth globalization as a future national strategy. With the end of the Cold War, expansion of free market ideology, acceleration of globalization from the development of IT, and acceleration of regional integration such as the North American Free Trade

[57] *Ibid.*

Agreement (1992) and European Union (1993), Korean companies started full-scale foreign investment to enhance international competitiveness. As the domestic and overseas economic situations changed, the Korean government also facilitated its globalization policy and gradually liberalized and simplified FDI regulations. For instance, the government supported the globalization efforts of companies through an amendment to the Foreign Exchange Control Act in 1991 (i.e., transition of the basic foreign investment approach to general freedom and exceptional regulation) and the introduction of an automatic FDI approval system in 1996. FDI was further emphasized as a strategy to overcome reduced competitiveness resulting from the global opening of domestic markets and increased domestic production costs, which were caused by the joining of OECD in October 1996 and the Asian financial crisis in 1997.

FDI by Korean companies has rapidly grown as a part of the globalization strategy, following these internal and external factors and the easing of relevant regulations. Specifically, after annual FDI exceeded 1 billion USD in 1990, FDI showed a sharp, nearly twenty-fold increase over a 17-year period, exceeding 5 billion in 2000, 10 billion in 2006 and 20 billion in 2007. In addition, the number of cases of new investment per year, which had remained at about 50 until the mid-1980s, exceeded 100 in 1988, 1,000 in 1994 and 5,000 in 2006. The amount of new investment has also grown quickly. In particular, 2006 marked a turning point by exceeding investment of 10 billion USD and 5,000 companies for the first time. The increasing trend continued except for negative growth in both the amount and cases of investment by new companies during the Asian financial crisis in 1997 and global financial crisis in 2008 as shown in Table 3-1.

3.1.2 FDI Trends by Industry

For the past 40 years, FDI by Korean companies was mainly focused on the manufacturing industry. As of 2013, cumulative investment in the manufacturing industry was the largest among all industries with overwhelming ratios of 48.6% of cases of new investment and 35.9% in terms of amount. This shows that the manufacturing industry is the most important industry in terms of FDI for cost reduction and local market entry. The manufacturing industry was followed by the mining industry and the wholesale and retail industries in terms of investment amount.

The mining industry and the financial insurance industry showed fewer cases with overwhelming amounts of investment with nearly 67 million USD and 40 million USD per case, respectively. Table 3-2 provides further information about the cases and amounts of Korea's outward FDI by country.

Table 3-2: Korea's outward FDI status by industry (cumulative as of 2013)

(Unit: K USD, %)	Investment		Ratio (%)		Amount
	Cases	Amount	Cases	Amount	per case
Manufacturing	27,615	90,857,493	48.6	35.9	3,290
Mining	696	46,510,552	1.2	18.4	66,826
Wholesale and retail	10,106	28,456,456	17.8	11.2	2,816
Financial and insurance	641	25,557,463	1.1	10.1	39,871
Professional scienc and technology	1,853	20,036,681	3.3	7.9	10,813
Real estate renting and leasing	2,681	15,047,137	4.7	5.9	5,613
Publication/ broadcasting/ IT	1,668	5,559,902	2.9	2.2	3,333
Constrcution	2,043	5,433,195	3.6	2.1	2,659
Transportation	1,030	4,108,496	1.8	1.6	3,989
Others	8,531	11,408,938	15	4.5	1,337
	56,864	252,976,313	100	100	4,449

Source: Korea Eximbank[58]

3.1.3 FDI Trends by Investment Purpose

Looking at the structure for each investment purpose as of the end of 2013, local market entry investments were the largest, comprising 28.6% of all companies and 35.3% of the overall investment amount. This was followed by resource development (21.4%) and export facilitation (19.8%) in terms of amount, and export facilitation (24.6%) and utilization of low income (17.4%) in terms of the number of cases as Table 3-3.

Table 3-3: FDI status by each investment purpose (cumulative as of the end of 2013)

(Unit: K USD, %)	Investment		Ratio (%)		Amount
	Cases	Amount	Cases	Amount	per case
Local market entry	16,259	89,212,470	28.6	35.3	5,487
Resource development	3,224	54,243,168	5.7	21.4	16,825
Export facilitation	13,965	50,183,085	24.6	19.8	3,593
Advancement into third nations	783	16,299,327	1.4	6.4	20,817
Utilization of low income	9,874	15,217,179	17.4	6	1,541
Introduction of advanced technologies	1,610	9,980,513	2.8	39	6,199
Solution to protective trade	578	2,125,732	1.0	0.8	3,678
Security of raw materials	964	697,729	1.7	0.3	724
Others	9,607	15,017,110	16.9	5.9	1,563
TOTAL	56,864	252,976,313	100	100	4,449

Source: Korea Eximbank[59]

[58] 이덕훈 (Lee, Duk-hoon), "2013 회계연도 해외직접투자 경영분석" (Management Analysis on FDI for the 2013 Fiscal Year), *한국수출입은행* (Korea Eximbank), December, 2014, p. 10.

The importance of different investment purposes has changed over time. Whereas investment in export facilitation and utilization of low wages showed high ratios in the mid-1990s and gradually decreased, investment in local market entry and resource development gradually increased after the mid-2000s. In particular, investment for the purpose of local market entry, the number one item based on cumulative figures, increased rapidly after 2005 as shown in Table 3-4.

Table 3-4: Korean companies outward FDI by purpose

(Unit: %)	1995		2000		2005		2011		2012		2013	
	Cases	$	Cases	$	Cases	$	Cases	$	Cases	$	Cases	$
Local market entry	1.6	6.0	2.9	11.4	6.6	27.4	66.4	34.0	69.2	44.2	68.8	47.4
Export facilitation	43.5	50.2	36.5	23.8	24.4	24.8	15.7	15.1	14.1	9.1	13.4	9.4
Resource development	3.0	10.7	2.1	6.1	2.5	9.2	3.5	30.2	2.9	28.7	2.5	24.4
Utilization of low income	25.6	10.2	16.7	3.2	22.7	12.1	9.6	6.9	7.2	3.4	8.7	2.3

Source: Korea Eximbank[60]

3.1.4 Regional Trends

In the 1980s, investment in North America was most active in terms of both the amount and the number of companies. However, Asia became the largest investment region after it surpassed North America for the first time in 1988 in terms of the number of companies and 1991 in terms of amount (see Table 3-5). With the exception of the investment amounts in 1999 and 2001, this trend continued until 2013. This illustrates that the largest investment region for FDI from Korea shifted from North America in the 1980s to Asia in the 1990s. The high proportion of investment in Asia also appears in the cumulative statistics for the end of 2013. Investment in Asia was ranked first by an overwhelming margin, showing cumulative ratios of 67.6% of cases and 43.4% of investment amount as of 2013 (see Table 1-1). These figures are about three times as large in terms of the number of companies and two times as large in terms of amount compared to North America, the region ranked second. However, the amount of investment per case is lowest at 2,855,000 USD. This is probably the result of relatively small-scale investments by individuals and small- or medium-sized companies due to geographical proximity and similar cultural backgrounds including Confucianism and the use of Chinese characters. Furthermore,

[59] *Ibid.*, p. 14.
[60] *Ibid.*, p. 22.

the rapid growth of investment in China is one of the greatest reasons why investment in Asia increased so rapidly over the past twenty years. Cumulatively, as of 2013, the United States is the nation that receives the largest amount of FDI from Korea, showing investment of 51.41 billion USD and 20.3% of total investment. The United States is followed by China by a small margin. However, China should actually be regarded as the nation that receives the largest amount of FDI from Korea, considering the fact that Hong Kong, responsible for 6% of investment, was returned to China in 1997 and the number of local companies in China is more than twice the number in the U.S.A. This is especially true considering that full-scale investment from Korea into China started in 1991 when the two countries' diplomatic relations was formalized, and investment showed a rapid increase after 2001 when China joined the WTO (see Table 3-6). Therefore, the sharp increase of investment in Asia over the past twenty years was mostly led by China. The following section focuses on the details and background of Korean investment in China, which played a decisive role in transforming Asia into the region receiving the largest amount of Korean investment since the 1990s.

3.2 Transition of Korean Foreign Direct Investment in China

3.2.1 Korea-China Economic Exchange and China's FDI Attraction

Korea–China trade reached 270 billion USD in 2013. When the diplomatic relationship was first formed on August 24, 1992, the volume of annual trade between the two nations was about 6.4 billion USD. This represents a more than forty-fold increase in 21 years. China not only surpassed the United States by an overwhelming margin of about 25% to become the largest exporter to Korea in 2003 but also became the largest importer of Korean goods by surpassing Japan in 2007. The two nations became economically dependent on one another with China occupying about 20% of total trade with Korea and Korea becoming one of China's four major trading partners.[61] FDI has been one of the decisive factors in the two countries' formation of such an intimate economic relationship.

[61] 조강국 (Cho, Gang-guk), "시진핑 방한으로 되돌아본 한중 수교 22주년" (22th Anniversary of Korea-China Diplomatic Relations Reviewed with Xi, Jinping's Visit to Korea), *아시아 경제* (Asia Kyung-jea), July 2, 2014.

3-5: Korea's outward FDI status by Region (Unit: K USD)

Year	Asia		North America		Europe		Central and South America		Oceania		Middle East		Africa		TOTAL	
	Cases	Amounts	Cases	Amounts	Cases	Amounts	Cases	Amounts	Cases	Amounts	Cases	Amounts	Cases	Amounts	Cases	Amounts
1980	88	49,535	118	32,725	51	5,210	20	4,878	25	4,975	30	22,608	20	25,265	352	145,196
1981	17	5,489	14	33,451	1	1,503	3	978	5	11,248	6	3,408	4	919	50	56,995
1982	12	21,613	16	42,188	5	2,152	5	1,061	4	41,621	5	6,610	3	593	50	115,837
1983	18	28,466	24	108,689	2	12,610	5	312	1	15,796	5	2,624	2	416	57	168,913
1984	7	10,284	24	19,016	1	1,016	3	739	3	11,860	4	6,691	3	580	45	50,186
1985	15	17,861	12	26,813	3	38,812	3	2,858	4	16,092	1	10,299	1	231	39	112,966
1986	13	94,062	26	80,638	3	5,581	3	2,720	4	52,854	2	80,249	0	0	51	316,105
1987	18	132,265	41	188,603	10	6,843	14	4,226	5	6,149	1	70,908	2	622	91	409,616
1988	66	60,005	57	95,829	16	15,443	15	14,209	15	3,226	1	41,213	2	1,450	172	231,374
1989	125	128,062	73	283,414	16	19,137	29	55,928	21	44,829	1	31,648	5	8,341	270	571,358
1990	189	365,939	87	454,814	22	81,971	26	66,812	20	32,483	0	40,275	2	26,520	346	1,068,813
1991	270	551,730	83	454,852	40	172,386	36	41,595	16	22,741	0	58,569	5	18,008	450	1,319,882
1992	362	568,459	61	403,825	36	215,027	28	36,504	9	23,566	2	75,250	4	29,069	502	1,351,700
1993	556	662,875	61	416,287	32	175,217	29	44,197	6	34,687	4	85,692	6	30,683	694	1,449,638
1994	1,217	1,190,704	134	566,556	56	375,538	37	54,898	35	24,887	4	38,275	8	113,517	1,491	2,364,376
1995	1,051	1,763,666	143	584,159	74	641,325	32	125,690	38	39,431	1	31,621	7	41,599	1,346	3,227,492
1996	1,088	1,937,818	199	1,601,534	71	600,777	41	288,430	69	72,772	5	26,484	8	22,172	1,481	4,549,986
1997	935	1,922,000	230	901,390	75	486,022	34	276,196	61	141,864	3	71,611	17	106,837	1,355	3,905,919
1998	399	2,010,572	136	993,564	37	1,269,675	15	260,328	17	137,366	1	27,643	9	99,665	614	4,798,813
1999	675	1,314,160	325	1,426,620	42	303,079	26	255,944	23	69,451	3	5,124	10	26,325	1,104	3,400,703
2000	1,205	1,710,133	729	1,474,183	68	313,849	51	1,505,334	55	90,231	4	34,025	7	157,384	2,119	5,285,138
2001	1,451	1,470,811	539	1,574,409	68	2,131,361	24	121,960	87	20,793	4	27,013	7	17,760	2,180	5,364,106
2002	1,845	1,906,591	474	621,137	69	1,055,717	36	297,733	75	78,435	11	48,645	10	22,112	2,520	4,030,370
2003	2,092	2,649,283	562	1,098,603	70	259,077	32	613,634	58	91,945	5	26,724	4	29,186	2,823	4,768,451
2004	2,711	3,605,858	867	1,425,768	100	731,062	43	614,073	53	76,190	9	37,149	13	47,812	3,796	6,537,912
2005	3,026	4,342,598	1,104	1,296,524	143	661,305	60	606,326	81	154,340	17	132,232	19	129,751	4,450	7,323,076
2006	3,472	6,447,308	1,343	2,283,019	165	1,233,104	77	1,091,475	98	207,737	35	397,740	21	206,766	5,211	11,867,148
2007	3,782	11,738,739	1,319	3,754,743	255	4,464,781	100	1,226,920	113	543,474	87	368,441	32	238,919	5,688	22,336,015
2008	2,755	11,854,019	808	5,276,070	198	3,407,393	93	2,077,013	101	776,493	51	264,096	30	320,246	4,036	23,975,330
2009	1,582	7,117,391	534	6,016,423	130	5,337,357	88	988,950	60	548,597	52	321,581	32	373,603	2,478	20,703,902
2010	1,932	10,168,179	551	4,675,729	154	6,143,923	100	2,224,582	72	778,531	58	349,474	24	290,944	2,891	24,631,362
2011	1,847	11,280,639	471	8,478,372	158	4,361,092	115	2,555,360	76	1,549,436	67	418,279	26	371,650	2,760	29,014,827
2012	1,715	11,321,448	481	6,196,851	127	4,113,354	101	3,329,667	54	2,348,790	33	370,289	29	365,320	2,540	28,045,719
2013	1,904	11,303,483	508	6,129,015	159	4,892,120	105	3,220,751	75	3,269,668	34	481,991	27	180,058	2,812	29,477,086

Source: Korea Eximbank[62]

[62] *Ibid.*, pp. 176-177.

China implemented "the reform and opening-up (改革開放)" policy allowing foreign investment into the country at 'the Third Plenary Session of the 11th Central Committee of the Communist Party of China（第十一屆三中全會)' in 1978 and started to attract FDI through the creation of special economic zones in the coastal region. Offering benefits such as low wages, an abundant labor force, rich natural resources like rare earth metals, and an expanding domestic market, China has become a global production base and has been actively attracting FDI through various policies, including the provision of incentives for public officials receiving successful investments and tax deductions for companies that invest in the country. As a result, it was ranked first in the world with a total inbound investment of 395.2 billion USD in 2001, becoming the countries with the most inbound FDI and an important target of investment by major global enterprises.[63] This increase of FDI flows into China has played the biggest role in boosting the Chinese economy, which is now ranked second in the world in terms of economic scale (based on GDP), surpassing Japan in 2010, and has seen 10% average annual growth for about 30 years.[64]

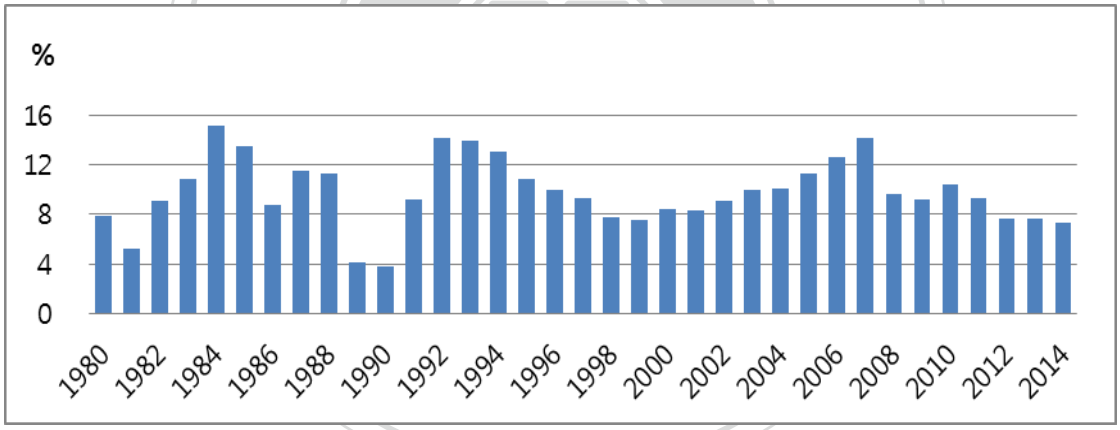


Figure 3-2: Growth of GDP in China (1980-2014)
Source: IMF[65]

3.2.2 Overview of Korean Investment in China

Korean FDI into China first began in 1988 and was further stimulated by the Korea–China diplomatic relationship formed in 1992. It then increased rapidly after 2001 when China became a member of the WTO. Although Korean FDI into China was reduced by the Asian financial crisis of 1997 and the global financial crisis of

[63] 조아라 (Cho, A-ra), "흔들리는 중국 VS 떠오르는 아세안" (Shaking China vs. Rising ASEAN), *한국정경신문* (Hankook Jung-kuyng News), November 29, 2013.
[64] The World Bank, GDP at market prices, http://data.worldbank.org/indicator/NY.GDP.MKTP.CD
[65] International Monetary Fund, World Economic Outlook Database, http://www.imf.org/external/pubs/ft/weo/2014/02/weodata/weorept.aspx?sy=1980&ey=2014&scsm=1&ssd=1&sort=country&ds=.&br=1&c=924&s=NGDP_RPCH&grp=0&a=&pr1.x=64&pr1.y=18#

2008, it nevertheless showed an overall trend of growth. It has grown so fast that China exceeded the United States as the target of the largest amount of investment from Korea from 2002 to 2007 as Table 3-6 shows.

Table 3-6: Outward Korean FDI into top five investment destinations (2000–2014)

	1	2	3	4	5
2000	U.S.A.	Bermuda	**China**	Hong Kong	Philippines
	1,438,437	1,377,388	**763,939**	271,759	144,666
2001	Netherlands	U.S.A.	**China**	U.K.	Indonesia
	1,569,104	1,519,306	**659,355**	322,040	189,526
2002	**China**	U.S.A.	Netherlands	Hong Kong	Italy
	1,100,993	615,822	304,719	230,517	186,225
2003	**China**	U.S.A.	Cayman	Singapore	Vietnam
	1,828,670	1,081,443	403,843	239,363	164,827
2004	**China**	U.S.A.	Cayman	Japan	U.K.
	2,422,896	1,416,734	360,393	294,319	273,922
2005	**China**	U.S.A.	Hong Kong	Vietnam	Slovak
	2,860,589	1,261,690	382,265	325,652	227,821
2006	**China**	U.S.A.	Hong Kong	Vietnam	Bermuda
	3,499,627	1,892,124	859,044	597,756	421,381
2007	**China**	U.S.A.	Hong Kong	Vietnam	Ireland
	5,439,482	3,613,979	1,867,621	1,298,093	827,066
2008	U.S.A.	**China**	Hong Kong	Vietnam	Kazakhstan
	5,111,888	**3,858,861**	2,620,472	1,375,009	822,618
2009	U.S.A.	**China**	CANADA	U.K.	Hong Kong
	3,584,662	**2,476,017**	2,434,311	1,716,557	1,583,765
2010	**China**	U.S.A.	U.K.	Malaysia	Hong Kong
	3,656,988	3,443,348	3,281,387	1,599,793	1,295,477
2011	U.S.A.	**China**	Hong Kong	Australia	Canada
	7,302,660	**3,537,549**	1,631,576	1,381,770	1,326,927
2012	U.S.A.	**China**	Australia	Hong Kong	Netherlands
	5,625,777	**4,036,864**	2,234,202	1,618,573	1,290,352
2013	U.S.A.	**China**	Australia	Netherlands	Cayman
	5,676,026	**5,007,420**	2,666,760	1,738,271	1,441,562
2014	U.S.A.	**China**	Cayman	Australia	Vietnam
	5,577,644	3,132,964	2,208,770	1,563,659	1,558,483

(Based on amount, unit: K USD) Source: Korea Eximbank[66]

Samsung Group has been the largest investor with employment of 120,000 persons in China and cumulative investments of 16.8 billion USD as of 2013, the most of any company in Korea. Ever since establishing a manufacturing company in Hui-zhou, China, in 1993, LG Group has also been actively increasing its investment in China by making investments into 34 companies of 6 affiliates, such as LG Display, as of

[66] 해외경제연구소 (Overseas Economic Research Institute), http://211.171.208.92/odisas.html

2013.[67]

According to the statistics of the Export-Import Bank of Korea, Korean investment into China had reached 24,084 cases and 48.8 billion USD, cumulatively, as of 2014. The number of new companies grew rapidly from 100–800 cases every year in the 1992–2000 period to 1,000–2,000 cases every year in 2001–2008 with the largest number, 2,292 cases, being recorded in 2006. Although the number of new companies established dropped below 1,000 cases per year starting in 2009 due to the increased burden of investment from the financial crisis, the amount of investment showed an increasing trend overall and recorded its highest value in 2007. Investment amount per case first exceeded 1 million USD in 1995, 2 million USD in 2007, and 3 million USD in 2009.

Table 3-7: Annual investment by Korea into China

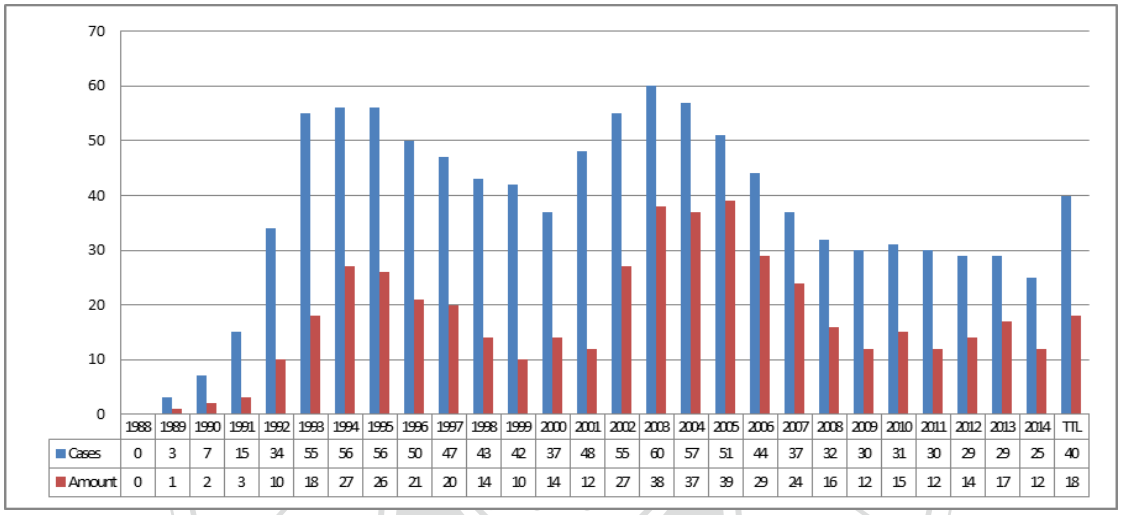
Year	Cases	Amount	Amount per case
~1988	1	10	10
1989	7	6,360	909
1990	24	16,173	674
1991	69	43,091	625
1992	**170**	**140,503**	826
1993	382	264,017	691
1994	841	640,616	762
1995	750	847,336	**1,130**
1996	741	951,797	1,284
1997	637	784,415	1,231
1998	267	686,034	2,569
1999	464	350,370	755
2000	785	763,939	973
2001	**1,056**	659,375	624
2002	1,392	**1,100,952**	791
2003	1,682	1,828,578	1,087
2004	2,149	2,422,896	1,127
2005	2,261	2,860,123	1,265
2006	**2,292**	3,499,889	1,527
2007	2,115	**5,438,787**	2,572
2008	1,302	3,858,861	2,964
2009	734	2,476,002	3,373
2010	898	3,652,233	4,067
2011	828	3,537,499	4,272
2012	723	4,036,944	5,584
2013	816	5,006,351	6,135
2014	698	3,024,599	4,333
Total	**24,084**	**48,897,750**	**2,030**

Source: Korea Eximbank[68]

[67] 조강국 (Cho, Gang-guk), "시진핑 방한으로 되돌아본 한중 수교 22주년" (22th Anniversary of Korea-China Diplomatic Relations Reviewed with Xi, Jinping's Visit to Korea), *아시아 경제* (Asia Kyung-jea), July 2, 2014.

Except for 1999–2002, when it was affected by the Asian financial crisis, investment amount per case showed a continually increasing trend until 2014.

China's ratio as a recipient of Korean outward FDI generally increased, except around the Asian financial crisis of 1997 and the global financial crisis of 2007. As of 2014, the cumulative cases of new companies and investment amount were 40% and 18%, respectively. After China joined the WTO in 2001, the number of new companies peaked at 60% in 2003, and the investment amount reached its highest value of 39% in 2005 (see Figure 3-3).



	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	TTL
Cases	0	3	7	15	34	55	56	56	50	47	43	42	37	48	55	60	57	51	44	37	32	30	31	30	29	29	25	40
Amount	0	1	2	3	10	18	27	26	21	20	14	10	14	12	27	38	37	39	29	24	16	12	15	12	14	17	12	18

Figure 3-3: Ratio of China in outward FDI of Korea (Unit: %)

(Remark: Rounded to the next whole number)

Source: Korea Eximbank[69]

3.2.3 Transition of Investment

1) Embryonic (1988–1991)

Korean investment in China had started with indirect investment through third countries like Hong Kong in 1985 while FDI started in a practical sense in 1988. Korea started to make foreign investment when it started to cope with several internal and external factors, including strict environmental regulation around the Seoul Olympic Games in 1988, increased production costs from increased wages, worsening export competitiveness due to the appreciation of the Korean won, and various stimuli

[68] 해외경제연구소 (Overseas Economic Research Institute), http://211.171.208.92/odisas.html

[69] *Ibid.*

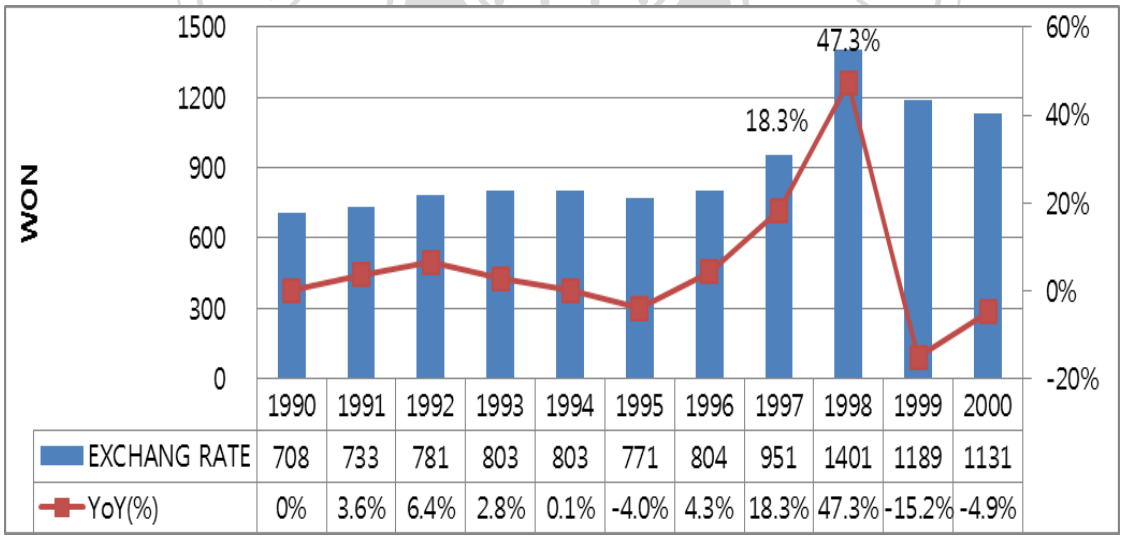
for FDI inflows with the 'reform and opening-up' (改革開放)[70] policy of the Chinese government in 1978, the end of the Cold War, and the increasingly competitive environment resulting from globalization.

2) Growth (1992–1996)

In the 1990s, Korean companies in labor-intensive industries showed increased investment in China in order to overcome the weakened price competitiveness of export products caused by increased domestic wages. In particular, the Korea–China diplomatic relationship in 1992 functioned as a catalyst for the full-scale growth of investment in China by offering the Investment Promotion and Protection Agreement (Bilateral Investment Treaty, BIT) to Korean companies, as well as intangible effects such as the removal of uncertainties.[71]

3) Decline (1997–1999)

The Asian financial crisis of 1997 contracted investment in China by dealing a direct blow to the Korean economy. Most notably, worsened profitability of companies due to the 18% rise in the value of the USD in 1997, 47% rise of the USD in 1999, and economic slowdown further increased the burden on investment, and the number of investment cases and amount of investment rapidly dropped to about half in 1998 and 1999. The ratio of FDI into China was also reduced.



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
EXCHANG RATE	708	733	781	803	803	771	804	951	1401	1189	1131
YoY(%)	0%	3.6%	6.4%	2.8%	0.1%	-4.0%	4.3%	18.3%	47.3%	-15.2%	-4.9%

Figure 3-4: Trend of the KRW–USD exchange rate in the 1990s

Source: The World Bank[72]

[70] Deng Xiaoping announced the reform and opening up at the 11th Central Committee of the Communist Party of China in 1978 and actively attracted FDI based on China's inexpensive labor force.

[71] Please refer to Appendix IV, 1.

[72] http://data.worldbank.org/indicator/PA.NUS.FCRF

4) Shakeout (2000–2007)

In the 2000s, the Korean economy was prepared to emerge from its slump by fully paying off its IMF relief loan of 19.5 billion USD within 4 years. FDI by Korean companies into China increased rapidly along with the approximately 10% annual growth of the Chinese economy and China joining as a member of the WTO. China joining the WTO was an especially strategic turning point for investment and motivated Korean companies with the resulting visible institutional improvements for fairness and transparency, such as the reduction of tariffs, removal of non-tariff barriers, guarantee of autonomy of corporate management, equal treatment of domestic and foreign companies, protection of intellectual property rights, and the psychological effect of removing uncertainties. In other words, this sparked the transition from investment in simple manufacturing exports in the past to gradually expanding investment in Chinese market entry.[73] The Development of the Western Region in China（西部大開發）[74] promoted in the 2000s and rapid increase in demand for large infrastructure in preparation for the 2008 Beijing Olympic Games resulted in a rapid increase in Korean investment into China. It first exceeded 1,000 cases and 1 billion USD in 2001 and 2002, respectively. China not only became the largest investment target for Korea in 2002–2007, surpassing the United States but also recorded its highest values of 2,292 cases in 2006 and 5.43 billion USD in 2007.

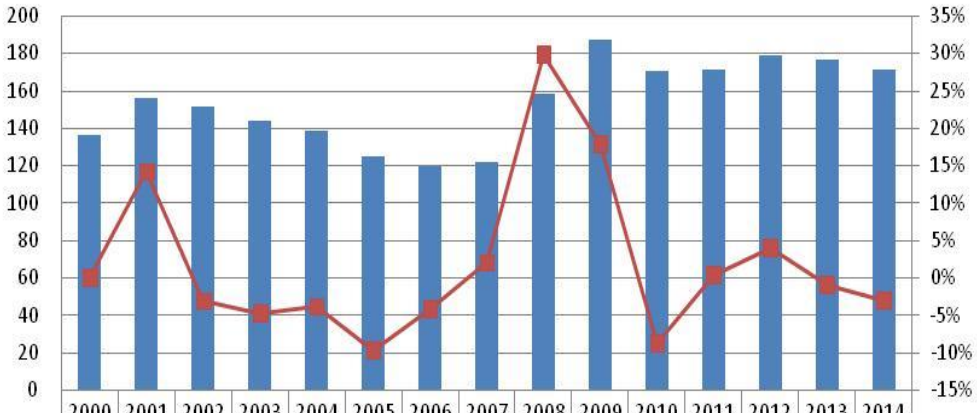
5) Maturity (2008–2014)

As part of the qualitative growth of the Chinese economy, which has been quantitatively growing fast because of promotion by the Chinese government, the investment environment was changed by a policy for attracting selective or strategic investments. Investment by Korea into China entered into a period of maturity in 2008 due to domestic (internal) and international (external) factors, including the global economic recession caused by the global financial crisis. Specifically, investment efficiency and its merits were reduced and the risk and burden for Korean companies were increased. These were especially the result of Chinese domestic factors, such as the contraction of tax benefits (e.g., change of corporate income tax on foreign investment companies from region- and business-type-based to a fixed rate of 25%),

[73] Please refer to Appendix IV, 2.

[74] As the development of inland regions was slower than coastal regions in the east developed after the reform and opening up in 1978, the Jiang Zemin government promoted this policy in 2000 to promote balanced development (implementing various preferential policies such as corporate tax benefits to foreign investment companies and a quick permission system).

gradual reinforcement of investment control by limiting supported businesses and increasing prohibited businesses through revision of the 'Catalogue of Industries for Guiding Foreign Investment (外商投資產業知道目錄)', and abolition of preferential benefits of 'two exemptions and three reductions' (二免三減)[75] applied to supported businesses), reinforcement of labor rigidity including enforcement of the Labour Contract Law (勞動合同法) since 2008, continued increase of wages, reinforcement of environmental regulations, selective attraction of investments with the Eleventh Five-Year Plan (十一五規劃)[76], reduced profit of companies due to the global economic recession, and rapid increase in the exchange rate of the CNY compared to the KRW. As a result, investment in China reached its peak in 2007 and showed decreasing or stagnating trends in terms of investment cases, amount, and overall ratio.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Exchange Rate	137	156	151	144	138	125	120	122	159	187	171	172	178	177	171
YOY %	0%	14%	-3%	-5%	-4%	-10%	-4%	2%	30%	18%	-9%	0%	4%	-1%	-3%

Figure 3-5: KRW–CNY exchange rate (2000–2014)

Source: The World Bank[77]

[75] Exemption of corporate income tax for two years from the date on which profit starts to occur and 50% reduction of corporate income tax for three years after exemption.

[76] Changes in basic direction of investment attraction through transition from funding and quantitative attraction to qualitative attraction with emphasis on human resources, foreign investment attraction appropriate for industrial policy, growth of advanced industries and R&D centers, and shift of focus from manufacturing industry to service industry (2006–2010).

[77] The World Bank, Official exchange rate (LCU per US$, period average), http://data.worldbank.org/indicator/PA.NUS.FCRF

3.2.4 Investment by Company Size

As of the end of 2014, the investment amount was 33,937 million USD (69%) by large enterprises, 12,863 million USD (26%) by small and medium enterprises, 560 million USD by individual enterprises, and 7.4 million USD by others (individuals and non-profit enterprises). There were 1,857 cases of FDI (8%) by large enterprises, 12,355 cases (51%) by small and medium enterprises, 2,474 cases by individual enterprises, and 7,400 cases by others.

Table 3-8: Korean companies' investment in China by company size

Unit: K USD	Large		Small and Medium		Individual		Others	
Year	Cases	Amount	Cases	Amount	Cases	Amount	Cases	Amount
1988	0	0	1	10	0	0	0	0
1989	3	5,000	4	1,360	0	0	0	0
1990	8	7,254	15	8,760	1	160	0	0
1991	9	14,543	58	27,991	1	157	1	400
1992	17	55,020	147	83,572	6	1,860	0	50
1993	31	58,971	329	198,271	14	4,318	8	2,457
1994	98	338,532	673	288,490	31	7,494	39	6,130
1995	86	471,556	583	342,448	36	8,372	45	24,961
1996	83	547,316	478	364,223	130	21,350	50	18,909
1997	55	486,449	418	271,375	84	10,512	80	16,078
1998	17	542,246	160	132,043	54	5,365	36	6,379
1999	14	246,417	274	85,365	107	11,238	69	7,351
2000	32	512,030	538	220,090	93	11,444	121	20,376
2001	56	314,329	721	301,929	117	15,915	162	27,181
2002	113	599,507	848	442,110	154	19,753	277	39,623
2003	137	1,059,762	1,024	669,414	141	24,485	380	75,009
2004	136	1,330,961	1,038	907,682	326	62,151	649	122,102
2005	140	1,592,013	887	1,003,767	335	87,884	899	176,926
2006	125	2,104,557	886	1,095,982	298	74,689	983	224,399
2007	120	3,715,154	817	1,428,514	233	66,456	946	229,358
2008	101	2,465,524	524	1,206,157	101	44,123	576	143,057
2009	55	1,719,073	304	660,322	46	15,568	330	81,053
2010	101	2,794,798	356	739,596	46	19,671	395	102,923
2011	92	2,665,290	320	769,517	45	13,592	370	89,149
2012	81	3,346,982	278	592,949	32	12,601	331	84,332
2013	88	4,377,247	339	549,024	23	12,121	366	69,029
2014	59	2,602,987	335	472,339	20	8,830	287	48,808
TOTAL	**1,857**	**33,973,518**	**12,355**	**12,863,300**	**2,474**	**560,108**	**7,400**	**1,616,040**

Source: Korea Eximbank[78]

Small and medium enterprises showed overwhelming ratios in terms of cases (50%) and large enterprises, in terms of amount (70%). Cumulative as of 2014, the average amount of investment per case was 2 million with 18 million by large enterprises, 1

[78] 해외경제연구소 (Overseas Economic Research Institute), http://211.171.208.92/odisas.html

million by small and medium enterprises, 0.2 million by individual enterprises and 0.4 million by others. The amount continuously increased and showed a trend of increasing investment scale, especially for large enterprises.

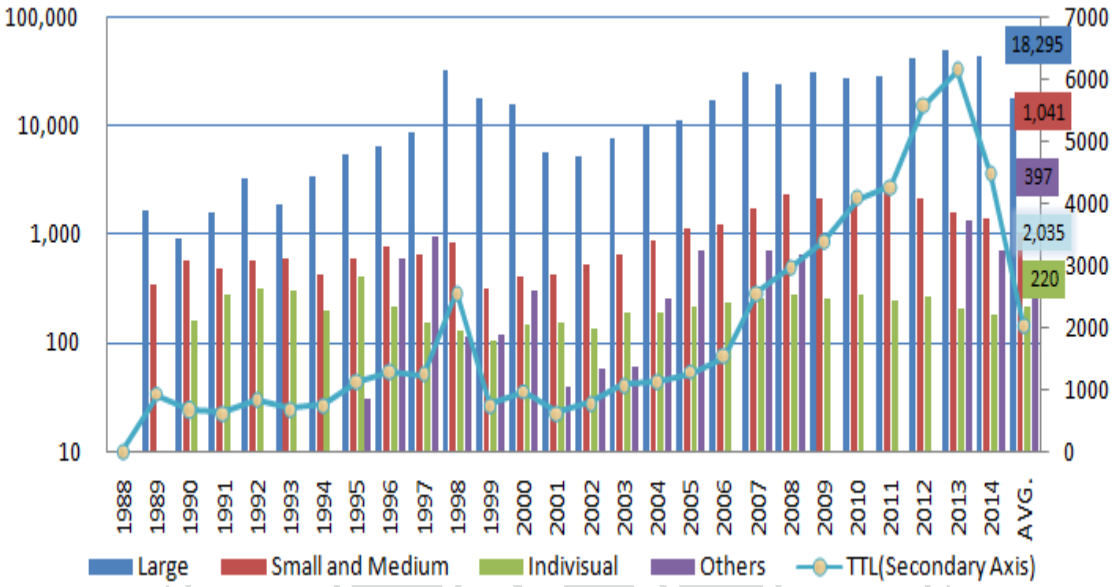


Figure 3-6: Trend of investment amount per case by investor type (Unit: K USD)

Source: Korea Eximbank[79]

Whereas the primary purpose of investment in the past was to take advantage of low wages, investment by large enterprises has rapidly grown and expanded since 2005 with investment of over 10 million USD per case. With China joining as a member of the WTO, growth of its purchasing power and domestic market due to economic growth, and change of foreign investment attraction policies by the government (selective attraction focused on service industries and high-tech industries), investment by large enterprises in China was revitalized by the transition from investment in labor-intensive manufacturing industries as a production base with emphasis on labor power to large-scale facility investment in domestic markets.[80] Whereas investment by Korea into China showed a trend of reduction or stagnation due to domestic and foreign factors around 2008, the investment amount and ratio of large enterprises increased.

[79] *Ibid.*

[80] Please refer to Appendix IV, 2.

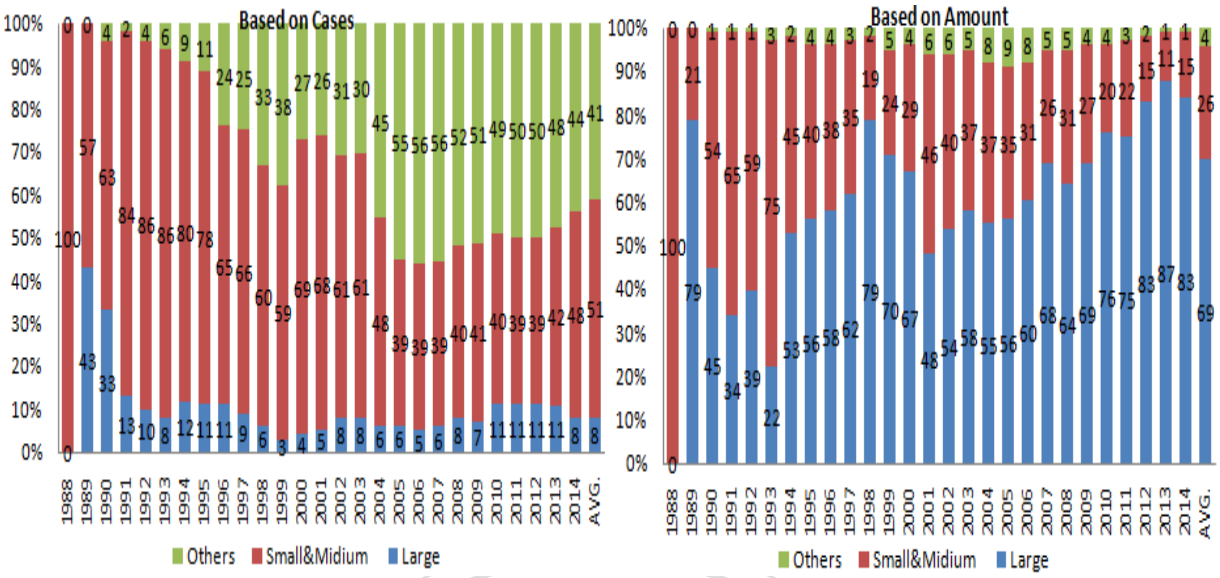


Figure 3-7: Ratio of investment in China by company size

Source: Korea Eximbank[81]

Changes in the investment environment, such as worsened hiring conditions (e.g., increased minimum wages), contraction of tax benefits, and global economic recession, created a relatively greater burden and entry barrier for small and medium enterprises and individual enterprises. Investment cases and the ratio of others (see Figure 3-7) also continued to increase after exceeding 40% in 2004, showing reduced uncertainty due to China joining the WTO and the decrease in investment barriers from increased accessibility of information with the development of the internet.

3.2.5 Investment by Purpose

The primary purposes of Korean FDI in China were low wages, export facilitation and local market entry with overwhelming margins. In terms of the number of cases, low wages (7,295 cases), export facilitation (6,544 cases) and local market entry (5,544 cases) were responsible for 80% of all investment cases. In terms of investment amount, local market entry (23,673 million), export facilitation (11,524 million) and low wages (8,150 million) were responsible for about 90% of total amount. Looking at different periods, the primary purpose changed from resource development in the early 1990s to export facilitation and low wages in the mid-2000s and local market entry since 2007.

[81] 해외경제연구소 (Overseas Economic Research Institute), http://211.171.208.92/odisas.html

Table 3-9: Top three purposes of Korean FDI into China (cumulative as of 2014)

	Based on Cases			Based on Amount		
	Purpose	Cases	%	Purpose	K USD	%
1	Utilization of low wages	7,295	30.3	Local market entry	23,673,302	48.3
2	Export facilitation	6,544	27.2	Export facilitation	11,524,311	23.5
3	Local market entry	5,544	23.0	Utilization of low wages	8,150,393	16.6
TOTAL		19,383	**80.5**	TOTAL	43,348,006	**88.4**

Source: Korea Eximbank[82]

The rapid increase in the investment cases (7% to 42%) and amount (40% to 50%) for local market entry in 2007 was an especially important strategic turning point in the gradual shift from a production base for the use of low wages and export facilitation to the domestic market. The investment strategy, which used to pursue the production and export of "made in China" products to third countries like the United States using low wages in China, has gradually transformed into "made for China" focusing on the domestic market.

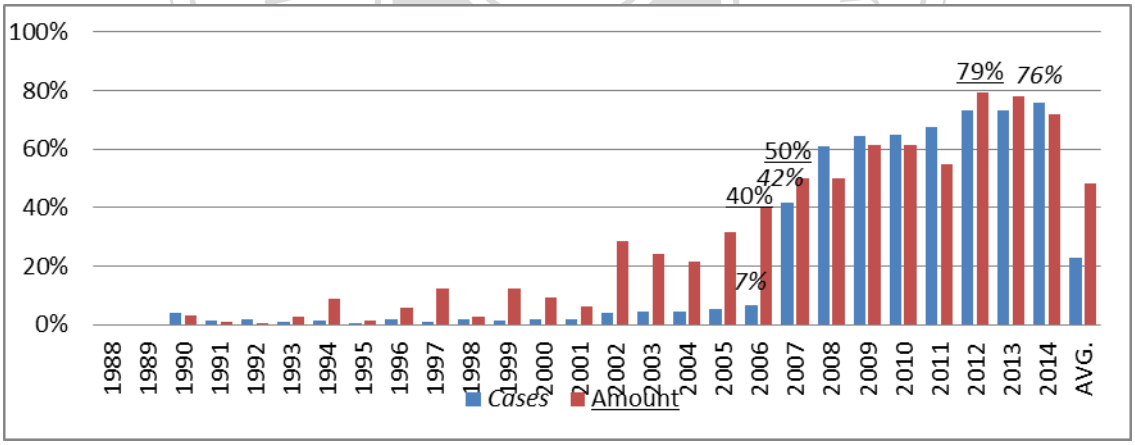


Figure 3-8: Ratio of local market entry (1988 is a cumulative value from 1968 to 1980)
Source: Korea Eximbank[83]

Based especially on the fact that the ratio of local market entry by large enterprises was overwhelmingly higher than the ratio of low wages by small and medium enterprises, the ratio of investment strategy of large enterprises for the domestic

[82] *Ibid.*
[83] *Ibid.*

market was relatively higher.

Table 3-10: Investment purpose ratios of local market entry and low wages by enterprise size

Based on Amount (Unit: %)		2006	2007	2008	2009	2010	1st half of 2011
Local Market Entry	Large	20.4	33.2	30.6	37.4	41.5	23.1
	Small & Medium	5.5	8.8	19.6	16.7	12.3	11.5
Utilization of Low Wages	Large	6.4	9.3	12.8	6.7	15.1	32.8
	Small & Medium	12.8	10	8.9	11.6	6.9	5.3

(Based on amount) Source: Korea Eximbank[84]

The increased importance of the domestic market is the result of complex domestic and foreign factors, such as (1) increased purchasing power and expanded size and potential of the domestic market with rapid growth of the Chinese economy; (2) rise of the Chinese market as an alternative to developed markets, which slowed down during the global financial crisis of 2007; (3) effective policies of the Chinese government for domestic economic stimulus with the "home appliances going to the countryside" (家電下鄉) policy and the "changing old into new" (以舊換新) policy; (4) the economic effects of hosting of the 2008 Beijing Olympic Games and establishment of infrastructure for the grand western development; and (5) increased manufacturing costs due to the increase of wages, including the labour Contract Law (勞動合同法), contraction of benefits like the export tax rebate rate, and increased legal and environmental regulations.

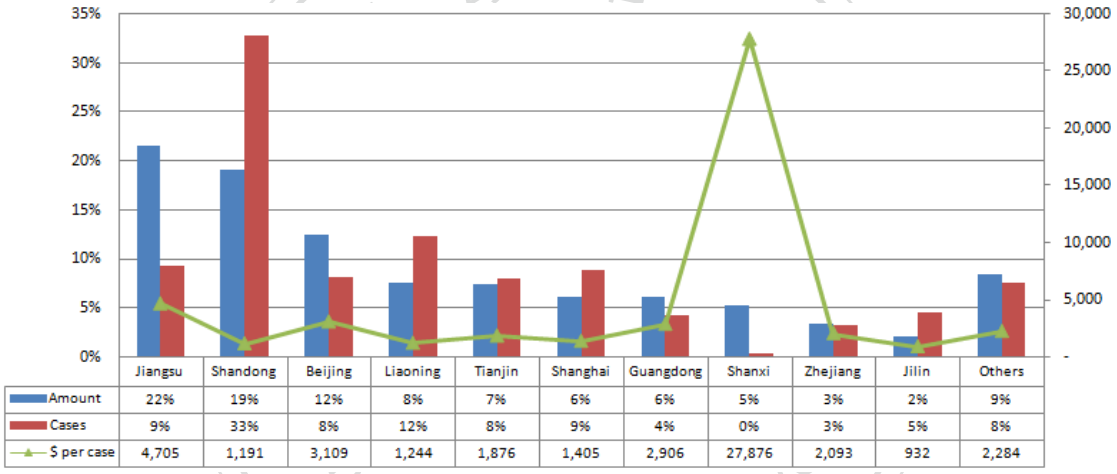
3.2.6 Investment by Region

Investment by Korea has focused on the eastern coastal regions such as Jiangsu Province and Shandong Province. As of 2014, Jiangsu Province (21.6%), Shandong Province (19.2%) and Beijing City (12.5%) showed overwhelming ratios in terms of cumulative investment amount. For the number of new companies, Shandong Province (32.8%), Liaoning Province (12.4%) and Jiangsu Province (9.4%) had overwhelming ratios. In particular, the top six regions, including Jiangsu Province,

[84] 해외경제연구소 (Overseas Economic Research Institute), "우리 나라의 대 중국 직접 투자 현황과 전망" (Current Status and Forecast of Korea's FDI in China), November 22, 2011, p. 6.

Shandong Province, Beijing City, Liaoning Province, Tianjin City, and Shanghai City, exceeded 70% of investment cases, and the combined percentage for the top ten regions was 90%, showing high regional preponderance.

Investment amount per case shows Shandong Province has received more traditional labor-intensive investments while Jiangsu Province has had relatively bigger amounts of investment in high-tech facilities. The amount per case in Shanxi Province was overwhelmingly high due to the foundation of Samsung (China) Semiconductor in 2012 and its initial investment of 2.3 billion USD, and the Xian Project of Samsung Electronics with a total investment of 7 billion USD[85]. This is a representative case of political economy that shows the interaction of politics (policy) and economics (investment) in the grand western development plan.



	Jiangsu	Shandong	Beijing	Liaoning	Tianjin	Shanghai	Guangdong	Shanxi	Zhejiang	Jilin	Others
Amount	22%	19%	12%	8%	7%	6%	6%	5%	3%	2%	9%
Cases	9%	33%	8%	12%	8%	9%	4%	0%	3%	5%	8%
$ per case	4,705	1,191	3,109	1,244	1,876	1,405	2,906	27,876	2,093	932	2,284

Figure 3-9: Korean companies' FDI in China by region (cumulative as of 2014, K USD)

Source: Korea Eximbank[86]

Different periods have the following characteristics. (1) In the early period (1990s), investment was focused on the northeastern and coastal regions near the Yellow Sea, such as Shandong Province, Tianjin City and Liaoning Province, because of their geographical proximity and cultural solidarity due to the residence of overseas Chinese and Koreans living in China. (2) The trend shifted to the Yangtze River Delta regions like Jiangsu Province and Shanghai City in the 2000s. (3) As investment size per case was reduced in coastal regions adjacent to the Yellow Sea as traditional

[85] 김성미 (Kim, Sung-mee), "이재용 머릿속엔 온통 '中 시안사업'" (Lee, Jae-yong, Full of Thoughts about 'Business in Xian, China'), *아시아투데이* (Asia Today), June 24, 2014.

[86] 해외경제연구소 (Overseas Economic Research Institute), http://211.171.208.92/odisas.html

investment regions, investment size has continuously increased in the newly emerging region of the Yangtze River Delta. (4) Investment in Shandong Province reached its peak in 2014 with about 30% of investment cases. It was the largest investment region, both in name and reality, receiving about 30% of investment until the mid-2000s.

Table 3-11: Top 10 of Korean companies' FDI into China by region

	~1994				1995~1999				2000~2004		
Area	**Cases**	**Amount**	**$/case**	**Area**	**Cases**	**Amount**	**$/case**	**Area**	**Cases**	**Amount**	**$/case**
Total	**1,494**	**1,110,801**	**744**	**Total**	**2,859**	**3,619,951**	**1,266**	**Total**	**7,063**	**6,775,852**	**959**
Shandong	28%	33%	888	Shandong	32%	26%	1,047	Shandong	39%	28%	686
Tianjin	11%	13%	889	Tianjin	9%	13%	1,951	Jiangsu	9%	22%	2,234
Liaoning	22%	12%	417	Jiangsu	6%	12%	2,853	Beijing	7%	12%	1,580
Jiangsu	4%	7%	1,239	Shanghai	4%	12%	3,684	Tianjin	8%	8%	964
Beijing	7%	7%	702	Liaoning	19%	9%	614	Liaoning	12%	7%	597
Heilongjiang	6%	6%	752	Beijing	4%	8%	2,229	Zhejiang	4%	5%	1,295
Guangdong	3%	5%	1,191	Guangdong	2%	4%	3,042	Shanghai	7%	5%	715
Shanghai	2%	4%	1,202	Zhejiang	3%	4%	1,883	Guangdong	4%	4%	1,168
Jilin	9%	4%	321	Jilin	12%	3%	342	Hunan	0%	2%	5,603
Hebei	3%	3%	707	Heilongjiang	1%	2%	3,693	Jilin	4%	1%	308
Others	5%	6%	N/A	Others	9%	6%	N/A	Others	6%	5%	N/A

2005~2009				2010~2014			
Area	**Cases**	**Amount**	**$/case**	**Area**	**Cases**	**Amount**	**$/case**
Total	**8,706**	**18,134,575**	**2,083**	**Total**	**3,964**	**19,371,785**	**4,887**
Jiangsu	10%	25%	5,282	Jiangsu	13%	21%	7,842
Shandong	33%	21%	1,293	Shanxi	2%	13%	40,140
Beijing	10%	15%	3,186	Shandong	24%	13%	2,625
Liaoning	12%	9%	1,602	Beijing	9%	12%	6,153
Tianjin	8%	8%	2,060	Guangdong	9%	9%	5,129
Shanghai	10%	6%	1,206	Shanghai	18%	6%	1,727
Guangdong	4%	4%	2,162	Liaoning	7%	6%	4,147
Zhejiang	4%	3%	1,763	Tianjin	5%	5%	4,515
Hebei	2%	2%	2,138	Jilin	2%	3%	7,596
Hunan	0%	2%	16,340	Zhejiang	3%	3%	5,385
Others	8%	6%	N/A	Others	9%	9%	N/A

Source: Korea Eximbank[87]

(5) However, starting in the mid-2000s, with the increased investment in Suzhou Industrial Park[88], Jiangsu Province has become the largest investment regions in terms of investment amount, and both investment cases and amount per case have also

[87] 해외경제연구소 (Overseas Economic Research Institute), http://211.171.208.92/odisas.html

[88] Suzhou Industrial Park was developed in February 1994 to secure a base for entry of Singaporean enterprises to China and to attract foreign investment on China. This complex has total area of 288km2, which takes up 3.4% of Suzhou City. Various preferential policies are available for high-tech enterprises such as 15% corporate income tax and subsidy on foreign investment companies.

continued to increase.

3.2.7 Investment by Industry

Investment cases in China in 2014 were led by 44.7% in the manufacturing industry, followed by the wholesale and retail industry (29.1%) and lodging and restaurant industry (7.6%).[89] Investment amounts were also led by the manufacturing industry (85.3%) and followed by the wholesale and retail industry (8.2%) as Table 3-12 shows.

Table 3-12: Investment by industry in 2014 (based on amount)

Unit: K USD	Amount	Ratio	Cumulative Ratio
Manufacturing	2,579,905	85.3 %	78.9 %
Wholesale and retail	246,767	8.2 %	5.3 %
Financial and insurance	74,832	2.5 %	4.7 %
Real estate renting and leasing	31,156	1.0 %	3.0 %
Transportation	22,256	0.7 %	0.9 %
Professional science and technical service	20,738	0.7 %	1.7 %
Lodging and restaurant	19,337	0.6 %	1.2 %
Publication, communication, IT service	16,938	0.6 %	0.6 %

Source: Korea Eximbank[90]

The ratios of investment amount and cumulative ratios in 2014 were 85.3% and 78.9%, respectively, for those sectors. Investment was overwhelmingly focused on the manufacturing industry. However, investment business types were diversified and investment in the manufacturing industry grew in size, as shown by the reduction in the ratio of investment cases in the manufacturing industry to 50% in 2014. Also, the amount of investment in non-manufacturing industries such as the service industry has continuously grown, though the rate of increase is low compared to the increase in the number of investment cases.[91]

[89] 해외경제연구소 상해 사무소 (Shanghai office of Overseas Economic Research Institute), "14년 우리기업의 대중 투자 현황 및 시사점" (Status and Implications of Korean Companies Investment in China in 2014), *한국 수출입은행* (Korea Eximbank), March, 2015, p. 3.
[90] *Ibid.*
[91] *Ibid.*

Chapter 4: Development of the Global and Korean TFT-LCD Panel Industry

4.1 Development of the Global TFT-LCD Panel Industry

4.1.1 Overview

A "display" is an image display device that shows a variety of information on a screen to be seen by human beings. Display devices developed from the cathode ray tube (CRT) TVs and monitors of the 1990s to the flat panel displays (FPD) such as the TFT-LCD displays of the 2000s. Organic light emitting diode (OLED) and flexible displays have been developed in recent years. The display industry, which had been growing consistently in the past, showed accelerated growth with the development of IT in the 2000s. The size of the global display market was about 130 billion USD as of 2014, and the display industry has become one of the major IT industries along with the semiconductor industry.

Table 4-1: Global display market volume and forecast

Unit: Million USD	2012	2013	2014	2015	2016
Market volume	125,630	129,493	130,484	139,752	145,566
YoY growth	13.2%	3.1%	0.8%	7.1%	4.2%

Source: DisplaySearch, KDIA[92]

FPDs in electronic devices like laptops, smart phones and TVs were the driving force of such rapid growth in the display market, and the growth of LCDs made the greatest impact with a contribution to overall growth of about 90%.

Table 4-2: Global market volume of Flat Panel Display (Unit: million USD)

Type \ Year	2009	2010	2011	2012e
LCD	84,468	107,607	100,672	108,592
PDP	4,420	4,896	4,351	3,366
OLED	827	1,567	3,873	6,840
Total	89,714	114,073	108,895	118,798

Source: DisplaySearch (Q3, 2012)[93]

[92] 이지은 (Lee, Ji-en), "대륙의 추격..세트에서 얻은 자신감 디스플레이로 확산" (Chasing China … Confidence about Sets Expanded to Displays), *뉴스토마토* (News Tomato), March 10, 2015.

The LCD panel market started to show rapid growth starting with laptops in the 1990s and expanding into monitors, mobile devices, TVs and tablets. Especially since the 2000s, LCD panels have become core necessities of the IT era. They are mainstream display products making up 58% of the display market in 2003 and 94% in 2010.

Table 4-3: Proportion of LCDs in the global display market

	2003	2006	**2010**
Ratio of LCD in global display market	58%	82%	**94%**

Source: Korea Institute for Advance of Technology[94]

In general, panels measuring nine inches or smaller are classified as small- and medium-sized panels and mainly applied to mobile devices and tablet PCs. Large panels sized 9.1 inches or larger are mainly used for TVs, monitors and laptops. As of 2012, global shipments of LCD panels amounted to about 785 million pcs, including 240 million laptops, 224 million TVs, 180 million monitors and 129 million tablets as Figure 4-1 shows.

	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16
Monitor	109.5	133.8	179.3	181.8	188.6	202.6	198.3	180.7	184.1	185.4	184.7	183.4
Notebook	61.2	75.5	108.4	134.9	174.2	212.8	221.5	240.5	261.3	286.1	310.6	336.0
Tablet	0.0	0.0	0.0	0.0	0.0	19.7	69.9	129.0	215.9	288.9	350.3	403.4
LCD TV	24.5	50.8	82.7	100.2	149.5	209.7	212.3	224.0	234.8	248.1	260.5	269.9
Others	5.5	9.8	11.6	11.3	12.3	10.7	9.3	11.0	11.1	11.1	11.2	11.4
Total	200.7	269.9	382.0	428.2	524.4	655.5	711.3	785.3	907.2	1,019.6	1,117.3	1,204.1
YoY	52%	34%	42%	12%	22%	25%	9%	10%	16%	12%	10%	8%

Figure 4-1: Annual growth of the global LCD panel market by application

Source: DisplayBank (forecast after 2013)[95]

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[93] 조철 외 (Cho, Chul et. al.), "주요 산업의 중국 내 동북아국가들의 경쟁구조 분석(제1권)" (Analysis of Competition Structure of Northeast Asian Countries in China on Major Industries (Volume 1)), *산업연구원 연구보고서* (KIET), 2012-636(1), p. 127.

[94] 김현진 외 (Kim, Hyun-jin et al.), "동북아 분업구조 전환에 따른 발전전략-디스플레이" (Development Strategy According to Transition of Specialization Structure among Northeast Asian Countries- Display), 2011-01, 정책기획보고서, *한국산업기술진흥원 (KIAT)*, January, 2011, p. 2.

Average prices of panels in October 2015 were $229 for TVs, $65 for monitors and $42 for laptops,[96] generally showing a steady downward trend.

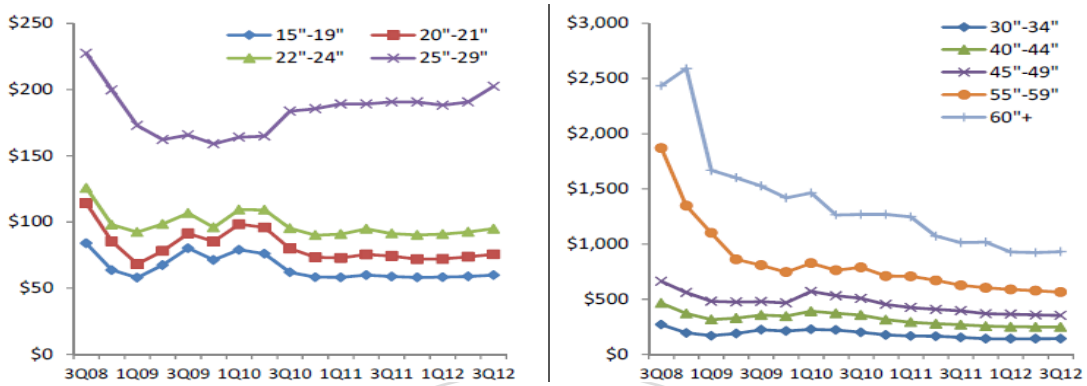

Figure 4-2: Price trends of panels for IT (left) and TV (right) (Unit: USD)

Source: DisplayBank[97]

Since the average selling price (ASP) of large-sized panels is higher than small- and medium-sized panels, the large-sized panel market takes up an overwhelming ratio[98] of about 75% (as of 2011) of the entire market in terms of sales volume. TV is responsible for the majority of the large-sized panel market.

Table 4-4: Large-sized LCD panel market by application

Unit: Billion USD	2010	2011	2012	
			Amount	Ratio (%)
TV	55.4	45	50	58.6
Monitor	16.2	14.5	14.1	16.5
Notebook PC	11.1	10.1	11.8	13.8
Tablet PC	1.4	3.9	7.4	8.7
Public Display	0.6	0	1.1	1.3
Others	1.3	1.2	0.9	1.1
Total	86	75.5	85.3	100

Source: DisplaySearch[99]

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[95] 김윤지 (Kim, Yoon-ji), "2012년4분기 IT 산업 리스크 분석" (IT Industry Risk Analysis Q4 2012), 해외경제연구소, *한국수출입은행* (Korea Eximbank), February 25, 2013, p. 19.

[96] 김동원 (Kim, Dong-won), "삼성디스플레이, 실적 차별화 전망" (SDC, Outlook on Performance Differentiation), Industry Analysis on Display, *Hyundai Research*, October 20, 2015, p. 1.

[97] 이지웅 (Lee, Ji-yoong), "2013년 산업전망" (2013 Industry Forecast), Industry Credit Outlook (Display), *한국 기업평가* (Korea Ratings), January 17, 2013, p. 5.

[98] 조철 외 (Cho, Chul et. al.), "주요 산업의 중국 내 동북아국가들의 경쟁구조 분석(제1권)" (Analysis of Competition Structure of Northeast Asian Countries in China on Major Industries (Volume 1)), *산업연구원 연구보고서* (KIET), 2012-636(1), p. 127.

[99] *Ibid.*, p. 131.

As such, the LCD TV market, which has the largest demand for LCD panels, showed rapid growth since 2004 and recorded sales figures of 217 million pcs in 2013. This is the most important market and played the biggest role in leading the golden age of the LCD industry.[100]

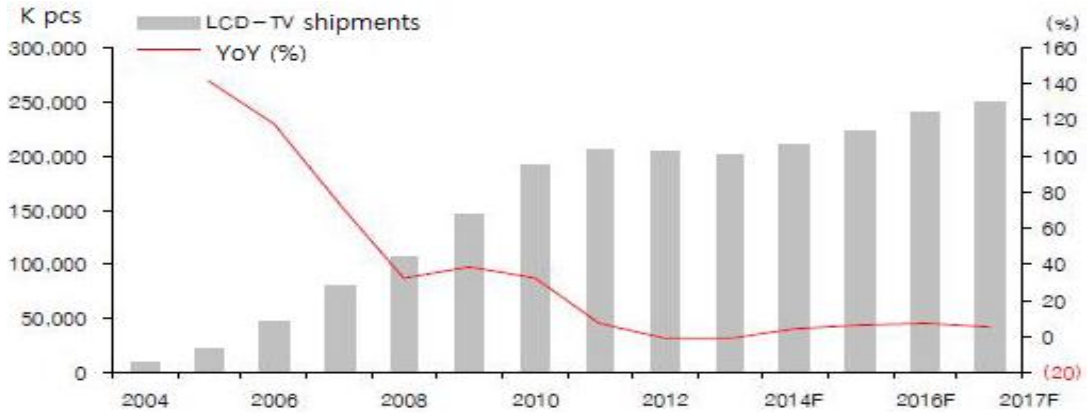


Figure 4-3: Forecast of global LCD TV sales volume

Source: IHS[101]

Global TV panel shipments reached 270 million in 2015, which was a 8.9% increase over the 248 million shipments in 2014. Two companies from each of three countries (Korea, Taiwan and China) are competing as the top six suppliers as the below table shows.

Table 4-5: TV panel shipments from the top six panel makers worldwide ('14 –'15)

Table 1: TV Panel Shipments from Top Six Panel Makers Worldwide, 2014~2015

Panel Maker	2014	2015	2015 YoY
LGD	51.95	55.30	6.4%
Innolux	50.16	51.73	3.1%
SDC	55.36	50.90	-8.0%
BOE	14.35	35.66	148.5%
AUO	28.78	27.18	-5.6%
CSOT	24.66	25.52	3.5%
Total (Unit: Million)	247.67	269.79	8.9%

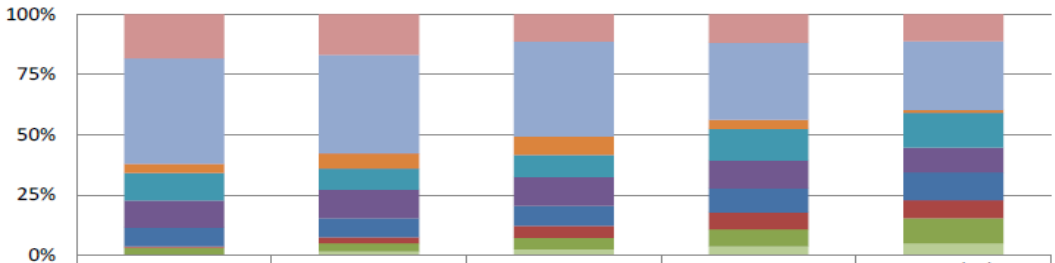
Source: WitsView, Jan., 2016

Source: WitsView (Jan., 2016)[102]

[100] 박대한 (Park, Dae-han), "세계 최대 중국 TV 시장 역성장…차별화로 뚫는다" (Chinese TV Market, the Largest Market in the World, Showing de-growth…Overcoming the Difficulty with differentiation), *연합뉴스* (Yonhap News), March 15, 2015.

[101] 김윤지 (Kim, Yoon-ji), "2013년3분기 IT 산업 리스크 분석" (IT Industry Risk Analysis Q3 2013), 해외경제연구소, *한국수출입은행* (Korea Eximbank), November 19, 2013, p. 18.

Despite the fact that quantitative growth of the LCD TV market has stagnated since 2012, the trend of increasing display size is leading the qualitative growth of the overall market. Specifically, whereas panels sized 32 inches or smaller made up the majority of shipments through 2013, the ratio of panels sized 40 inches or larger has been gradually increasing.



	2011	2012	2013	2014	2015(e)
<=31"	18.4%	16.9%	11.4%	11.9%	11.3%
32"	43.6%	40.8%	39.3%	32.0%	28.4%
37"~39"	4.0%	6.4%	7.6%	3.7%	1.2%
40"	11.3%	8.7%	9.2%	13.2%	14.5%
42"~43"	11.2%	11.8%	11.9%	11.5%	10.1%
46"~49"	7.8%	7.9%	8.3%	10.0%	11.6%
50"~54"	0.4%	2.5%	4.9%	6.9%	7.5%
55"~58"	2.9%	3.4%	4.8%	7.1%	10.3%
>=60"	0.3%	1.6%	2.5%	3.7%	5.1%

Figure 4-4: Ratio of global shipments for different LCD TV panel sizes (2011–2015)

Source: MIC (Feb. 2015)[103]

As a result, the average panel size in the global LCD TV market has increased by about an inch per year, and the average size, which was 37.2 inches in 2013, is expected to reach 41 inches by 2017. The trend of increasing panel size has become an important strategic consideration for panel companies.

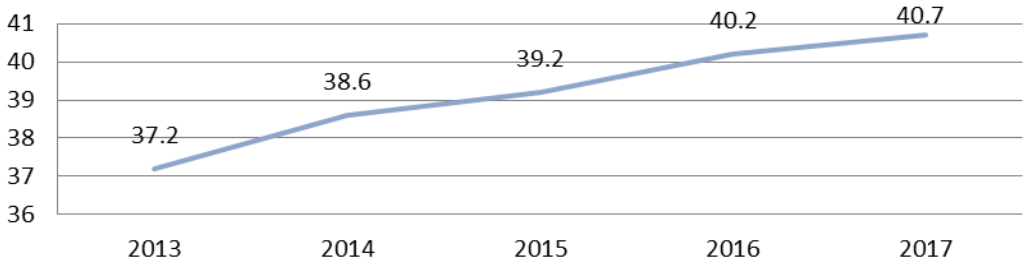


Figure 4-5: Increasing average size of LCD TV (Unit: inch)

Source: DisplaySearch[104]

[102] 옥철 (Ok, Cheol), "LG디스플레이 작년 TV 패널 공급 세계 1위 탈환" (Last Year, LGD Recaptured the World No.1 TV Panel Supplier), *연합뉴스* (Yonhap News), January 18, 2016.

[103] 陳彥合 (Chen, Yan-he), "2015年全球液晶電視面板產業回顧與展" (Review and Forecast of Global LCD TV Panels Industry in 2015), *產業研究報告* (Industry Research Report), *財團法人資訊工業策進會產業情報研究所* (MIC), February, 2015, p. 7.

Besides the LCD TV market, the monitor, tablet and signage markets are also trending towards increasing panel sizes. Shipments of large-sized panels more than doubled from 2008 to 2014.

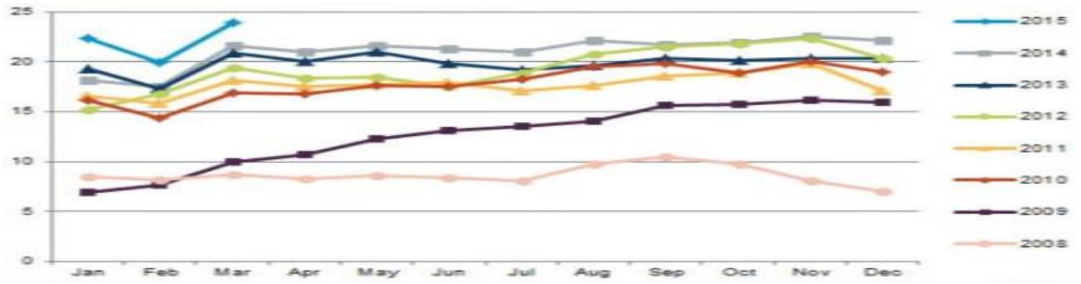


Figure 4-6: Large-area panel shipments (Unit: million)
Source: Display, IHS[105]

Also, TV resolutions based on horizontal and vertical pixels were developed as High Definition (HD, 1,366×768), Full HD (FHD, 1,920×1,080) and Ultra HD (UHD, 3,840×2,160). UHD displays, which are about 20–30% more expensive (see Table 4-6) and four times the resolution of FHD, were recently developed to expand the premium line-up.

Table 4-6: Comparison of cost structure and profit between FHD and UHD

49" FullHD 60HZ LED	
Glass	$13.3
Target	$1.4
Chemical & Indirect Materials	$5.5
Array Material Total	$20.3
Yielded Array Material Cost	$22.1
Color Filter	$24.1
Polarizer	$24.5
LC	$9.0
Others	$1.6
Cell Material Total	$59.2
Yielded Cell Material Cost	$62.9
Driver IC	$6.3
Backlight	$75.5
LED Contorer Board / Inverter	$7.8
PCB, etc	$10.7
Module Component Total	$100.3
Yielded Module Material Cost	$101.3
Material and Component Total	$179.8
Yield Material and Component Total	$186.3
Direct Labor	$21.9
Indirect Labor	$4.9
Personnel Cost	$26.9
7 year Straight Line depreciation	$32.8
Building and Clean Room	$6.7
Depreciation Cost	$39.4
Indirect Expense Total	$18.6
Manufacturing Total Cost	$271.2
Cash Cost	$231.7
SG & A	$21.3
	7.5%
Sales Total Cost	**$292.4**
Sales Profit	−$9.1
	−3.2%
Module Price	**$283.4**

49" UHD 60HZ LED	
Glass	$13.3
Target	$1.4
Chemical & Indirect Materials	$5.5
Array Material Total	$20.3
Yielded Array Material Cost	$23.9
Color Filter	$24.1
Polarizer	$24.5
LC	$9.0
Others	$1.6
Cell Material Total	$59.1
Yielded Cell Material Cost	$66.5
Driver IC	$12.5
Backlight	$100.6
LED Contorer Board / Inverter	$10.4
PCB, etc	$16.1
Module Component Total	$139.6
Yielded Module Material Cost	$142.2
Material and Component Total	$219.1
Yield Material and Component Total	$232.7
Direct Labor	$23.7
Indirect Labor	$5.3
Personnel Cost	$29.1
7 year Straight Line depreciation	$35.4
Building and Clean Room	$7.2
Depreciation Cost	$42.7
Indirect Expense Total	$23.3
Manufacturing Total Cost	$327.7
Cash Cost	$285.0
SG & A	$27.6
	7.5%
Sales Total Cost	**$355.2**
Sales Profit	$12.5
	3.4%
Module Price	**$367.7**

Source: DisplaySearch, E-trade Security Research Center[106]

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[104] 정승환 (Jung, Seung-huan), "LCD패널업계 "공장 풀가동해도 모자랄 판"" (LCD Panel Industry "Can not Accommodate for Demand even if Factories are Fully Operated"), *매일 경제* (Maeil Kyungjea), March 13, 2015.

[105] 장시복 (Jang, Si-bok), "삼성·LG 이끄는 LCD TV 패널시장 "3월 출하량 역대최고"" (LCD TV Panel Market Led by Samsung and LG shows "All-time High Shipments in March"), *머니투데이* (Money Today), May 1, 2015.

UHD panels, which accounted for only 2% of flat screen TV panel demand in 2013, exceeded 25% (about 40 million pcs) in 2015. They are expected to become increasingly popular and grow rapidly, reaching 40% (about 67 million pcs) of demand in 2016.[107]

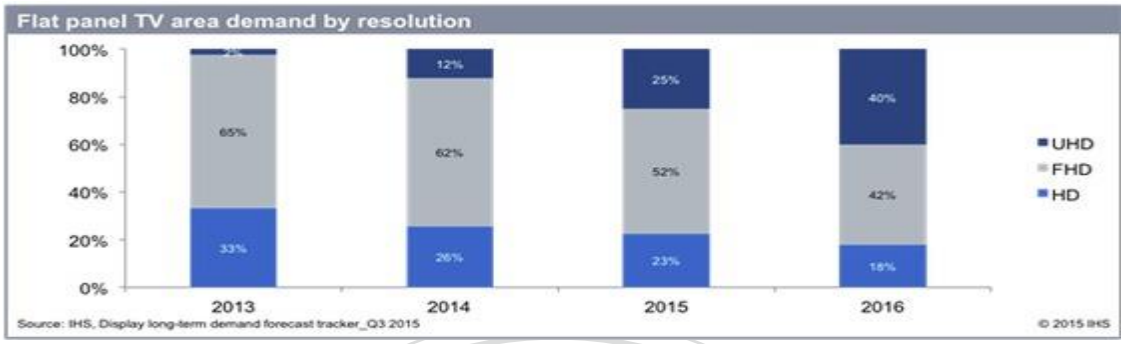

Figure 4-7: Flat panel TV area demand by resolution
Source: HIS (Q3, 2015)[108]

The global LCD industry has made a transition from the quantitative growth of the past to qualitative growth with the increase in demand for large-sized panels, the trend of increasing panel size (area), the diversification of applications like signage, and the expansion of premium line-ups like UHD.

4.1.2 Characteristics of the Industry

1) Platform industry

LCD panel manufacturing is a mid-stream industry that is not only closely linked with the upstream industries of components, materials and equipment and the downstream industry of finished products like TVs, but it is also an important platform industry with large effects on both the upstream and downstream industries. Therefore, technical and price innovations in the upstream industry and market expansion in the downstream industry have decisive effects on the development of the LCD panel industry.

2) Process industry with high entry barriers

The LCD industry is a process industry with high entry barriers because it has technology- and capital-intensive characteristics and requires mass production

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[106] 전병기 (Jeon, Byung-ki), "Again 2012!", Analysis of LGD, *이트레이드 증권* (E-trade Security), June 23, 2014, p. 9.
[107] 김진 (Kim, Jin), "UHD TV 패널 수요 급증 … IHS '올해 4000만대 돌파'" (Rapid Increase in Demand for UHD TV panels … IHS says, 'It will exceed 40 million this year'), *뉴스1* (News 1), November 4, 2015.
[108] *Ibid.*

through an economy of scale. For example, the investment amount for the 8G (generation; hereafter G) line is about 2.5 billion, and that investment amount increases with each generation as Table 4-7 shows.

Table 4-7: Comparison of characteristics among generations

	4G	5G	6G	7G	8G	10G	11G(e)
Production time (Company)	3Q2000 (Samsung)	1Q2002 (LGD)	1Q2004 (SHARP)	2Q2005 (Samsung)	3Q2006 (SHARP)	3Q2009 (SHARP)	?
Glass size(mm)	730*920	1000*1200	1500*1800	1870*2200	2160*2460	2880*3130	3000*3300
Optimal panel size(inch)	~10,17~18	15~19	32"	40,42,46,47	46,55	65~	62,72
Investment Amount(bilion USD	0.75	1.1	1.5	2	2.5	4.6	4.8
Investment mount/unit area (USD/mm2)	11.167	8	5.405	4.558	4.545	5.103	4.848

(Remarks: Based on a foreign exchange rate of 1:1,000)

Source: KIAT[109]

Since the prices of LCD panels have shown a decreasing trend in the long term, panel companies must reduce costs. The most effective method is to increase the size of the mother glass and improve productivity. Increasing the size of the mother glass results in a generation increase. A new generation is generally classified as having an area increase of 1.5 times the previous generation. Whereas a new generation means enhancing the possible number or size that can be produced and improved efficiency and productivity, higher generations do not necessarily mean larger panel sizes but instead mean larger optimal panel sizes. For instance, BOE's 10.5G line is optimized for 65-inch and 74-inch panels with glass efficiencies of 96% and 98%, repectively. These are large-sized panels used for TV products as Figure 4-8 shows.

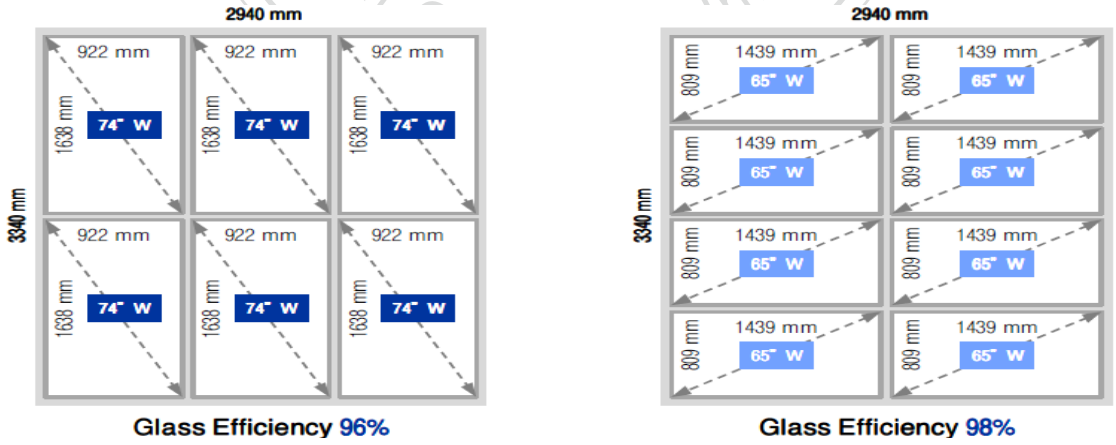

Figure 4-8: High glass efficiency of 74-inch and 65-inch TV panels in BOE's 10.5G

Source: DisplaySearch and Etrade Security Research Center [110]

[109] 김현진 외 (Kim, Hyun-jin et al), "동북아 분업구조 전환에 따른 발전전략-디스플레이" (Development Strategy According to Transition of Specialization Structure among Northeast Asian Countries- Display), 2011-01, 정책기획보고서, *한국산업기술진흥원 (KIAT)*, January, 2011, p. 75.

However, investment amount is about twice as large as that of 8G, which can also produce the same sizes (refer to Table 4-7). Therefore, an increase of demand in the large-sized panel market would result in a successful investment, but higher demand for 40–50-inch panels, as is the case at present, can present a great risk. In other words, accurate analysis of market needs and trends is the key to successful investments.

Moreover, the indusry relies heavily on the upstream industries not only because the procurement of equipment occupied around 70% of such large invesments but also because components and materials comprise about 70% of panel costs. Major components include the back light unit (BLU), responsible for 26% of the cost, and color filter, responsible for 12% of the cost.[111]

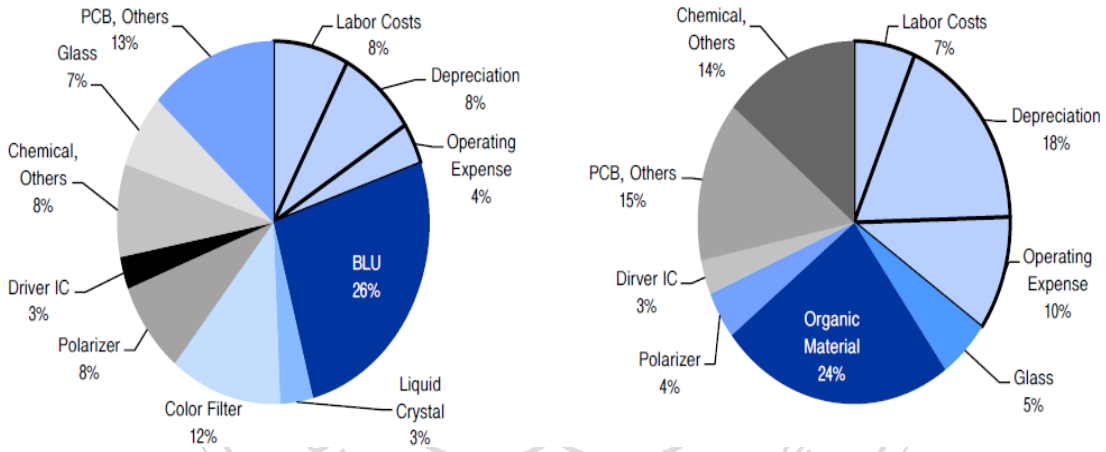

Figure 4-9: Cost structure of LCD (left) and OLED (right) panel manufacturing

Source: DisplayBank, E-trade Security Research Center[112]

Direct labor and depreciation are added to such materials costs to determine the fully-loaded cost, which shows a decreasing trend because of the gradual decrease of depreciation as Table 4-8 shows. Generally, LCD modules with LED BLU account for 70–80% of LCD TVs.[113]

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[110] 전병기 (Jeon, Byung-ki), "디스플레이-32. 중국발 투자가 몰려온다" (Display-32. Investment is Coming in from China), 산업 업데이트 (Industry update), *이트레이드 증권* (E-trade Security), August 18, 2014, p. 15.

[111] 김현진 외 (Kim, Hyun-jin et al), "동북아 분업구조 전환에 따른 발전전략-디스플레이" (Development Strategy According to Transition of Specialization Structure among Northeast Asian Countries- Display), 2011-01, 정책기획보고서, *한국산업기술진흥원 (KIAT)*, January, 2011, p. 3.

[112] 전병기 (Jeon, Byung-ki), "LCD & OLED 원가구조" (Cost Structure of LCD & OLED), Issue Comments, *이트레이드 증권* (E-trade Security), July 4, 2013, p. 1.

[113] 한주엽 (Han, Joo-yeop), "세계 TV업계 시름… 디스플레이 패널가격도 하락 압박" (Global

Table 4-8: Cost trends of 55-inch LCD TV panels

	11Q1	11Q2	11Q3	11Q4	12Q1	12Q2	12Q3	12Q4	13Q1	13Q2	13Q3(E)	13Q4(F)	14Q1(F)
Material Cost	486.1	468.2	453.1	432.2	403.8	386.7	375.3	358.6	334.1	313.9	305.7	295.1	284.7
Glass	59.7	58.3	57.1	54.4	49.2	47.8	46.9	43.9	38.8	34.5	33.8	32.9	31.9
Liquid Crystal	19.4	18.6	18.1	17.4	16.5	15.8	15.4	14.6	13.7	13.0	12.8	12.3	12.1
Color Filter	104.7	102.0	100.1	95.2	86.4	84.0	82.4	77.1	68.1	60.6	59.2	57.3	55.4
Polarizer	45.2	44.1	43.1	41.5	39.9	39.2	38.3	37.6	36.9	36.1	35.5	34.8	34.2
BLU	203.0	192.6	183.6	174.6	164.5	153.9	147.2	141.3	133.8	128.5	124.0	118.2	112.5
Driver IC	7.2	7.0	6.9	6.7	6.5	6.4	6.3	6.1	6.0	5.9	5.8	5.7	5.6
Chemical	13.2	12.8	12.5	12.0	11.4	10.9	10.6	10.3	10.0	9.6	9.4	9.2	8.9
Others	33.7	32.7	31.7	30.5	29.4	28.8	28.2	27.7	26.8	25.8	25.3	24.8	24.0
Direct Labor	31.4	30.8	29.8	28.9	28.4	27.8	27.0	25.9	25.1	24.1	23.6	22.7	22.0
Operating Expense	44.0	42.2	44.0	43.1	43.1	41.3	41.3	38.5	39.4	39.4	39.4	41.3	42.2
Depreciation	82.2	78.4	75.0	71.9	68.3	65.9	63.3	60.8	60.1	58.9	57.6	55.9	54.8
Fully-loaded Cost	**643.7**	**619.6**	**602.0**	**576.1**	**543.5**	**521.7**	**506.8**	**483.8**	**458.7**	**436.4**	**426.3**	**415.0**	**403.7**
QoQ		*-3.7%*	*-2.8%*	*-4.3%*	*-5.6%*	*-4.0%*	*-2.9%*	*-4.5%*	*-5.2%*	*-4.9%*	*-2.3%*	*-2.7%*	*-2.7%*

Source: E-trade security research center[114]

3) Competition among Korea, Taiwan, China and Japan

Production in the LCD panel industry is mostly concentrated in the Asia-Pacific region and consists of an oligopoly of about fifteen companies from four countries: Korea, Taiwan, China and Japan. Fierce competition has resulted as all four countries selected the LCD panel industry as a key national industry. The ratios of production by each country in 2014 were 46.6%, 31%, 11% and 6.9% for Korea, Taiwan, China and Japan, respectively (refer to Figure 1-1).

SDC and LGD are the representative players in Korea and have maintained the number one spot for the past ten years. Innolux and AUO of Taiwan and BOE and CSOT of China are competing fiercely with them.

Table 4-9: Major TFT-LCD panel companies by country

	Major Companies
Korea	Samsung Display (SDC), LG Display (LGD)…
Taiwan	Innolux, AUO, CPT, Hannstar, QDI…
China	BOE, CSOT, CEC-Panda, Tianma, FVO, IVO…
Japan	Sharp, Panasonic, Japan Display…

Source: Author

TV Industry in Anxiety…Display Panel Price Facing Downward Pressure), *디지털 데일리* (Digital Daily), October 8, 2015.

[114] 전병기 (Jeon, Byung-ki), "밸팔번뇌-6.대형 LCD 패널 ASP &Cost 추이 및 전망" (6.Trend and Forecast of Large-area LCD panel's ASP & Cost), Issue comment, *이트레이드 증권* (E-trade Security), August 6, 2013, p. 2.

SDC and LGD of Korea were ranked first and second with respective market shares of 23% and 22% in 2014, and they were followed by Innolux (16%) and AUO (13%) of Taiwan and BOE (7%) and CSOT (4%) of China as Table 4-10. Chinese companies like BOE have been growing fast with high YoY growth since the late 2000s as Table 4-10 shows.

Table 4-10: Trend and forecast of TFT-LCD panel makers' capacity (based on area)

		2009	2010	2011	2012	2013	2014	2015F	2016F	2017F
Shipment Area	Samsung Display	34,379	41,520	49,435	51,536	50,828	52,830	54,171	57,922	59,135
	LG Display	28,508	38,144	45,307	49,132	50,981	51,887	52,862	54,130	56,359
	Innolux	22,602	28,784	32,162	33,323	34,951	36,252	36,998	38,336	39,727
	AUO	21,985	26,342	28,244	29,195	30,161	30,347	30,251	31,908	32,158
	BOE	1,704	2,154	5,305	9,500	12,491	16,737	24,047	28,310	35,274
	CSOT			248	4,752	8,084	9,066	11,706	15,469	17,380
	Tianma	937	1,471	2,305	2,192	2,123	2,562	2,825	2,992	4,365
	JDI	2,215	2,158	2,152	2,373	2,940	3,632	3,987	4,539	4,797
	Sharp	9,001	14,586	14,562	14,942	15,059	15,123	14,818	15,159	15,700
	Others	10,581	13,365	14,517	13,488	13,359	13,501	15,668	18,459	22,335
	Total	131,911	168,524	194,237	210,432	220,978	231,935	247,334	267,225	287,230
YoY	Samsung Display	32%	21%	19%	4%	-1%	4%	3%	7%	2%
	LG Display	37%	34%	19%	8%	4%	2%	2%	2%	4%
	Innolux	27%	27%	12%	4%	5%	4%	2%	4%	4%
	AUO	19%	20%	7%	3%	3%	1%	0%	5%	1%
	BOE	18%	26%	146%	79%	31%	34%	44%	18%	25%
	CSOT				1820%	70%	12%	29%	32%	12%
	Tianma	-45%	57%	57%	-5%	-3%	21%	10%	6%	46%
	JDI	-2%	-3%	0%	10%	24%	24%	10%	14%	6%
	Sharp	28%	62%	0%	3%	1%	0%	-2%	2%	4%
	Others	0%	26%	9%	-7%	-1%	1%	16%	18%	21%
	Total	24%	28%	15%	8%	5%	5%	7%	8%	7%
M/S	Samsung Display	26%	25%	25%	24%	23%	23%	22%	22%	21%
	LG Display	22%	23%	23%	23%	23%	22%	21%	20%	20%
	Innolux	17%	17%	17%	16%	16%	16%	15%	14%	14%
	AUO	17%	16%	15%	14%	14%	13%	12%	12%	11%
	BOE	1%	1%	3%	5%	6%	7%	10%	11%	12%
	CSOT			0%	2%	4%	4%	5%	6%	6%
	Tianma	1%	1%	1%	1%	1%	1%	1%	1%	2%
	JDI	2%	1%	1%	1%	1%	2%	2%	2%	2%
	Sharp	7%	9%	7%	7%	7%	7%	6%	6%	5%
	Others	8%	8%	7%	6%	6%	6%	6%	7%	8%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

(Unit: 1,000m^2) Source: Hana Financial Investment[115]

4) Crystal Cycle

The LCD industry has experienced a "crystal cycle" in which an imbalance of supply and demand repeats due to the competitive facility investment of producers, resulting in a cycle of upturns and downturns. When there is lack of supply, investment increases. When investment increases, oversupply results. In turn, this leads to lower profitability for panel companies and a return to a lack of supply, forming a cycle. Thus, the cycle proceeds as follows: Upturn → Increased price → Increased profit → Increased investment → Oversupply → Reduced price → Reduced profit → Downturn → Reduced investment → Reduced price → Increased demand → Lack of

[115] 이원식 (Lee, Won-sik), "디스플레이: 악순환의 연속" (Display: Continuation of the Vicious Circle), Equity Research, *하나대투 증권* (Hana Daetoo Securities), October 19, 2015, p. 21.

supply → Increased price → Upturn and so on.

A setup term of about two years is added to investment decisions and mass production of panel companies, resulting in a cyclic imbalance of supply and demand. However, recent diversification of applications, such as tablets and navigation, thereby increasing market demand, has resulted in a gradual shortening of the cycle, and the supply and demand situation is not as clear as in the past. Profitability of companies depends on product strategy instead of the LCD cycle, especially since 2012 when the LCD panel market diversified into different sizes. The crystal cycle phenomenon, where excess and shortage of supply occur repeatedly for all panel sizes, is changing.[116] Therefore, it is essential for the panel companies to implement flexible and effective strategies including adjustment for the capacity utilization rate through accurate prediction of demand and timely investment.

4.1.3 Manufacturing Process

The manufacturing process for LCD panels is largely divided into three steps: two front-end processes (fabrication; hereafter, fab), including the Array Process and Cell Process, and the back-end process, also called the Module Assembly Process. After going through the Array and Cell Process using automated equipment, an LCD module (LCM) is manufactured by assembling components such as the Back-Light Unit (BLU), driver IC and so on. The front-end processes do have operators, technicians and engineers, but the importance of automated equipment is relatively higher, whereas the back-end process has much higher relative labor costs due to the large amount of manual labor involved.

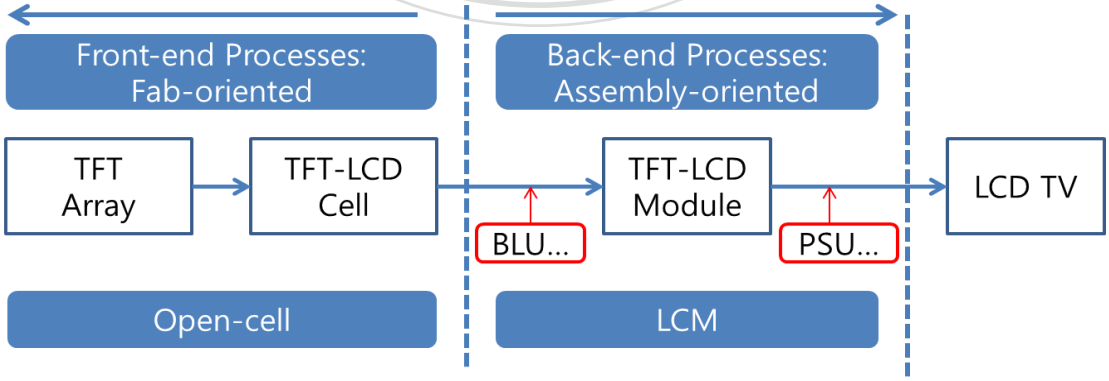

Figure 4-10: LCD panel manufacturing process and features

Source: Author

[116] 송주영 (Song, Joo-young),"LGD "중국發 LCD 공급 과잉 우려는 기우" (LGD says Concerns for Oversupply of LCD from China are Groundless", *ZDNet Korea*, April 22, 2015.

In the past, panel companies supplied LCD panels as modules with BLU and driver IC to customers such as TV set companies. Recently, however, the industry has been showing a trend of selling semi-finished products (without attached components like BLU) called 'open cells'. TV set companies are directly assembling LCD modules in order to reduce costs and differentiate their products. For the LCD panel companies, open cells may be advantageous in terms of profitability because there are fewer manufacturing processes, low inventory management expenses and low defect rates, but sales volumes and profit margins may be reduced due to the selling price being about 10%–30% lower than modules.[117]

4.1.4 Development of the LCD Panel Industry

The LCD industry started full-scale operation in the 1990s as companies like Sharp of Japan phased out CRTs, which had issues such as the difficulty of implementing large screens and their greater volume and weight. With the digitalization and innovative development of IT in the 2000s, the LCD industry showed large growth rates with a rapid increase in demand for PCs, mobile phones, TVs and computer monitors. LCDs made up 58% of the entire display market in 2003 and gradually encroached on the PDP TV market, rising sharply to 82% in 2006 and surpassing 90% with a 100 billion USD market volume in 2010. In summary, LCD panels maintained fast growth and high market share in the display market in 2000s.[118] In particular, LCD TVs have led the LCD panel industry's rapid growth since 2005 by replacing CRT TVs.

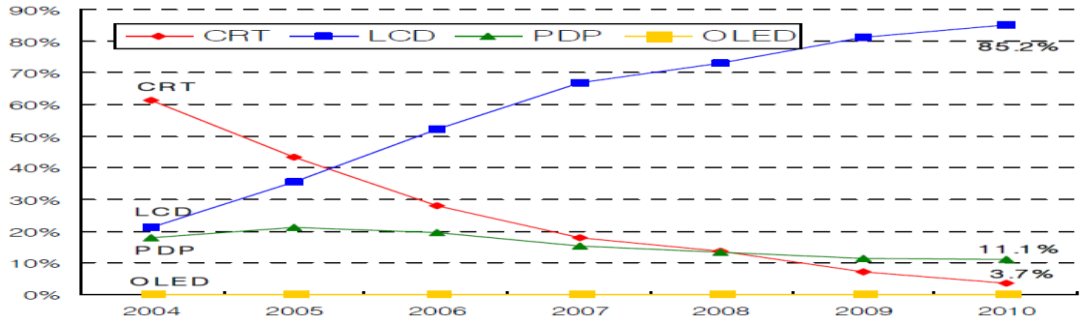

Figure 4-11: TV ratio by display type
Source: KIAT[119]

[117] 성현희 (Sung, Hyun-hee), "디스플레이, 반제품 '오픈셀' 판매 비중 70% 넘어 ... 삼성디스플레이는 97%" (Display, Share of Half-finished Good 'Open Cells' Over 70% ... SDC Hits 97%), *전자신문* (Et News), May 15, 2015.
[118] 조철 외 (Cho, Chul et. al.), "주요 산업의 중국 내 동북아국가들의 경쟁구조 분석(제1권)" (Analysis of Competition Structure of Northeast Asian Countries in China on Major Industries (Volume 1)), *산업연구원 연구보고서* (KIET), 2012-636(1), pp. 126-127.
[119] 김현진 외 (Kim, Hyun-jin et al.), "동북아 분업구조 전환에 따른 발전전략-디스플레이"

The LCD industry started in Japan in the early 1990s, but Korea successfully caught up by means of decisive investments in the middle of the economic depression caused by the Asian financial crisis in the late 1990s. As a result, Korea took the lead in the early 2000s. During this time period, Taiwan followed up based on its technical affiliation with Japan. Korea, Taiwan and Japan were the top three countries until the late 2000s. Although pioneering Japan gradually showed a downturn as it failed to compete with Korea and Taiwan, it still has a competitive advantage, especially in the upstream industries (i.e., materials, components and equipment), based on its ownership of original and core technologies. Meanwhile, China has actively invested with governmental support and a rising domestic market since the mid-2000s, surpassing Japan in 2012 to rank third in overall market share. With the rapid growth of China's industry, there is fierce competition in the LCD panel industry that has significant economic effects on the four countries.

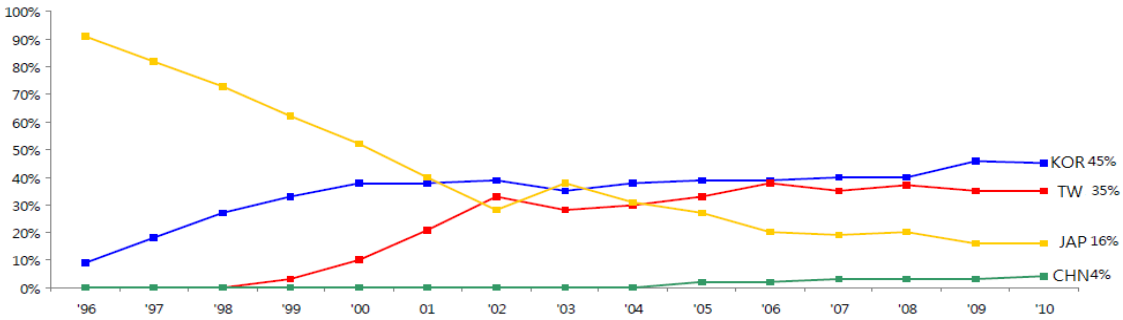

Figure 4-12: Trends in global LCD panel market share by country
Source: KIAT[120]

4.2 Development of the Korean LCD Panel Industry

4.2.1 Economic Effects

The Korean LCD industry has continued to grow rapidly since the first mass production began in 1995. In 2002, Korea took the lead away from Japan and has since maintained the number one spot. The LCD industry has become a key national industry and is an important part of the Korean economy. Specifically, the LCD industry of Korea was 4.83% of GDP (35.3 billion USD) and 9.5% of total exports in 2007 (see Table 4-11). The Korean display industry was ranked number one in terms global market share (45.9%) with a domestic production of 44 billion USD (44 trillion Won, based on an exchange rate of 1:1000), accounting for 3.2% of total GDP;

(Development Strategy According to Transition of Specialization Structure among Northeast Asian Countries- Display), 2011-01, 정책기획보고서, *한국산업기술진흥원 (KIAT)*, January, 2011, p. 6.

[120] *Ibid.*, p. 10.

seventh in exports (34 billion USD); and third in total number of employees (127,000) in 2013.[121] In 2014, the display industry exceeded 20% of Korea's total exports along with the semiconductor and petrochemical industries, playing an important role in the Korean economy as an export-oriented country.[122]

Table 4-11: Korean display industry's economic ratio

	2007	2009[123]	2010[124]
GDP Ratio	4.83%	3.4%	3.8%
Export Ratio	9.5%	8.6%	7.4%

Source: Author

4.2.2 Analysis by Industry Life-cycle Model

1) Embryonic: Until mid-1990s

The world's first 1G TFT-LCD mass production line started operation in Japan in the early 1990s, and the market was dominated by about ten Japanese companies, including Sharp, NEC and Toshiba, until the mid-1990s.[125] The LCD panel industry of Korea was launched in full scale as Samsung (currently SDC) and LG Philips LCD (currently LGD) started mass production of 2G lines in 1995.

2) Growth: Late 1990s

In order to compete with Japan, the industry leader, Korean companies made investments in 3G and 4G lines with the operation of 2G lines. In particular, as Japan had a passive attitude during the bad investment environment of the Asian financial crisis in 1997, Korean investment led to an upturn from the lack of supply with increased demand for laptops in 1998 (increased adaptation of TFT-LCD to replace STN-LCD). With the trend of increasing screen sizes in the laptop market, which was the most common application and showed the largest demand at the time, Korean companies possessing optimized production lines increased their market share. The

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121 이강은 (Lee, Kang-en), "디스플레이 산업 '위기에서 기회로'" (Display Industry 'From Crisis to Opportunity), *산업일보* (San-up Ilbo), October 7, 2014.

122 이종혁 (Lee, Jong-huyk), "중국 위협 어느정도길래" (How Strong is Threat of China), *서울경제* (Seoul Kyung-jea), July 15, 2015.

123 복득규 외 (Bok, Deuk-gyu et al.), "동아시아 LCD 클러스터의 네트워크 구조와 협력방안" (Network Structure and Cooperation of LCD Clusters in East Asia), *SERI*, June 15, 2007, pp. 30-31.

124 조철 외 (Cho, Chul et. al.), "주요 산업의 중국 내 동북아국가들의 경쟁구조 분석(제1권)" (Analysis of Competition Structure of Northeast Asian Countries in China on Major Industries (Volume 1)), *산업연구원 연구보고서* (KIET), 2012-636(1), p. 2.

125 복득규 외 (Bok, Deuk-gyu et al.), "동아시아 LCD 클러스터의 네트워크 구조와 협력방안" "Network Structure and Cooperation of LCD Clusters in East Asia," *SERI*, June 15, 2007, pp. 30~31.

Korean LCD industry leapt forward as a result. The Korean government also supported industrial development by aiding the localization of and research on panels, components and materials through the Korea Display Research Association (한국디스플레이연구조합, EDIRAK) founded in 1990 and implementing a duty exemption system for LCD production facilities, which offered duty exemption for core manufacturing equipment and automated factory equipment through separate taxation.

Table 4-12: Trend of the Korean LCD panel lines' operation

Company	Line (Generation)	Location	Initial Operation Date	Glass Size (m*m)
Samsung	1(2)	Giheung	1995.3	370*470
	2(3)	Giheung	1996.9	550*650
	3(3.5)	Cheonan	1998.2	600*720
	4(4)	Cheonan	2000.8	730*920
	5(5)	Cheonan	2002.8	1100*1250
	6(5)	Cheonan	2003.10	1100*1300
	7-1(7)	Tangjung	2005.4	1870*2200
	7-2(7)	Tangjung	2006.3	1870*2200
LG Philips LCD	1(2)	Gumi	1995.8	370*470
	2(3)	Gumi	1998.2	590*670
	3(4)	Gumi	2000.6	680*880
	4(5)	Gumi	2002.3	1000*1200
	5(5)	Gumi	2003.5	1100*1250
	6(6)	Gumi	2004.8	1370*1670
	7(7)	Paju	2006.11	1950*2250
BOE -Hydis	1(2)	Icheon	1996.10	370*470
	2(3)	Icheon	1997.9	550*650
	3(3.5)	Icheon	2003.3	620*720

Source: Korea Association of Information and Telecommunication[126]

3) Shakeout: 2000–2007

Although the LCD industry faced stagnation (oversupply) due to the decrease in demand caused by the mass production of 3G and 4G displays by Japan, investment by Taiwan based on its affiliation with Japan, and the collapse of the IT bubble in the 2000s, Korean companies made another bid for success by quickly investing in the

[126] *Ibid.,* p.54.

next-generation (5G) line. The Korean LCD industry entered into an upturn with economic recovery and the rapid increase in demand for laptops and monitors since 2001, surpassing the market share of Japan to take the number one spot. The Korean industry also predicted the increase in the size of TVs and monitors, making early investments in 6–7G and was the first in the world to apply the One Drop Filling (ODF) method. The golden age of LCD panels had begun by improving productivity and profitability through continued research and development.

4) Maturity: 2008–2012

To continue with this success, Korean LCD companies increased their strategic affiliations, including the founding of S-LCD[127] and increased investment in China to reduce costs. However, growth of the industry stagnated due to decreased demand during the economic depression of the global financial crisis, increasing competition from Taiwanese companies and the entry of Chinese companies into the market.

Table 4-13: Trends of the Korean LCD production and market share

Unit: milion USD		2003	2006	2009	CAGR
Large Size	Production	10,348	23,656	32,410	21.0%
	Market Share	44.30%	44.90%	52.40%	-
Small & Medium Size	Production	740	3,170	3,464	29.3%
	Market Share	8.70%	19.80%	20.90%	-
Total	Production	11,090	26,826	35,873	21.60%
	Market Share	34.80%	39.10%	45.8	-

Source: DisplayBank (2010)[128]

5) Decline: 2013–

Korea faced the crisis of becoming stuck between Japan, which has competitive upstream industries with core technologies and materials and aimed to revive its industry by introducing Abenomics and the weakening Japanese yen in 2013, and China, which was experiencing rapid growth based on strong government support and having the largest market in the world. Expanded investment in OLED (a substitute) gaining the spotlight as a post-LCD display technology, rapid growth of the Chinese LCD industry, and stagnation of the LCD market have led to a downturn for the

[127] S-LCD is a joint company (50:50) founded by Samsung Electronics and Sony in 2004.

[128] 조철 외 (Cho, Chul et. al.), "주요 산업의 중국 내 동북아국가들의 경쟁구조 분석(제1권)" (Analysis of Competition Structure of Northeast Asian Countries in China on Major Industries (Volume 1)), *산업연구원 연구보고서* (KIET), 2012-636(1), p. 14.

Korean LCD industry.

Table 4-14: Forecast of OLED market size and ratio (Unit: Million USD)

	2008	2009	2010	2011	2012	2013	2014	2015
LCD	92057	82149	104437	109552	114230	113848	113418	113288
OLED	251	536	1177	3569	5831	7810	9614	11252
Ratio(%)	**0.2**	**0.6**	**1**	**2.9**	**4.6**	**6.1**	**7.4**	**8.6**
Others	14000	9330	9040	8075	7442	7137	6912	6744
Total	106308	92015	114654	121197	127502	128795	129945	131284

Source: DisplaySearch (4Q, 2010)[129]

4.2.3 Current Status

Although the Korean LCD industry is facing a quantitative downturn, it is showing qualitative growth with premium products through consistent research and development. For example, the overall market penetration rate is over 10%, and Korea is gaining a competitive advantage in the rapidly-growing UHD market.

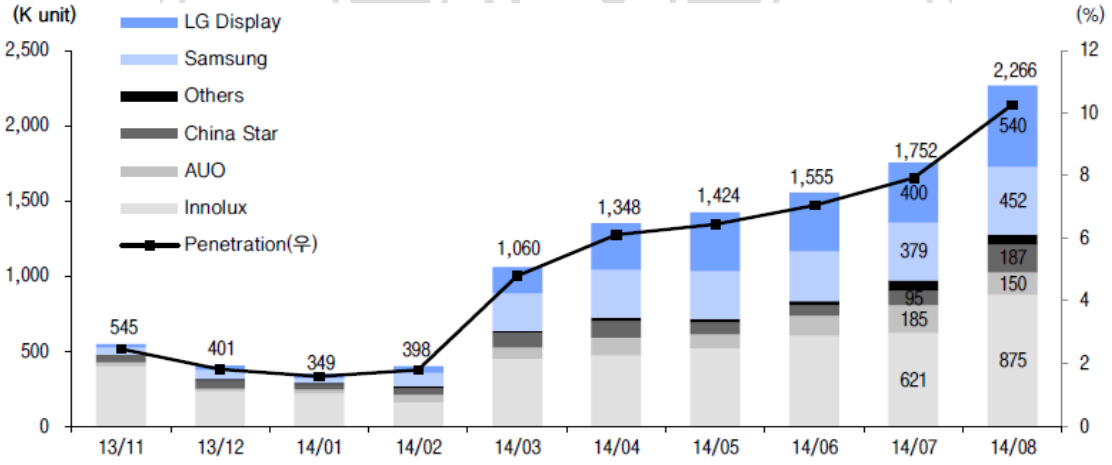

Figure 4-13: Trends of UHD panel shipments and penetration rate

Source: DisplaySearch, E-trade research center[130]

In the UHD market initially led by Innolux of Taiwan, LGD and SDC of Korea have consistently increased their ratios and competitive advantage in terms of the quality

[129] 김현진 외 (Kim, Hyun-jin et al.), "동북아 분업구조 전환에 따른 발전전략-디스플레이" (Development Strategy According to Transition of Specialization Structure among Northeast Asian Countries- Display), 2011-01, 정책기획보고서, *한국산업기술진흥원 (KIAT)*, January, 2011, p. 80.
[130] 전병기 (Jeon, Byung-ki), "백팔번뇌-37. 8월 TV패널 시장 분석" (Market Analysis of TV Panel in August), Industry Update, *이트레이드 증권* (E-trade Security), September 23, 2014, p. 8.

and quantity of their premium line-ups, especially by occupying the TV market, which is the largest market and makes up about 50% of total UHD panel shipments.

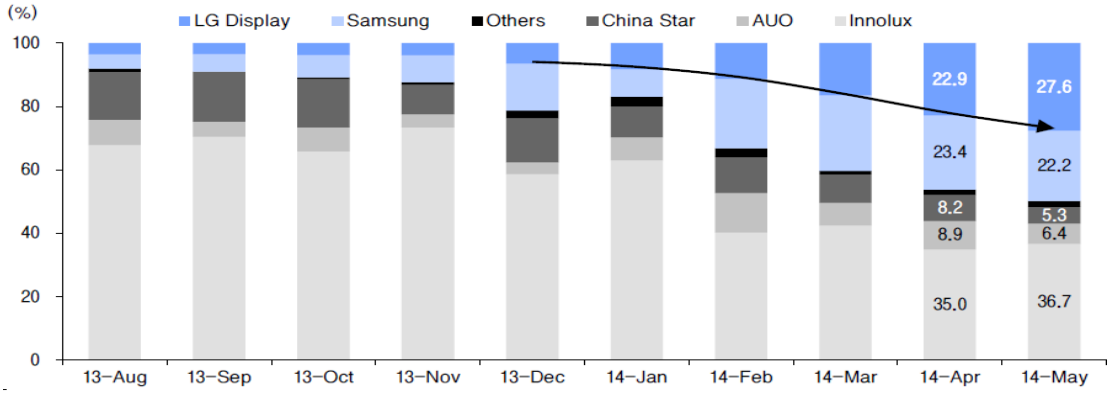

Figure 4-14: Ratio of UHD TV panel shipments by company

Source: DisplaySearch, E-trade research center[131]

Also, the Korean LCD industry is a trendsetter that leads the trend of increasing panel size, on average producing sizes larger than 37 inches, the average TV panel size in the industry (see Figure 4-15). It is still the global leader, both quantitatively and qualitatively, in terms of capacity, sales and premium line-up.

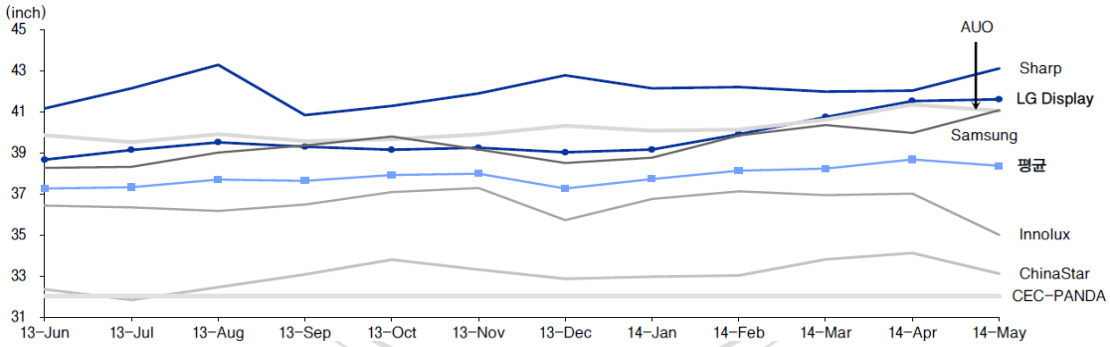

Figure 4-15: Trends of average TV panel size by company

Source: DisplaySearch, E-trade research center[132]

4.2.4 Success Factors of the Korean Display Industry

The following major factors helped the Korean LCD panel industry maintain the world's number one spot since 2002 and make great a contribution to the Korean economy despite being a latecomer. First, there was government support including the localization of panels, components and materials through KDIA and tariff reduction

[131] 장시복 (Jang, Si-bok), "삼성·LG 이끄는 LCD TV 패널시장 "3월 출하량 역대최고"" (LCD TV Panel Market Led by Samsung and LG shows "All-time High Shipments in March"), *머니투데이* (Money Today), May 1, 2015, p. 8.

[132] *Ibid.*, p. 6.

for core production facilities. Second, preemptive investment of panel companies despite the Asian financial crisis in 1997 and collapse of the IT bubble in 2001 helped them to gain a dominant foothold in the market.[133] Third, Korean companies made timely and risk-taking investment through fast, efficient decision making by owner management based on confident and accurate forecasts of future demand in the market even during periods of recession. Lee, Kun-hee and Koo, B. J. the chairmen of Samsung and LG Philips LCD at the time, conducted extensive studies on the LCD industry by recruiting domestic and overseas experts and made unsparing investments in relevant technology. Despite the downfall of the LCD market caused by the Asian financial crisis and collapse of the IT bubble, they made quick, preemptive, and even countercyclical investments with the belief that there would be an expansion of product applications and a trend of increasing panel sizes. This was a risky large-scale investment that could have decided the fate of companies, and Japanese competitors hesitated to make investments as they failed to reach board resolutions. Meanwhile, Korea made a successful move through the quick decision making and investment by Korean conglomerates.[134] Fourth, manufacturers increased production efficiency and profitability through consistent technical innovations such as the first implementation of the One Drop Filling (ODF) method based on its expertise in the semiconductor industry. Fifth, the industry localized and enhanced competitiveness through technology transfers, support, and sharing through a self-sufficiency strategy (vertical integration) with group-wide investment in the upstream and downstream industries.

Table 4-15: Vertical integration of Samsung Group and LG Group

Stream	**Samsung Group**	**LG Group**
Up	Samsung Corning (Glass) Samsung Fine Chemical (Optical Film) Samsung Cheil Industry (Polarizers) Hansol LCD (BLU), SEMES (Equipment)…	LG CHEM (Polarizers), LG Innotek (LEDs) New Optics (Optical Films), Heesung Electronics (BLU), ADP (Equipment)…
Mid	**Samsung Display (LCD Panel)**	**LG Display (LCD Panels)**
Down	Samsung Electronics (LCD TVs, Mobile)	LG Electronics (LCD TVs, Mobile)

Source: Author

[133] Please refer to Appendix II, 1.
[134] Please refer to Appendix IV, 4.

Sixth, stable captive markets within groups have emerged: LGD and SDC have grown together with LG Electronics and Samsung Electronics, the major shareholders and largest customers that became global leaders in the downstream industry for TVs and mobile phones.

Table 4-16: Top 15 global TV makers (based on shipments)

Ranking	Company	2013		2014		2015Q1		2015Q2	
		Shipments	%	Shipments	%	Shipments	%	Shipments	%
1	**Samsung**	**48,604.8**	**21.4**	**52,944.2**	**22.5**	**10,129.7**	**20.3**	**10,278.5**	**21.4**
2	**LG**	**33,535.4**	**14.7**	**34,019.9**	**14.5**	**7,363.4**	**14.8**	**6,243.0**	**13.0**
3	TCL	13,734.2	6.0	12,190.0	5.2	2,969.8	6.0	2,636.8	5.5
4	SONY	13,069.0	5.7	14,621.3	6.2	2,703.6	5.4	2,611.4	5.4
5	Hisense	9,909.7	4.4	11,585.2	4.9	2,848.3	5.7	2,458.8	5.1
6	VISIO	6,420.2	2.8	7,046.7	3.0	1,230.8	2.5	2,044.1	4.3
7	Skyworth	9,276.9	4.1	9,271.6	3.9	2,551.9	5.1	1,996.4	4.2
8	ADC/TP Vision	8,536.7	3.8	7,617.9	3.2	1,609.1	3.2	1,623.8	3.4
9	Changhong	8,430.6	3.7	6,773.5	2.9	1,488.0	3.0	1,576.0	3.3
10	Panasonic	9,344.1	4.1	8,506.6	3.6	1,285.8	2.6	1,507.1	3.1
11	Sharp	7,871.9	3.5	7,271.0	3.1	1,700.0	3.4	1,405.0	2.9
12	Haier	4,853.5	2.1	4,778.7	2.0	1,750.9	3.5	1,355.1	2.8
13	Kongka	6,392.1	2.8	5,603.2	2.4	1,363.1	2.7	1,007.5	2.1
14	Punai	6,057.6	2.7	4,771.0	2.0	848.4	1.7	905.6	1.9
15	Toshiba	9,239.2	4.1	7,586.1	3.2	1,396.5	2.8	893.9	1.9
Total Market Shipments		227,368.0		234,921.0		49,899.9		48,012.0	

Note: Red represents Chinese companies.

Source: HIS, DisplaySearch[135]

Specifically, LG Electronics and Samsung Electronics, the largest customers of LGD and SDC respectively, had about 35% of global market share of LCD TVs (see Table 4-16), and LGD and SDC were able to grow as stable suppliers. Seventh, aggressive investment and technological development resulted in new applications, thus opening up new markets and expanding existing markets. A virtuous cycle was formed through the reinvestment by companies with increased profitability. Lastly, well-intended competition between Samsung Group and LG Group as traditional rivals in Korea has also made a contribution in changing the Korean LCD industry from a fast-follower into a first mover.[136]

4.3 Analysis of the Korean LCD Industry Using Porter's Five Forces Model

Porter's five forces model was used to analyze the structure of the Korean LCD industry to determine the competitive advantages and strategy of the Korean LCD

[135] 한주엽 (Han, Joo-yeop), "세계 TV업계 시름… 디스플레이 패널가격도 하락 압박" (Global TV Industry in Anxiety…Display Panel Price Facing Downward Pressure), *디지털 데일리* (Digital Daily), October 8, 2015.

[136] Please refer to Appendix II, 1.

industry.

1. Intensity of rivalry among existing competitors: Taiwan

The Taiwanese LCD industry showed growth based on its technical affiliation with Japan beginning in the mid-1990s, and the major companies include Innolux, AUO, CPT, Hannstar and QDI.

Table 4-17: Taiwanese LCD production and market share

Unit: Million USD		2003	2006	2009	CAGR
Large size	Production	8,174	22,879	22,466	18.35%
	Market share	35.0%	43.5%	36.4%	-
Small & medium size	Production	580	3,198	5,172	44%
	Market share	6.8%	20.0%	31.1%	-
Total	Production	8,760	26,078	27,638	21.11%
	Market Share	27.5%	38.0%	35.3%	-

Source: DisplayBank (2010)[137]

Taiwan was the world's largest producer of IT devices such as laptops in the early 2000s (including the production by Taiwanese companies in China). It showed rapid growth in market share to 30–40% based on its large market and thus competed against Korea. Since 2012, the Taiwanese government also came up with diverse policies to enhance competitiveness of its LCD industry, such as the Two Trillion and Twin Star Development Program (兩兆雙星產業發展計畫) and the formation of LCD clusters like Hsinchu Science Park (新竹科學園區). Moreover, as Taiwan has recently begun to improve its relationship with China, their cooperation may become an important variable in the future. Specifically, since the Kuomintang (國民黨, KMT) came to power in 2008, Taiwan reinforced its economic cooperation with China based on the "1992 Consensus" (九二共識) and "economics first, politics later" (先經濟後政治). Particularly after signing the Economic Cooperation Framework Agreement (ECFA) in 2010, cross-strait economic cooperation has been referred to as 'Chi-wan' (implying close cooperation between China and Taiwan) and showed diversified and organized interaction. For instance, when Taiwanese panel companies experienced difficulties in the aftermath of the financial crisis in 2008, a purchasing

[137] 김현진 외 (Kim, Hyun-jin et al.), "동북아 분업구조 전환에 따른 발전전략-디스플레이" (Development Strategy According to Transition of Specialization Structure among Northeast Asian Countries- Display), 2011-01, 정책기획보고서, *한국산업기술진흥원 (KIAT)*, January, 2011, p. 23.

group of Chinese TV companies visited Taiwan and purchased their panels. Purchase volume in 2015 is expected to reach 4.5 billion USD.

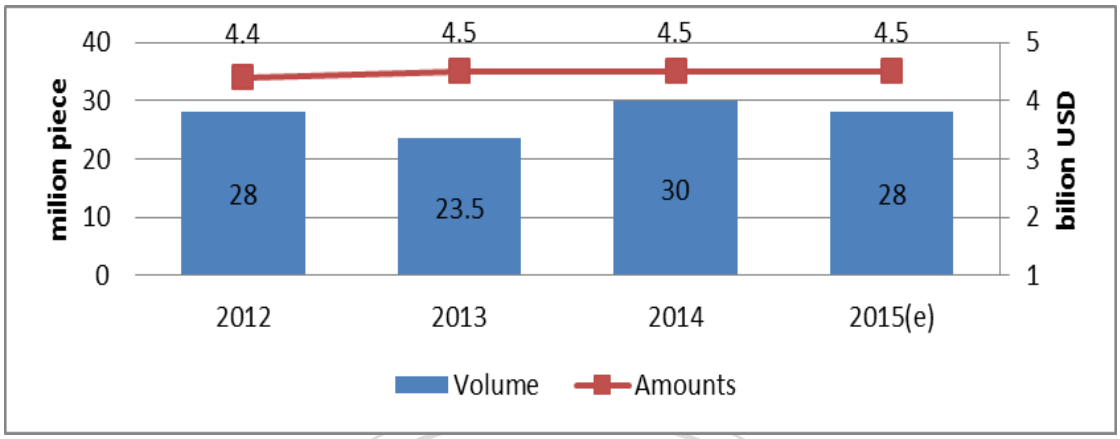

Figure 4-16: Recent panel purchases of Chinese purchasing group in Taiwan

Source: China Times[138]

In addition, when Taiwanese and Korean companies invest in China in the future, it is possible that China would make a political decision prioritizing Taiwanese companies or offering special benefits such as tax favors. The Taiwanese LCD industry is still the largest and is the greatest potential competitor for Korea due to its diverse technical affiliations, government support and cooperation with China.

2. Bargaining power of suppliers

Although the upstream industries of equipment, components and materials increased their competitiveness since the mid-2000s with group-wide investment, including vertical integration and R&D support from the Korean government, core components and materials still rely on importation from original/core technology companies from Japan or elsewhere. The localization rate of back-end process equipment is relatively high, but the rate of core front-end process equipment, which has a high added value, is still relatively low. In conclusion, the bargaining power of suppliers differs based on the group-wide self-sufficient (localization) strategy and possession of source technologies by panel companies.

3. Bargaining power of customers

Major customers of the Korean LCD panel industry include companies that manufacture finished products like TVs, mobile phones, PCs, monitors and tablets, such as LG Electronics, Samsung Electronics, Apple and Haier. The bargaining power

[138] 黃欣 外 (Huang, Xin et. al.),"白為民對台採購 續買45億元" (Bai, Wei-min Makes 4.5 billion USD of Purchasing in Taiwan), *工商時報* (China Times), March 7, 2015.

of customers basically increases with an excess of supply and decreases with a shortage of supply. However, bargaining power has been changing lately according to the supply and demand for each display size.

Figure 4-17: Profitability trends of TV divisions of Samsung and LG
Source: DisplaySearch[139]

As an example, whereas the profit margin of panel companies in Q4 of 2014 exceeded 20% when they suffered a shortage of supply due to the increased demand for 42-inch panels, the margins of the TV divisions of LG Electronics and Samsung Electronics was below 2%. This shows that bargaining power was especially low at this time. Such trends change as competitors increase production of sizes with high margins and customers put pressure on suppliers to lower panel prices. In the case of premium products like UHD (4K) and curved LCD panels for which Koran companies are competitive, customers' bargaining power differs for each product model as it is relatively decreased by increased market demand (UHD TV, curved TV). In addition, bargaining power differs with purchasing power as well, generally in proportion to the purchasing power of customers. For example, major TV companies such as Samsung, LG, and Sony that purchase about 40% of TV panels globally have relatively high bargaining power as customers. Since inventory is a great burden and risk for panel companies, they need stable customers. It is also important for customers (i.e., set makers) to secure the quantity they need. Therefore, the bargaining power of customers is relatively high if purchasing quantity is high. In brief, the bargaining

[139] 한주엽 (Han, Joo-yeop), "삼성전자 등 TV 완성품 업계 "LCD 패널 값 인하하라" 강력 요구 (TV Makers like Samsung Electronics Strongly Urging "Price Down of LCD Panel"), *디지털데일리* (Digital Daily), March 23, 2015.

power of customers is basically affected by market supply and demand, but it can differ according to model (size), function and the purchasing power of customers.

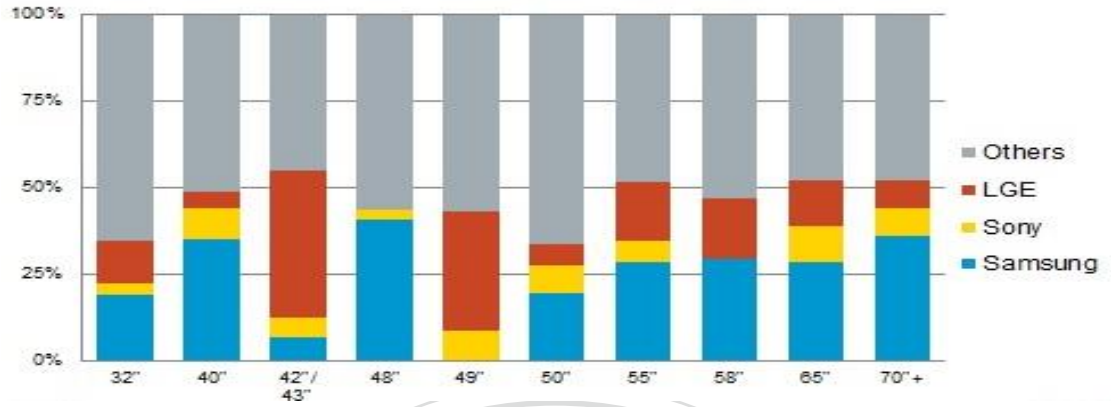

Figure 4-18: Top three TV brands' business plans as shares of global panel supply in 2015
Source: IHS[140]

4. Threat of substitute products or services: OLED

Even though LCD is still the major product and occupies about 90% of the display market, it has entered into a period of maturity with a stagnated growth rate. On the other hand, OLED is now in the spotlight as a next-generation display and rapidly growing to become a threat as a substitute product. Ever since SDC started the world's first mass production of OLED for smartphones in 2010, OLED was used for the flagship Galaxy series of Samsung mobile phones. Contributing to its successful popularization, display companies are regarding OLED as having many strengths and the potential to serve as a post-LCD strategy. SDC and LGD of Korea are leading the OLED market, and the two companies are securing relative competitiveness for large sizes and small–medium sizes, respectively. Compared to LCD, OLED is more appropriate for flexible and large screens and has a variety of strengths, including power efficiency and color. As OLED does not require a color filter or BLU, with their high cost ratios (see Figure 4-9), it has the potential to be cost competitive with improving an production yield in the future.

[140] 김은별 (Kim, En-byeol), "세계 톱3 TV브랜드, 패널시장 절반 구매" (Global Top 3 TV Brands Purchase half of the Panel Market", *아시아 경제* (Asia Kyung-jea), March 3, 2015.

Figure 4-19: Samsung's flexible OLED display roadmap

Source: Hyundai Security[141]

According to KDIA, OLED has grown rapidly in the global display market and recorded two-digit growth rates since 2010 (see Figure 4-20).

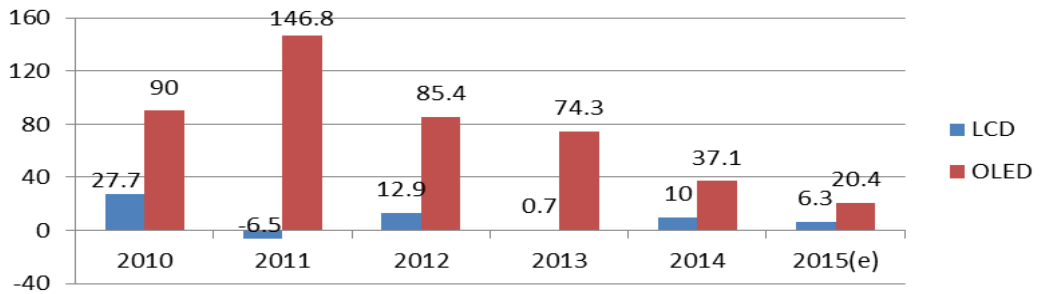

Figure 4-20: Global display market growth rate (Unit: %)

Source: KDIA[142]

The size of the OLED market is expected to reach 11 billion USD in 2015, which would represent ten-fold growth in two years. It will continue to increase its market share in the display industry, especially when cost competitiveness is secured through improved production yields in the future, and will become the largest threat as a substitute technology for the LCD industry.

[141] 김윤지 (Kim, Yoon-ji), "2012년4분기 IT 산업 리스크 분석" (IT Industry Risk Analysis Q4 2012), 해외경제연구소, *한국수출입은행* (Korea Eximbank), February 25, 2013, p. 19.

[142] 성현희 (Sung, Hyun-hee), "中 정부 주도 디스플레이 산업 신화, 이제 한계인가" (Display Industry Led by the Chinese Government has Reached its Limit?), *전자신문* (Et News), April 12, 2015.

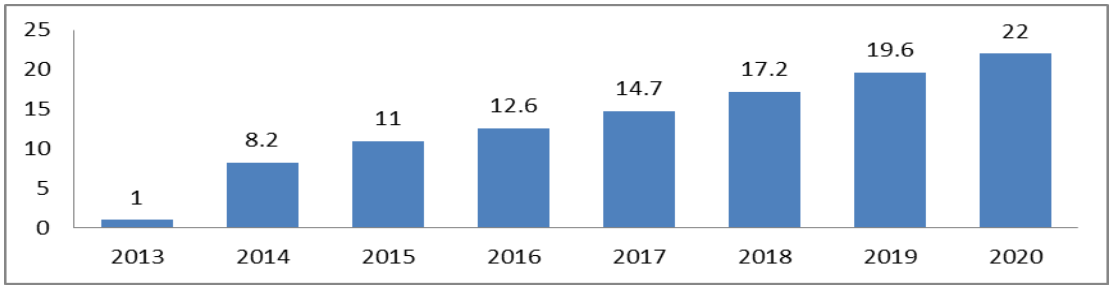

Figure 4-21: Forecast of Global OLED panel market size (Unit: billion USD)
Source: DisplaySearch[143]

5. Threat of new entrants: China

Even though China was the latest entrant among the four major producers to emerge as a key player in the LCD industry in the mid-2000s, it grew quickly due to its gigantic domestic market, active government support and aggressive investment by panel companies. The global market share of China's LCD manufacturers was lower than 3% until 2009 as Table 4-18 shows, but it surpassed Japan in terms of sales volume and production capacity in 2012 to take the world's number three spot and become the biggest variable in the industry.[144] China's LCD panel production capacity is forecast to continuously expand from 20.1% in 2015 to 26.3% in 2017 (see Figure 1-1) and is expected to surpass Korea's in 2018. China has become the greatest threat to Korea among the new entrants.

Table 4-18: China's LCD production and market share trends

Unit: milion USD		2003	2006	2009	CAGR
Large Size	Production	0	1,625	1,644	243.6%
	Market Share	0%	3.1%	2.7%	-
Small & Medium Size	Production	0	0	644	193.9%
	Market Share	0%	0%	3.9%	-
Total	Production	0	1,625	2,288	263%
	Market Share	0%	2.4%	2.9%	-

Source: DisplayBank[145]

[143] 황민규 (Hwang, Min-kyu), "위기의 한국 LCD… OLED로 중국 넘는다" (Korean LCD Faces Crisis…Surpasses China with OLED), *디지털 타임스* (Digital Times). July 10, 2015.
[144] 박일경 (Park, Il-kyung), "LGD, 광저우 8.5세대 LCD공장 가동…총 투자액 4조" (LGD Operates 8.5G LCD Plant in Guangzhou…Total Investment of 4 billion USD), *세계파이낸스* (Segye Finance), September 3, 2014.
[145] 김현진 외 (Kim, Hyun-jin et al.), "동북아 분업구조 전환에 따른 발전전략-디스플레이"

Chapter 5: Korean LCD Panel Industry Strategies for Investment in China

5.1 Development of the Chinese LCD Industry

The Chinese LCD panel industry started as a result of investment by Korean, Taiwanese and Japanese companies in module lines (back-end processes) in China in the early 2000s, and it has developed into a full-scale industry with mass production by local companies like BOE since the mid-2000s. The Chinese industry has grown rapidly, and China is expected to overtake Korea in 2018 to become the country with the largest panel production in the world. This was made possible through various forms of government support and protective policies for the industry, such as reduced corporate taxes, low interest loans, increased tariffs, having the largest market in the world, and active investment by companies.

1. Central and local government support and protective policies:

1) LCD industry rearing policy: The Chinese government selected growth of the display industry as the top priority for the information and electronics industry in the 11th Five-Year Plan (2006–2010) and enforced an active support policy to grow the display industry through the 12th Five-Year Plan (2011–2015). For instance, the self-sufficiency rate for LCD panels in 2015 and 2016 was set at 80%, both in terms of quantity and area, attempting to make a shift from quantitative growth to qualitative growth.[146] In addition to direct growth policies, the Chinese government also implemented indirect support policies to facilitate domestic demand, such as 'home appliances to the countryside' (家電下鄉) and 'home appliance replacement' (以舊換新). It pursued overall growth of the LCD industry by inducing a virtuous cycle of investment by related companies.

2) Protection of domestic industry through increasing tariffs: In April 2012, the Chinese government increased tariff rates on 32-inch and larger LCD open cells and

(Development Strategy According to Transition of Specialization Structure among Northeast Asian Countries- Display), 2011-01, 정책기획보고서, *한국산업기술진흥원 (KIAT)*, January, 2011, p. 27.

[146] 전병기 (Jeon, Byung-ki), "디스플레이-32. 중국발 투자가 몰려온다" (Display-32. Investment is Coming in from China), 산업 업데이트 (Industry update), *이트레이드 증권* (E-trade Security), August 18, 2014, p. 6.

polarizers, which play large roles in terms of cost as core parts, from 3% and 5% to 4% and 6%, respectively. There is even the possibility of additional rate increases in the future. The primary purpose of such increases is to encourage investment by competing nations in China's next-generation line, creating a technology transfer effect, while also protecting Chinese companies that have started mass production.[147] Although increasing tariffs may be a burden in the short term for China's downstream industry, it will increase the competitiveness of the Chinese panel industry by increasing its self-sufficiency rate in the long term. In fact, as the self-sufficiency rate of TV panels in China increased sharply from below 1% in the first quarter of 2011 to 32% in the first quarter of 2014, the rate of usage of Korean panels by Chinese TV makers dropped from 40% to 26%.[148]

3) Restrictions on market entry: In order to help prioritize investment in and development of Chinese companies and prevent them from becoming less profitable due to excess duplicate investments, the Chinese government requires that all new investments in large LCD lines that are 8G or higher receive prior approval from the central government. LGD and SDC of Korea made a decision to invest in China in 2009, after much consideration on issues like technology leakage, and struggled to get the approval of the Korean government because it was concerned about deindustrialization.[149] Even after the decision and approval, they had to endure yet another tense period with the delay of final business approval by the Chinese government due to concerns about oversupply that could result from duplicate investments contained in applications by Taiwanese and Japanese companies.

4) Tax benefits: China recognized the LCD panel manufacturing technology as an advanced technology, sharply reduced its corporate tax from 25% to 15%, and enforced a tax exemption policy on the use of domestic facilities.

5) Investment funding for Chinese panel companies: The Chinese government does not provide direct subsidies due to WTO restrictions, but it offers active indirect support such as equity investment in the construction of factories and the provision of low-interest loans. For example, of the total investment of 32.8 billion Chinese yuan

[147] Please refer to Appendix II, 2.

[148] 전병기 (Jeon, Byung-ki), "디스플레이-32. 중국발 투자가 몰려온다" (Display-32. Investment is Coming in from China), 산업 업데이트 (Industry update), *이트레이드 증권* (E-trade Security), August 18, 2014, p. 7.

[149] The Korean government has approved the investment project of SDC and LGD on 24, Dec. 2009 through the 'industry protect committee'.

by BOE in the 8G line in Chongqing, actual investment by BOE was less than 20%, with 40% from bank loans and 33% from the city of Chongqing.[150]

2. Largest market: China has grown into the largest display market in the world and led the revival of the panel industry, surpassing North America in 2011. In particular, rapid growth of the Chinese LCD TV market made the biggest contribution to the global market and was responsible for 29.4% of revenue and 26%[151] of quantity in 2013. In addition, China is the largest TV market and production base in the world, manufacturing half of all color TVs globally with a production of 39.5 million units in 2001 and 141 million in 2014.[152] Furthermore, the Chinese market is one of the only markets showing growth despite the recent slowdown of the global TV market (as of 2015) and has the greatest potential for future growth due to the increasing purchasing power of its large population.[153]

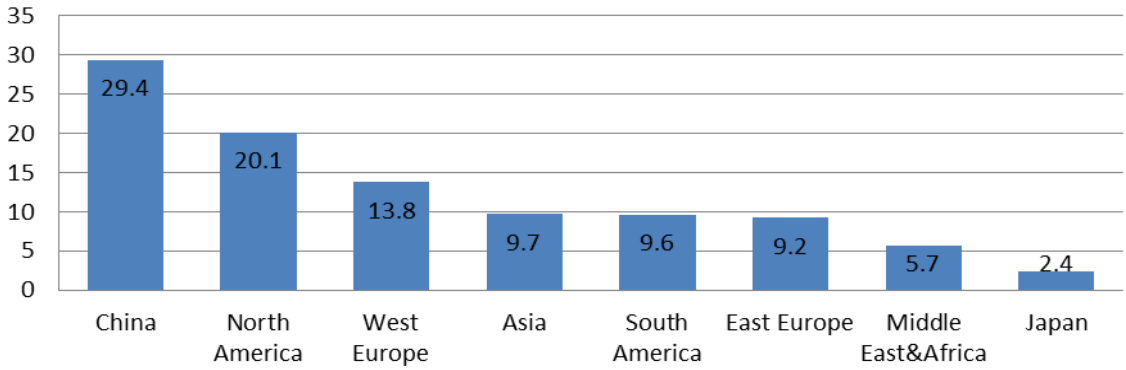

Figure 5-1: Market share of LCD TV sales by region in 2013

Source: DisplaySearch[154]

3. Aggressive investment by panel companies: Based on governmental support and the gigantic domestic market, Chinese panel companies have been active in their investments. Chinese companies have shown vigorous investment activity, and China's importance in terms of facility investments globally increased sharply from

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[150] 전병기 (Jeon, Byung-ki), "디스플레이-32. 중국발 투자가 몰려온다" (Display-32. Investment is Coming in from China), 산업 업데이트 (Industry update), *이트레이드 증권* (E-trade Security), August 18, 2014, p. 9.

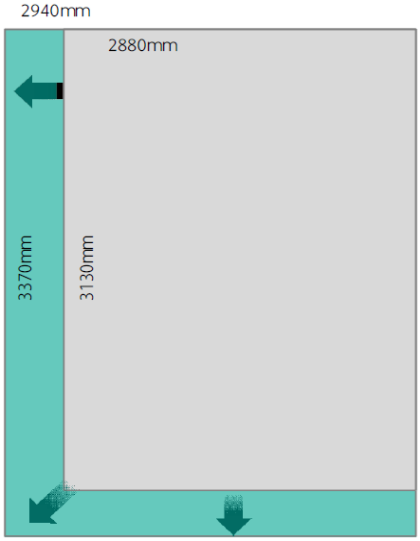
[151] *Ibid.*, p. 8 .

[152] 楊伶雯 (Yang, Ling-wen), "七度率採購團來台 白為民：今年預計採購金額45億美元" (7 Times to Visit Taiwan, Bai, Wei-Min: Expect to Purchase 4.5 billion USD this Year), *鉅亨網* (Ju-Heng-Wang), May 28, 2015.

[153] Please refer to Appendix I, 3.

[154] 박일경 (Park, Il-kyung), "LGD, 광저우 8.5세대 LCD공장 가동…총 투자액 4조" (LGD Operates 8.5G LCD Plant in Guangzhou…Total Investment of 4 billion USD), *세계파이낸스* (Segye Finance), September 3, 2014.

37% in 2011 to 89% in 2014.[155] Among such companies, BOE became the largest Chinese company with the largest number of production lines within ten years of starting mass production of monitor panels through the acquisition of Hydis, a Korean company, in 2003.



Sharp Gen 10 vs. BOE Gen 10.5

	Sharp Gen 10	BOE Gen 10.5	Remarks
X Side (mm)	3130	3370	Before: 3340
Y Side (mm)	2880	2940	
Capacity	72K/M	90K/M	Long term 120K/M
Tech.	VA	IPS	Will produce curved TV
MP Timing	Q3'09	Q3'17	
Technology	a-Si	a-Si oxide	
Economical Panel Cut	32', 40' 60', 70', 80'	42'/43', 65', 74' 61'(21:9) 70'(21:9)	

Economical cut and glass efficiency by size

Panel Size	Economical Cut	Glass Efficiency
42'/43'	18	98%
48'	12	82%
65'	8	96%
75'	6	95%
61'(21:9)	10	93%
70'(21:9)	8	91%

Figure 5-2: Investment details of BOE 10.5G

Source: Hana financial investment[156]

BOE astonished the industry by announcing its investment in a 10.5G production line, surpassing the latest 10G manufacturing by Sharp, and is expected to start mass production in the third quarter of 2017. This is a strategy to become the first mover in the industry through preemptive investment showing glass efficiency of over 90% for large-size panels of 60 inches or larger. Moreover, other Chinese companies like CSOT and Tianma also have plans to expand their investment to the extent that there is a great concern about possible oversupply, as shown in Table 5-1. China's sudden rise is causing significant changes in specialization and competition structures in the LCD industry. The industry had maintained a similar structure for years with Japan producing materials and equipment, Korea and Taiwan producing panels, and China producing modules, each involved in the industry based on their comparative advantages. The Korean LCD panel industry has been carrying out diverse investments in China as a part of its strategy to respond to such changes and continuously enhance competitiveness.

[155] 이홍표 (Lee, Hong-pyo), "급성장한 중국의 LCD, 한국 비책은?" (Rapid Growth of Chinese LCD, What is Korea's Solution?), *한국경제매거진* (Hankook Kyungjea Magazine), July 6, 2015.
[156] 이원식 (Lee, Won-sik), "디스플레이: 악순환의 연속" (Display: Continuation of the Vicious Circle), Equity Research, *하나대투 증권* (Hana Daetoo Securities), October 19, 2015, p. 29.

Table 5-1: Chinese LCD companies' plan for increasing production lines

Manuf.	Factory	Phase	Tech.	Gen.	Application	MP Ramp	1Q15	2Q15	3Q15	4Q15	1Q16	2Q16	3Q16	4Q16
BOE	BOE B7	1	LTPS	6	LCD+AMOLED	Apr-17								
	BOE B8	1	a-Si	8	LCD	May-15		45	90	90	90	90	90	90
		2	a-Si	8	LCD	Jul-15			90	90	90	90	90	90
		3	a-Si	8	LCD	Feb-16					45	90	90	90
		4	a-Si/Oxide	8	LCD	Mar-17								
	BOE B9	1	a-Si	10.5	LCD	Dec-17								
	BOE Ordos B6	1	LTPS	5.5	LCD+AMOLED	Nov-14	48	60	60	60	66	72	72	72
		2	LTPS	5.5	LCD+AMOLED	Apr-17								
	BOE B10	1	a-Si	8	LCD	Apr-17								
	Total						48	105	240	240	291	342	342	342
CSOT	CSOT T2	1	a-Si	8	LCD	Apr-15		60	150	180	180	180	180	180
		2	a-Si/Oxide	8	LCD+AMOLED	May-16						60	90	120
	CSOT T4	1	a-Si/Oxide	8	LCD+AMOLED	Dec-17								
	CSOT LTPS T3	1	LTPS	6	LCD+AMOLED	Sep-16							6	24
		2	LTPS	6	LCD+AMOLED	Jun-17								
	Total							60	150	180	180	240	276	324
CEC Panda	PND Nanjing 1	3	a-Si	6	LCD	Feb-17								
	PND Nanjing G8	1	a-Si/Oxide	8	LCD	Jun-15		60	120	180	180	180	180	180
		2	a-Si/Oxide	8	LCD	Apr-16						30	45	45
		3	a-Si/Oxide	8	LCD	Dec-16								30
	Total							60	120	180	180	210	225	255
Ever Display	Ever Display 1 LTPS	2	LTPS	4	AMOLED	Nov-15				9	18	18	18	18
	Ever Display 2 LTPS	1	LTPS	6	AMOLED	Dec-17								
	Total									9	18	18	18	18
Tianma	TNM 2 LTPS	1	LTPS	6	LCD	Jul-16							15	45
	TNM Wuhan LTPS	1	LTPS	6	LCD+AMOLED	Feb-17								
	Total												15	45
Truly	TLY L4	1	LTPS	4	LCD+AMOLED	Jun-16						30	45	75
	Total											30	45	75
Visionox	VSX Kunshan	1	LTPS	5.5	AMOLED	Sep-15			3	6	12	15	15	15
		2	LTPS	5.5	AMOLED	Oct-16								15
	Total								3	6	12	15	15	30
Total							48	225	513	615	681	855	936	1089

Note: Based on mother glass input (Unit: 1,000 pcs)

Source: Hana Financial Investment[157]

5.2 Korean LCD Industry Strategies for Investment in China

The display industry is a key export industry for Korea, along with the semiconductor and petrochemical industries, which together exceeded 20% of overall exports in 2014. This industry has a high level of dependence (66.8%) on China.[158] In other words, the largest market for the display industry, which is extremely important for the Korean economy, is in China.

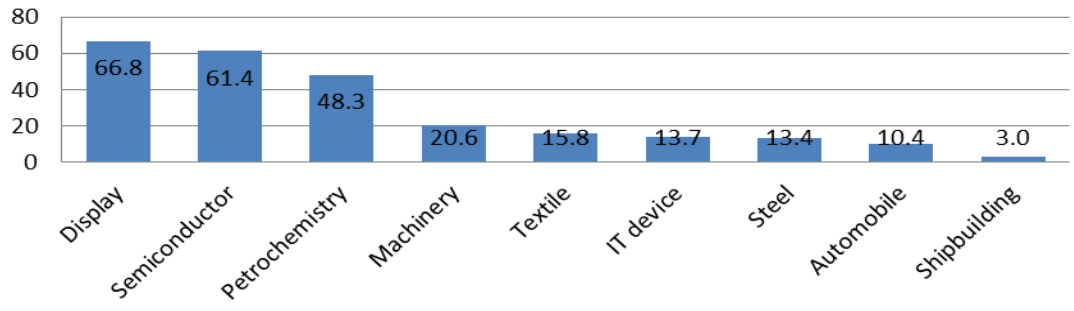


Figure 5-3: Export proportions of major Korean industries to China in 2014 (Unit: %)
Source: KIET[159]

[157] 이원식 (Lee, Won-sik), "디스플레이: 악순환의 연속" (Display: Continuation of the Vicious Circle), Equity Research, *하나대투 증권* (Hana Daetoo Securities), October 19, 2015, p. 20.
[158] 이종혁 (Lee, Jong-huyk), "중국 위협 어느정도길래" (How Strong is Threat of China), *서울경제* (Seoul Kyung-jea), July 15, 2015.
[159] *Ibid.*

Growth of the Chinese LCD industry and market caused an investment dilemma, where the risks of technology leakage had to be weighed against the benefits of investment and prior market occupation for Korean companies. However, Korean companies have shown aggressive investment in China with diverse strategies since the early 2000s in order to turn the threat of China's rise into an opportunity.

5.2.1 LG Display Co., Ltd.

LGD was founded as Gold Star Software in 1985, and its name was changed to LG LCD in 1998, LG Philips LCD in 1999, and LG Display in 2008.[160] LGD is an affiliate of LG Group, which consisted of 61 domestic companies and 289 overseas companies as of December 31, 2014. LG Electronics is the largest shareholder, with a 37.9% share in LGD.[161] In the global LCD market, it has maintained its position as the top company with the biggest market share for 22 consecutive quarters since the fourth quarter of 2009 and had a market share of 23.9% in the first quarter of 2015.[162] LGD is especially competitive in large-size (9.1 inches or larger) panels used in TVs, monitors and laptops with a market share of over 25%.

Table 5-2: Market share of different panel types (2012–2014)

	2014	2013	2012
Panels for Televisions (1)	25.0%	24.7%	25.2%
Panels for Monitors	32.7%	34.0%	32.3%
Panels for Notebook Computers (2)	27.5%	32.3%	32.1%
Panels for Tablet Computers	27.0%	32.0%	40.3%
Total	26.9%	27.8%	28.4%

Note: (1) includes panels for public displays; (2) includes panels for notebooks

Source: DisplaySearch[163]

This is an export-oriented company, ranked first for TV panels in 2015 with a ratio of overseas sales of over 90% in 2014 (see Table 5-3).

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[160] LGD, "2014년 사업보고서 (2014 Annual Business Report)", *DART*, March 27, 2015, p. 3,

[161] *Ibid.*, pp. 5~6, p. 228.

[162] 김지영 (Kim, Ji-young), "LG디스플레이, 광저우·난징·옌타이에 공장…中 LCD 선점" (LGD Sets Up Factories in Guangzhou, Nanjing, and Yantai in Order to Occupy the Market in China), *이투데이* (E-today), July 27, 2015.

[163] Kim, Hee-yeon, "2014 Annual Report of LG Display Co., Ltd.", Report of Foreign Private Issuer Pursuant to Rule 13a-16 under the Securities Exchange Act of 1934, *Securities and Exchange Commission, Washington, D.C.* March 26, 2015, p. 8.

Table 5-3: Busines ratio of LGD in 2014

(Unit: In billions of Won, except percentages)

Business area	Sales type	Items (Market)	Usage	Major trademark	Sales in 2014 (%)
Display	Product/ Service/ Other sales	Display panel (Overseas [1])	Panels for notebook computers, monitors, televisions, smartphones, tablets, etc.	LG Display	23,847 (90.1%)
		Display panel (Korea [1])	Panels for notebook computers, monitors, televisions, smartphones, tablets, etc.	LG Display	2,609 (9.9%)
Total					26,456 (100.0%)

Source: LGD[164]

Major customers of large-size panels, which make up the largest portion of sales, are major global TV makers such as LGE, Sony and Skyworth. LGD has a stable sales structure based on its triangle strategy, with 43.7% of sales going to LGE, its largest shareholder and largest customer as of the first quarter of 2015, 22% to Japanese companies, and 34.2% to Chinese companies.

Table 5-4: LGD large-sized LCD panel supply destinations (1Q15)

Nation	Korea	China	Japan
Customers	LGE	Skyworth, Changhong, Konka, TCL, Hisense, etc.	Sony, Sharp, Panasonic, etc. (presumed)
Quantity (approx.)	18,144,240	9,134,400	14,199,840
Ratio (approx.)	43.7%	22%	34.2%

Source: DisplaySearch[165]

1. Investment Status

LGD has been investing an average of more than one billion USD every year since the early 2000s with an aim to becoming the best display company in the world through enhanced global competitiveness. On average, it invested about 10% and 5% of sales into facilities and R&D, respectively.[166] As shown in Table 5-5, LGD had 32 equity investments including eighteen consolidated subsidiaries globally as of 2014.

[164] *Ibid.*, p. 9

[165] 이슬기 (Lee, Seul-gi), "'22분기 연속 세계 1위', LG디스플레이 비결은 '트라이앵글' 전략" (A Secret of LGD for "The World No. 1 for Consecutive 22 Quarters' is 'Triangle Strategy'"), *헤럴드경제* (Herald Gyung-jae), July 7, 2015.

[166] LGD, "2014년 사업보고서 (2014 Annual Business Report)", *DART*, March 27, 2015, p. 9.

Table 5-5: Status of equity investments (as of Dec. 31, 2014)

Company	Investment Amount		Initial Equity Investment Date	Equity Interest
LG Display America, Inc.	US$	411,000,000	September 24, 1999	100%
LG Display Germany GmbH	EUR	960,000	November 5, 1999	100%
LG Display Japan Co., Ltd.	¥	95,000,000	October 12, 1999	100%
LG Display Taiwan Co., Ltd.	NT$	115,500,000	May 19, 2000	100%
LG Display Nanjing Co., Ltd. (1)	CNY	2,936,759,345	July 15, 2002	100%
LG Display Shanghai Co., Ltd.	CNY	4,138,650	January 16, 2003	100%
LG Display Poland Sp. zo.o.(2)	PLN	511,071,000	September 6, 2005	100%
LG Display Guangzhou Co., Ltd.(3)	CNY	1,654,693,079	August 7, 2006	100%
LG Display Shenzhen Co., Ltd.	CNY	3,775,250	August 28, 2007	100%
LG Display Singapore Pte. Ltd.	SGD	1,400,000	January 12, 2009	100%
L&T Display Technology (Xiamen) Limited	CNY	41,785,824	January 5, 2010	51%
L&T Display Technology (Fujian) Limited	CNY	59,197,026	January 5, 2010	51%
LG Display Yantai Co., Ltd.	CNY	955,915,000	April 19, 2010	100%
LG Display U.S.A. Inc.	US$	10,920,000	December 8, 2011	100%
Nanumnuri Co., Ltd.	₩	800,000,000	March 19, 2012	100%
LG Display (China) Co., Ltd.	CNY	4,254,002,206	December 27, 2012	70%
Unified Innovative Technology, LLC	US$	9,000,000	March 21, 2014	100%
MMT (Money Market Trust)	₩	18,100,000,000	June 11, 2007	100%
Suzhou Raken Technology Co., Ltd.	CNY	637,079,715	October 7, 2008	51%
Paju Electric Glass Co., Ltd.	₩	33,648,000,000	March 25, 2005	40%
TLI Co., Ltd.	₩	14,073,806,250	May 16, 2008	10%
AVACO Co., Ltd.	₩	6,172,728,120	June 9, 2008	16%
New Optics Ltd.	₩	12,199,600,000	July 30, 2008	46%
LIG ADP Co., Ltd.	₩	6,330,000,000	February 24, 2009	13%
Wooree E&L Co., Ltd. (formerly Wooree LED Co., Ltd.)	₩	11,900,000,000	May 22, 2009	21%
Global OLED Technology LLC	US$	45,170,000	December 23, 2009	33%
LB Gemini New Growth Fund No. 16(4)	₩	14,064,704,518	December 7, 2009	31%
Can Yang Investment Ltd.	CNY	93,740,124	January 27, 2010	9%
YAS Co., Ltd.	₩	10,000,000,000	September 16, 2010	19%
Narae Nanotech Corporation	₩	30,000,000,000	April 22, 2011	23%
Avatec Co., Ltd.	₩	10,600,000,000	December 6, 2011	16%
Glonix Co., Ltd.	₩	2,000,000,000	April 10, 2012	20%

Source: LGD[167]

The proportion of investment in China is overwhelmingly high, both in terms of number of cases and amount. This is because the percentage of overall sales to China is 56%.

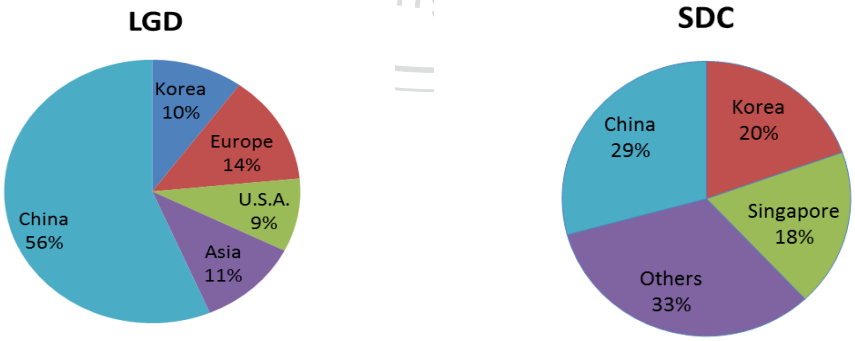

Figure 5-4: SDC and LGD revenue by region in 2013
Source: E-trade security[168]

[167] Kim, Hee-yeon, "2014 Annual Report of LG Display Co., Ltd.", Report of Foreign Private Issuer Pursuant to Rule 13a-16 under the Securities Exchange Act of 1934, *Securities and Exchange Commission, Washington, D.C.* March 26, 2015, p. 24.

[168] 전병기 (Jeon, Byung-ki), "디스플레이-30. 시진핑 방한과 패널 관세" (Display: Xi, Jinping's

As China emerged as the largest market in the world and the most important in terms of display sales, LGD has undertaken many diverse investments for market occupation and increased competitive advantage as shown in Table 5-6.

Table 5-6: Summary of LGD investment in China

Year Established		Company	Share (%)	Type	Main Activities	Remark	Items
1	2002	LG Display Nanjing	100	GF	Manufacturing & sales	Module	Tablet, NB,PC
2	2003	LG Display Shanghai	100	GF	Sales	Sales	N/A
3	2006	LG Display Guangzhou	100	GF	Manufacturing & sales	Module	TV, MNT
4	2007	LG Display Shenzhen	100	GF	Sales	Sales	N/A
5	2008	Suzhou Raken Technology	51	JV	Manufacturing & sales	Module & TV	N/A
6	2010	L&T Display Technology (Xiamen)	51	JV	Manufacturing	Module	TV, MNT
7	2010	L&T Display Technology (Fujian)	51	JV	Manufacturing	Module	TV, MNT
8	2010	LG Display Yantai	100	GF	Manufacturing & sales	Module	Mobile
9	2012	LG Display China	70	JV	Manufacturing & sales	Fab	TV

Note: GF: Greenfield; JV: Joint Venture

Source: LGD[169]

In particular, LGD has made the following important investments:

1. After establishing LG Display Nanjing, the first factory of the Korean LCD industry manufacturing TFT-LCD modules (a back-end process) in Nanjing, China, and starting mass production of 3.6 million modules per year, LGD expanded its production line to one million modules per month in 2004 to capture the trend of global PC companies that reinforced local production in China. The aim was to reinforce customer support including timely delivery and quick after-sales service or

Visit and Panel Tariffs), Issue comment, *이트레이드 증권* (E-trade Security), July 9, 2014, p. 2.

[169] LGD, "2014년 사업보고서 (2014 Annual Business Report)", *DART*, March 27, 2015, pp. 47, 238, and homepage http://www.lgdisplay.com/kor/company/locationGlobal?placeLocCode=OVE01

support through localized manufacturing and supply of TFT-LCDs.[170] Specifically, three Nanjing module factories from N1 to N3 received TFT-LCD panels manufactured in Korea. Focusing on laptops and monitors, they manufacture modules locally and sell products to major global IT companies that have established themselves in China, such as LG Electronics, HP, Dell, Asustek, and BenQ.[171]

2. LGD established LG Display Shanghai in 2003 as a sales corporation intended to secure a sales network and enhance the efficiency of customer service.

3. LG Display Guangzhou, the second module factory in China, was established in 2006 for the purpose of manufacturing and selling TFT-LCD products as a part of its efforts to create a global production system. This accelerated penetration of the Chinese market has shown rapid growth and great potential.[172]

4. LG Display Shenzhen, a sales company, was established in 2007 to increase the efficiency of interaction with major set companies, such as Skyworth, located in or near Guangdong Province.

5. Suzhou Raken Technology, a joint venture company with AmTRAN Technology of Taiwan, the leading company in the North American LCD TV market, was established to manufacture LCD modules and OEM-type LCD TVs and to secure stable long-term panel dealers and customers.[173]

6–7. LGD signed a joint investment contract with Top Victory Investment Limited of Hong Kong in 2010 for the purpose of manufacturing LCD modules, LCD TVs, and monitor sets, and established L&T Display Technology (Xiamen) Limited and L&T Display Technology (Fujian) Limited in Xiamen and Fujian, China.[174]

8. In April 2010, LGD took over the small and medium module lines of nine inches or smaller in Yentai, China, owned by LG Innotek, an affiliate of LG, as an active response to the rapidly growing smartphone and tablet markets of China.[175]

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[170] 김승수 (Kim, Seung-soo), "광저우 8.5세대 LCD 공장, 중국 TV 패널시장 공략 앞장" (Guangzhou 8.5G LCD Factory will Lead in Penetrating TV Panel Market in China), *중앙일보* (Joong-ang Il-bo), November 27, 2014.

[171] 임윤규 (Lim, Yun-gyu), "LPL 난징 모듈공장 4년만에 누적생산 1억대" (Cumulative Production of LPL Nanjing Module Factory Hits 100 Million Units in Four Years), *디지털타임스* (Digital Times), 2007.12.19.

[172] 김승수 (Kim, Seung-soo), "광저우 8.5세대 LCD 공장, 중국 TV 패널시장 공략 앞장" (Guangzhou 8.5G LCD Factory will Lead in Penetrating TV Panel Market in China), *중앙일보* (Joong-ang Il-bo), November 27, 2014.

[173] LGD, "2012년 3분기 사업보고서 (2012 Q3 Business Report)", *DART*, November 13, 2012, p. 14.

[174] *Ibid.*

[175] 김지영 (Kim, Ji-young), "LG디스플레이, 광저우·난징·옌타이에 공장…中 LCD 선점"

9. In 2014, LGD established a joint company called LG Display China (8.5G, 2,200mm*2,500mm)[176] in Guangzhou, China with Guangzhou GET Technologies Development Co., Ltd. and Shenzhen Skyworth-RGB Electronics Co., Ltd., a major customer of LGD and one of the largest TV makers in China. The investment ratio among the three companies was 7:2:1 and was done in order for LGD to successfully penetrate the Chinese market, which surpassed North America to become the world's largest market in 2011. After its establishment near LG Display Guangzhou,[177] which was the existing back-end process line, the Guangzhou LGD cluster was formed on a site of about 330,000m^2 and gross floor area of about 120,000m^2—about the area of twenty soccer fields. This gigantic cluster covered a total land area of about 2,000,000m^2 and included the existing module factory, dormitories and complex of partners.[178] LG Display China focuses on manufacturing LCD panels for mid-to-large-size TVs such as 55·49·42 inches with premium UHD and FHD resolutions. Major target clients are Chinese subsidiaries of LGE and Chinese TV makers including Skyworth, Konka, Changhong and Hisense.[179] Starting with a manufacturing of 60,000 sheets per month (based on the input of mother glass), LGD plans to boost its production to the maximum capacity of 120,000 sheets per month by the end of 2016.[180]

(LGD Sets Up Factories in Guangzhou, Nanjing, and Yantai in Order to Occupy the Market in China), *이투데이* (E-today), July 27, 2015.

[176] Add.: No. 88, Kaida Road, Science City of Guangzhou, High-Tech Industrial Development Zone, China.

[177] Add.: No. 59, Kaitai Road, Science City of Guangzhou High-tech Industrial Development Zone, China.

[178] 김지영 (Kim, Ji-young), "LG디스플레이, 광저우·난징·옌타이에 공장…中 LCD 선점" (LGD Sets the Factories in Guangzhou, Nanjing, and Yantai…in Order to Preoccupy the Market in China), *이투데이* (E-today), July 27, 2015.

[179] *Ibid.*

[180] 박일경 (Park, Il-kyung), "LGD, 광저우 8.5세대 LCD공장 가동…총 투자액 4조" (LGD Operates 8.5G LCD Plant in Guangzhou…Total Investment of 4 billion USD), *세계파이낸스* (Segye Finance), September 3, 2014.

Table 5-7: SDC and LGD operations and plans for LCD fab line in China

	SDC	LGD
Operating date	Oct. 2013	Jul. 2014
1st phase (pcs)	17,000 / month	60,000 / month
2nd phase (pcs)	48,000 / month (Q4, 2014)	30,000 / month (Q1, 2015)
3rd phase (pcs)	65,000 / month (target for end of 2015)	planned to invest in 2015
TTL purpose capacity	130,000 / month	120,000 / month

Source: E-t news[181]

2. Analysis of Investment Strategy

LGD has been making the most active and largest foreign investments in China, and its key strategy lies in localization through the creation of a batch production system. The localization strategy was completed by focusing on investment in back-end process (module) lines, which are highly dependent on labor, in the early stage of investment and shifting to investment and expansion in front-end process (fab) lines, which require a relatively large amount of investment for the equipment. This is the result of an overall cost leadership strategy, which accounts for the shift of investment purpose in China. Until the mid-2000s, it served as a production base for export to third countries, but the investment later shifted to focus on the domestic market, which was supported by the Chinese government, and the synergy of reduced labor costs and the batch production system. The reason for the concentrated investment in the Guangzhou region with the batch production system is that relevant upstream industries like glass substrate companies are clustered nearby and Guangzhou is geographically close to major customers (i.e., the downstream industry) in Guangdong Province, including Skyworth (Shenzhen). This strategic investment

[181] 성현희 (Sung, Hyun-hee), "삼성·LGD, 중국 LCD 공장 내년부터 `최대` 생산능력 가동" (SDC and LGD will Operate LCD Factory in China at 'Full' Capacity from Next Year), *전자신문* (E-t News), June 7, 2015.

seeks to achieve intangible cluster effects, including devising a flexible production strategy based on quick acquisitions of the latest market trends or information and providing differentiated services such as sales efficiency through quick customer servi ce. In addition, the investment focuses on tangible effects like the reduction of logistics and packing expenses.[182] In fact, LGD focused on highly profitable 50–60-inch TV panels in early 2015. However, as demand for 32-inch TV panels unexpectedly increased, it maximized its profit by responding promptly to market demand through a fab mix strategy.[183] Lastly, the types of investment are being diversified from wholly owned investment in the early and mid-2000s to joint investment with Chinese or Taiwanese companies, including customers, or local partners (i.e., local government). This is to reduce the burden of investment, secure stable clients and create synergistic effects through customer participation.

5.2.2 Samsung Display Co., Ltd

SDC was split off from the LCD Division of Samsung Electronics in April 2012 in order to secure expertise and reinforce competitiveness in the display industry. This is the world's best display company, both in name and reality, formed by the acquisition of Samsung Mobile Display, the number one company for small and medium OLEDs, and S-LCD in July of the same year.[184] In addition, it is an affiliate of Samsung Group, which consisted of 69 domestic companies including Samsung Electronics as of December 31, 2014.[185] Ever since it took over the throne of the small- and medium-size display market from Sharp in the fourth quarter of 2009, SDC played a significant role in the development of the Korean LCD industry by maintaining its status as the leading global display company for twenty consecutive quarters until the third quarter of 2014.[186]

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[182] Please refer to Appendix I, 2.

[183] 최종희, (Choi, Jong-hee) "실적 '잭팟' LGD 비결은 '꽵 믹스'… "8세대 대형 라인서 '중소형' 뽑아내"" (The Secret to 'Jackpot' LGD is in 'Fab Mix'…"Producing 'Small and Medium' Models in 8G Line"), *뉴데일리경제* (Newdaily Kyung-jae), April 23, 2015.

[184] SDC, "2012년 사업보고서" (2012 Annual Business Report), *DART*, April 1, 2013, p. 59.

[185] SDC, "2014년 사업보고서" (2014 Annual Business Report), *DART*, March 31, 2015, pp. 6, 238.

[186] 박대한 (Park, Dae-han), "'중소형 패널 왕좌 넘보지마' 삼성디스플레이 1위 탈환" ('Holding the Throne of Small and Medium Sized Panels'– SDC Reclaims the No. 1 Spot), *연합뉴스* (Yonhap News), June 17, 2015.

Table 5-8: SDC's market share for displays

Year	2014	2013	2012
Small and medium	20.5%	26.8%	23.6%
Large	20.9%	20.4%	25.4%
Total	20.7%	22.7%	24.9%

Source: DisplaySearch[187]

As of 2014, major customers included Samsung Electronics (60%), the parent company and largest shareholder with a share of 84.78%, and global companies like Apple (8%) and Sony (3%).[188]

Table 5-9: Major customers' proportion of SDC revenue in 2014

	Samsung	Apple	Sony
Proportion	60%	8%	3%

Source: SDC[189]

SDC is an export-oriented company with sales of about 25 billion USD in 2014 and an export ratio of about 91% (23 billion USD).[190] It relies heavily on China, showing a 29% ratio of sales to China (see Figure 5-4), which is the largest sales ratio for a single market.

1. Investment in China

SDC has shown large-scale investment of over one billion USD every year on average for about the past ten years, starting as the LCD Division of Samsung Electronics, in order to achieve the top rank in the world. SDC has been especially devoted to investment in China. The proportion of its foreign investment in China is so high that four of its six overseas business sites with production facilities (the exceptions being Samsung Display Vietnam and Samsung Display Slovakia) and five out of 16 global networks (Shanghai, Qingdao, Chongqing, Shenzhen and Beijing) in nine countries

[187] SDC, "2014년 사업보고서" (2014 Annual Business Report), *DART*, March 31, 2015, p. 12.
[188] *Ibid*, p. 40.
[189] *Ibid*, p. 16.
[190] *Ibid.*

are located in China.[191]

SDC was also responsible for a large portion of module production by focusing its investment since the early 2000s on back-end process lines in the Dongguan, Suzhou and Tianjin regions. SDC invested about three billion USD in Suzhou, China, in 2011 to establish Samsung Suzhou LCD (SSL), an 8.5G panel front-end process (fab) factory. SSL is a joint venture owned by SDC with a 60% share, Suzhou Industrial Park (SIP) with 30%, and TCL—an important major customer and strong Chinese LCD TV maker—with 10%.[192] SSL, constructed on a site of 562,000m^2 in Suzhou Industrial Park along with the existing back-end process module factory called SDSZ, started its operation on a scale of 17,000 sheets per month upon completion of the 8G lines (2,200 x 2,500 mm) in October 2013. Its production capacity was increased by 48,000 sheets per month in 2014. Once additional expansion is completed in 2015, SSL will have a total production capacity of 130,000 sheets (see Table 5-7).[193] Meanwhile, SDC invested a share of 14.49% in CSOT, an affiliate of TCL and competitor of SDC, in September 2011 to implement a strategy for diversification of panel supply and demand. This strategic alliance involves cross-supply/purchase of 40-inch products from Samsung Electronics and 32-inch products from CSOT.[194]

191 Refer to SDC homepage, http://www.samsungdisplay.com/kor/intro/loc_country.jsp

192 성기명 (Sung, Ki-myung), "삼성 中 LCD 공장 2013년 초 양산…中 TCL 지분투자" (Samsung will Operate LCD factory in China from early 2013…Investing Shares to TCL in China), *노컷뉴스* (Nocut News), April 21, 2011.

193 성현희 (Sung, Hyun-hee), "삼성·LGD, 중국 LCD 공장 내년부터 `최대` 생산능력 가동" (SDC and LGD will Operate LCD Factory in China at 'Full' Capacity from Next Year), *전자신문* (Et News), June 7, 2015.

194박성호 (Park, Sung-ho), "장원기 사장 '中 LCD공장 손익분기점 1년 후 가능'" (C.E.O. Jang, Won-gi Says 'LCD Factory in China will Possibly Break Even Next Year), *아시아경제* (Asia Kyung-jea), May 30, 2011.

Table 5-10: Summary of SDC's FDI in China (Unit: billion Won)

Date Established[195]	Company Name	Share[196]	AMT[197]	Purpose	Remarks
2001.11	Samsung Display Dongguan (SDDG)[198]	100%	358	Display manufacturing	Back-end process (module line)[199]
2002.09	Samsung Display Suzhou (SDSZ)[200]	100%	313	Display manufacturing	Back-end process (module line)
2004.06	Samsung Display Tianjin (SDTJ)[201]	95%	184	Display manufacturing	Back-end process (module line)
2011.07	Samsung Suzhou LCD (SSL)	60%	649	Display manufacturing	Front-end process (Fab)
2011.09	CSOT[202]	14%	278	Strengthening partnership	Strategic alliance

Source: SDC[203]

2. Analysis of SDC Investment Strategy in China

SDC's most important investment strategy in China is localization and the creation of a batch production system by shifting from the back-end process investment focus of the early and mid-2000s to front-end processes in the early 2010s. SSL is a front-end process (fab) factory that mainly manufactures premium LCD panels like 48-inch and 55-inch UHDs. This is a strategic investment intended to create a synergistic effect through the completion of a local production system with SDSZ, a module factory established in 2002.[204] In the past, SDSZ received panels from Korea and supplied

[195] Actual established date before split from Samsung Electronics (Based on Annual Report of Samsung Electronics in 2011).

[196] SDC, "2014년 사업보고서" (2014 Annual Business Report), *DART*, March 31, 2015, p. 257

[197] *Ibid.*

[198] The original name was Dongguan Samsung Mobile Display Co., Ltd.

[199] 고종민 (Ko, Jong-min), "이정찬 삼성모바일디스플레이 중국 동관 법인장" (Lee, Jung-chan, who is the president of Samsung Mobile Display Dongguan Corporation), *이투데이* (E-today), June 15, 2011.

[200] The original name was Samsung Electronics Suzhou LCD Co., Ltd.

[201] The original name was Tianjin Samsung Mobile Display Co., Ltd.

[202] 박성호 (Park, Sung-ho), "장원기 사장 '中 LCD공장 손익분기점 1년 후 가능'" (C.E.O. Jang, Won-gi Says 'LCD Factory in China will Possibly Break Even Next Year), *아시아경제* (Asia Kyung-jea), May 30, 2011.

[203] SDC, "2014년 사업보고서" (2014 Annual Business Report), *DART*, March 31, 2015, pp. 41, 257, and Samsung Electronics, "2012년도 사업보고서" (2012 Annual Business Report), *DART*, April 1, 2013, pp. 12-13.

[204] 송기용 (Song, Ki-yong), "삼성 쑤저우 LCD 공장 완공 '中 시장 1위 지속'" (SDC Suzhou

products to customers after assembling them as modules, but now it can directly receive panels from SSL, enhancing cost competitiveness with the elimination of the 5% import tariff and reduced logistical expenses. In addition, material, component and equipment companies in the upstream industries, which are important for the local production system, have formed an 'LCD industry cluster' in Suzhou Industrial Park and nearby areas. This investment aims to take advantage of the cluster effect with TCL, a major customer, located near Suzhou. It has allowed SDC to respond flexibly to the demands of clients for different ratios of 'open cells' and 'modules' in panels manufactured by SSL.[205] Lastly, SDC's investment types have diversified, mainly from wholly owned investment in the early 2000s to strategic alliances including joint ventures with major customers and even with competitors (which are affiliates of major customers at the same time).

5.3 Analysis of the Korean LCD Panel Industry's Strategies in China

The Korean LCD panel industry has led the global market for the past ten years and grown to play a key role in the Korean economy. Korean companies in the industry have used diverse and active investment strategies in China in order to pursue consistent growth and reinforce competitiveness. In particular, the following strategic characteristics and changes were seen in response to various changes at home and abroad, such as the emergence of China as the world's largest display market and largest potential competitor around 2010.

5.3.1 Strategic Characteristics

1. Investment features

1) High ratio of investment in China: China made up an overwhelmingly large ratio of total foreign investment. The investment was concentrated on sales and production corporations in China, which occupied the biggest revenue ratio.

2) Creation of batch production system (localization strategy): Aiming for synergy and localization, the batch production system was completed by shifting the focus of investment from back-end process (module) lines with relatively high labor costs in the early 2000s to front-end process lines with a heavy emphasis on automation

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Factory Completed, 'No. 1 in Chinese Market'), *머니투데이* (Money Today), October 25, 2013.

[205] 서영진 (Seo, Young-jin), " 삼성디스플레이, 중 TV시장 본격공략" (SDC Fully Started to Penetrate TV Market in China), *디지털타임스* (Digital Times). October 27, 2013.

facilities in the 2010s.

3) Enlargement of investment scale: The scale of investment was increased with the shift of investment from back-end process lines with relatively higher labor costs to front-end process lines with relatively higher proportions of investment in automation facilities.

4) Investment in up-to-date facilities optimized for market demand (differentiation strategy): When investing in front-end processes (fab), which are critical because they involve core technology and knowledge and therefore have related leakage risks, a differentiation strategy was implemented. This was done by investing in 8.5G facilities (the most advanced for Korean companies at that time) optimized for 30–40-inch or UHD panels and, at the same time, make up a large proportion of the Chinese market (which has the highest demand in the market) in order to enhance competitive advantage.

2. Investment Regions

1) Creation of a batch production system and LCD industry cluster near the major client: The strategy was to achieve the cluster effect by forming LCD clusters with major customers (downstream industries) and group affiliates and partners of the upstream industries in nearby regions. The batch production system was created for front-end and back-end processes to increase LCD panel production efficiency and create synergistic effects based on the timely supply of core materials, equipment and components necessary for production, as well as quick customer service. Furthermore, in addition to tangible cost effects such as a reduction in logistics and packing expenses, intangible effects like shortened delivery and lead times and flexible production plans based on the fast acquisition of new information (e.g., regarding the demands of or changes in customers/markets) were taken into account. This strategic investment aimed to accomplish tangible and intangible effects including various cluster effects, synergy of front-end and back-end processes, cost reduction, increased production efficiency, and improved customer response (close sales and service).[206]

3. Purpose of Investment

1) Shift of focus from labor expenses to the domestic market in China: Although investment in labor-intensive back-end process (module) lines in the early 2000s also considered the potential of the Chinese domestic market, the relative importance of

[206] See Appendix I, 1.

reducing labor costs was higher. However, as the Chinese LCD market demand grew rapidly beginning in the late 2000s and China surpassed North America to become the world's largest display market in 2011, the batch production system was completed by investing in front-end process lines near the existing back-end process factories, targeting the Chinese domestic market through additional expansion.

2) Synergistic and cluster effects: Synergistic effects were produced by the creation of the batch production system for front-end and back-end processes, and cluster effects were achieved through the formation of clusters incorporating both the downstream and upstream industries.

3) Shift of major target customers from global IT companies to Chinese companies: The major target customers of investment in module lines in the early 2000s were global IT companies (including group affiliates) that had a production base in China for export. Whereas China was a production base that produced half of all TV products in the world, sales within the domestic market were low, and there were few local set companies. However, the situation changed entirely when China surpassed North America in 2011 to become the largest market in the world with the rapid growth of the LCD TV market, the largest market for LCD panels. In particular, as Chinese brands showed strength in the growing domestic market, the proportion of major recipients of Korean LCD industry investment in China has been shifting gradually from global set companies to local Chinese set companies. This is the result of China serving as a large production base, though not as large as in the past, and its growing domestic market.

4) Response to Chinese government policies: The overall cost leadership strategy was strengthened by responding to the preference of Chinese set companies for products made in China in order to increase the target self-sufficiency rate set by the Chinese government, avoid tariffs increased to protect the domestic LCD industry, create synergistic (i.e., production efficiency enhancing) effects with the batch production system in the most important markets with highest sales ratios and potential, reduce logistics and packing expenses, receive corporate tax benefits (15%), and achieve various benefits such as tax exemption on the use of Chinese facilities.

4. Investment types

Investment types have diversified gradually from an orientation towards wholly owned investment in the early and mid-2000s to strategic alliances such as joint

ventures with customers or local partners including the local government (i.e., industrial parks). This strategic investment aims to collaborate with customers or local partners to promote stable management, diversification of risks, and secure stable dealers according to the increased amount of investment. In particular, it accounts for the positions (high market share) and locations (quick response) of major customers in the rapidly growing Chinese TV market.

5.3.2 Analysis of Corporate and Business Strategy Levels

1. Corporate strategy

Faced with essentially unlimited, borderless competition in the global era, the Korean LCD panel industry invested aggressively in China to increase its competitive advantage as a part of a global diversification strategy. This investment has aimed to create synergistic effects through a high ratio of investment in China (in terms of overall FDI), focus on the production and marketing base for LCD panels, joint advancement with affiliates or partners of the upstream industry based on a group-wide vertical integration strategy, intimate cooperation with local partners including customers and local governments, and creation of the batch production system (front- and back-end processes) and industrial clusters (upstream and downstream industries).

2. Business strategy:

1) Overall Cost Leadership: The local batch production system (localization) was completed by shifting the focus of investment from back-end process lines in the early and mid 2000s, which required relatively higher labor expenses, to front-end process lines since the end of the 2000s, which were more oriented towards automation facilities. The aim was to achieve a cost advantage through the synergy of front-end and back-end processes, economies of scale, accumulation of experience (additional expansion), reduction of inland and international transportation costs, industrial cluster effects, and reduced packing expenses. Clusters inclusive of downstream and upstream industries were formed by concentrating investment in places that were geographically close to customers, enhancing production efficiency through the reduction of visible expenses from logistics and packing, shortening of delivery distances, effective customer service (e.g., minimizing defect issues through quicker response times), quick grasping of the latest market trends, and efficient inventory management based on effective production strategies (i.e., mixing products). Lastly,

the overall cost leadership strategy aims to avoid tariffs, benefit from Chinese government policies, such as reduced corporate taxes or tax exemptions on facilities to promote localization, and invest in places with the largest markets.

2) Differentiation Strategy: Differentiated products were provided including larger sizes and those with premium functions by investing in the 8.5G front-end process lines (the most advanced facilities at the time for Korean companies). These lines were a key component of the batch production system and optimized for 30–40-inch and UHD panels and also matched the largest demand in the Chinese TV market at that time. In addition to the differentiation of products, this investment strategy aimed to provide differentiated services such as shortened lead times or delivery with quick, flexible responses to major customers. Lastly, as affiliates of Samsung Electronics and LG Electronics, which are the top two players in the LCD TV market, the biggest market for LCD panels, LGD and SDC differentiated themselves from other companies through their brand strategies and high brand power because of the reputation they had built up as leading players in the display industry.

3) Focus Strategy: When local Chinese set companies started to gain ground in the rapidly growing domestic market, the target customers for the Korean LCD panel industry shifted gradually from global set companies with production bases in China in the early 2000s to local set companies in China. They especially focused on Chinese customers through strategic alliances with TV set companies, the largest customers in China. Secondly, as Chinese clients have increased in importance since the beginning of the 2010s, investment has been more focused on front-end process lines (fab) and increasing capacity extensions from back-end process (module) lines in order to capitalize on their preference for open-cell (half-finished) goods.

Chapter 6: Conclusion

6.1 Korean Businesses' Strategies for Investment in China

Outward FDI by Korean businesses has quickly grown as a part of their global strategies to enhance their competitive advantages in the era of globalization. As of the end of 2013, the investment has mainly focused on the manufacturing industry to penetrate the local market in the Asian region (i.e., the shift of investment purpose from export facilitation and use of low wages in the 1990s to local market entry and resource development in the 2000s). The rapid growth of investment in China played a decisive role in Asia becoming the largest investment target for Korea, surpassing North America in the 1990s.

Full-scale investment by Korea in China started after Korea–China diplomatic relations were established in 1992, and it rapidly grew in 2001 when China joined as a member of the WTO. As of 2014, China has become Korea's largest FDI target by an overwhelming margin, showing cumulative ratios of 40% of cases and 18% in terms of amount. Key characteristics of Korean companies' investment strategies include (1) falling or stagnating investment amounts, cases and ratios since around 2008 due to diverse domestic and foreign effects, such as the global financial crisis, shift of Chinese policy to selective investment attraction for qualitative growth, contraction of benefits like the export tax rebate, and increase in investment costs because of the appreciation of the CNY; (2) increasing investment amounts by large enterprises; (3) high ratios of investment amount by large enterprises and high ratios of investment cases by small and medium-sized enterprises; (4) a trend of increasing scale of investments in terms of investment amount per case (especially with large enterprises); (5) a shift in investment purpose from the use of low wages and export facilitation to domestic market entry, especially for large enterprises since 2007; (6) expansion of investment regions from a few northeastern regions geographically close to Korea to other regions including the Yangtze River Delta since the 2000s, and (7) the increased scale of investment in the manufacturing industry and increased investment in non-manufacturing industries (diversification of business types). As the Chinese economy has transformed from a 'global factory' into a 'global market' by shifting from quantitative growth based on inward FDI to qualitative growth, Korean

companies' strategies for investment in China have also expanded from "made in China" to also include "made for China."

6.2 Korean LCD Industry Strategies for Investment in China

The Korean LCD panel industry has grown into a global leader and major industry of the Korean economy over the past 15 years through its preemptive, aggressive investment and its development of innovative products. This was helped by their diverse strategies for aggressive investment in China that were implemented since the early 2000s as the companies faced unlimited competition in the global era. The rise of the Chinese LCD industry since the mid-2000s was spurred by the rapid growth of the domestic market and Chinese government support policies. This presented a great threat to Korea's position as industry leader and changed the international division of labor, which used to involve Korea and Taiwan producing panels, China producing modules, and Japan producing components, materials and equipment based on each country's comparative advantage. Consequently, the Korean LCD panel industry has implemented more diverse and aggressive investment strategies, including more focus on investing in front-end processes, despite the risk of technology leakage, instead of back-end processes, which was common in the early-mid 2000s in order to enhance the companies' competitive advantage in the market.

Investment characteristics included a high ratio of investment in China, creation of the local batch production system (localization), enlargement of investment scale, investment in up-to-date facilities that were optimized for market trends, and the formation of LCD industry clusters in places near major customers. In addition, due to the effects of the increased target self-sufficiency rate, increased tariffs and corporate tax benefits implemented by the Chinese government, the major purpose of investment has shifted gradually from reducing labor expenses in the early 2000s to forming strategic alliances in order to penetrate the domestic market. The major clients shifted from targeting the production bases of global IT companies in China to local set companies in China. Investment types also diversified gradually from wholly owned investment to strategic alliances such as joint ventures with local partners including customers.

Table 6-1: Changes in the Korean LCD industry strategies for investment in China

	Early and mid-2000s	Since the late 2000s	Remark
Focus	Back-end processes (modules)	Front-end processes (fab)	Creation of batch production system and investment enlargement
Region	Industrial districts near customers	Nearby existing back-end process factories closer to the major customers	Completion of the local batch production system (back-end processes and front-end process) and LCD industry cluster including upstream, midstream and downstream industries
Purpose	Reducing labor expenses (made in China)	Selling to the domestic market (made for China), changes in policies related to China	From reducing production costs mainly from labor expenses to overall cost leadership by avoiding tariffs and promoting synergistic and cluster effects
Target clients	Production base of global set companies in China	Local set companies in China	Change of major clients (increasingly oriented towards Chinese clients)
Type	Wholly owned	Diversified (Strategic alliances)	Diversification including joint ventures with partners (e.g., major customers)

Source: Author

In terms of corporate strategy, Korean LCD panel industry investment in China first focused on LCD panel production and sales bases in China, which became the largest customer and competitor, as a part of global and diversification strategies. In terms of business strategy, this investment strategy has aimed to achieve the cluster effects with the downstream and upstream industries based on the synergy of the local batch production system, joint advancement with affiliates and partners in upstream industries based on a group-wide vertical integration strategy, and cooperation with local partners (i.e., local governments) and customers (i.e., downstream industries). More concretely, the production system based on the Korean industry's localization strategy was completed by shifting the focus of investment from back-end process (module) lines in the early and mid-2000s, which had a relatively higher ratio of labor expenses, to front-end process lines (fab) since the late 2010s. The overall cost leadership strategy was beneficial because it resulted in synergistic effects from the batch production system, economies of scale, tariff avoidance, reduced logistics and

packing expenses, corporate tax benefits, increased production efficiency, quick customer service, and enhanced sales and production efficiency through flexible inventory management. Second, a differentiation strategy was implemented by providing differentiated (premium) products through investment in 8.5G lines (the most advanced facilities at the time for Korean companies) that were optimized for customer needs (UHD or 30–40-inch panels) and differentiated services with close sales and efficient customer service. Lastly, a focus strategy was implemented in the early 2000s to shift the target clients from global IT companies with production bases in China to local TV companies, such as Skyworth and TCL, that were emerging as leaders in the biggest market for the Korean LCD industry. The focus strategy was further solidified through strategic alliances such as joint ventures with major customers in the largest market. In addition, as Chinese clients increased in importance, investment has focused on the front-end process (fab) lines including increasing capacity extension from back-end process (module) lines in order to capture the trend of their preference for open cells (half-finished goods) since the 2010s. In summary, the Korean LCD industry strategy for investment in China involved localization through establishment of the batch production system closer to the major customers in the biggest market, which has also enabled companies to provide differentiated products and services (i.e., differentiation strategy) based on the optimization of production management and the improvement of cost structures (i.e., overall cost leadership strategy) in order to focus more efficiently on target customers (i.e., focus strategy) and shifting from “made in China” (global IT set companies in China) to “made for China” (Chinese set companies).

Lastly, key characteristics of Korean companies’ strategies for investment in China, also shown in this case study of the Korean LCD panel industry, include (1) increased investment amounts within large enterprises, (2) a trend of increasing scale of investment in terms of amount per case (especially with large enterprises), (3) a shift in the purpose from the use of low wages and export facilitation to domestic market entry (especially with large enterprises), and (4) increased scale of investment in the manufacturing industry.

6.3 Forecast

6.3.1. Korean companies' investment in China

The quantitative growth in Korean companies' investment in China seems to be slowing down due to multiple domestic and international factors, including the decreased attractiveness of cost reduction from utilizing abundant labor with lower wages, increased burden resulting from the risky exchange rate, increasingly negative investment sentiment because of the slowdown of global and Chinese economies, the rise of alternative regions for investment (e.g., Vietnam), and the waiting period for the FTA between Korea and China to take effect. However, there will be increasing investment aiming to expand the domestic market by improving the consumption structure in China (leading to increased purchasing power) and implementing a reflation policy. Since 2013, the service industry has accounted for over 50% of China's GDP, and with the ratio of private consumption exceeding 60% in 2014 (higher than Korea's ratio of 50.9%), China is no longer a country centered on the manufacturing industry. Therefore, as the Chinese government's investment attraction policy and direction are focused on the fields of technology, advanced manufacturing, energy efficiency, the service industry, and environmental friendly energy, related investments are expected to increase.

6.3.2. Global LCD panel industry and market

Whereas the capacity of Chinese companies has been increasing since 2015 with their aggressive investment and operation of new lines, the recent downturn in panel prices is gradually deepening due to the oversupply (i.e., imbalance of supply and demand) caused by the slow growth of global TV and mobile phone markets. A strong dollar and the weak currencies of developing nations have been intensifying the downturn in panel prices lately. Since panels are transacted in dollars and TVs are transacted in local currencies, the weak currencies of developing nations like Brazil are a burden for TV makers, leading to greater pressure that lowers panel prices, which account for the biggest part of production costs. As TV makers are experiencing increased production costs because of increased part (e.g., panel) prices caused by the strong dollar, their profitability is also worsening because of the decreasing value of local currencies.

Table 6-2: Monthly price trend of LCD panels (Unit: USD)

Application	Size	Type	Format	Resolution	BLU	14.11	14.12	15.01	15.02	15.03	15.04	15.05	15.06	15.07	15.08	15.09	15.10	MoM
TV	65"W	VA/IPS	FHD(60)	1920x1080	Open-Cell	-	-	-	-	-	-	-	-	-	-	399	388	-2.8%
	55"W	VA/IPS	FHD(60)	1920x1080	Open-Cell	-	-	-	-	-	-	-	-	-	-	222	212	-4.7%
	50"W	VA/IPS	FHD	1920x1080	Open-Cell	198	201	201	201	201	201	201	200	197	191	183	174	-4.7%
	48"W	VA/IPS	FHD	1920x1080	Open-Cell	184	188	188	188	188	187	186	184	181	174	167	160	-4.5%
	43"W	VA/IPS	FHD(60)	1920x1080	Open-Cell	-	-	-	-	-	-	-	-	-	-	132	125	-5.7%
	40"W	VA	FHD	1920x1080	Open-Cell	131	135	135	135	135	135	135	135	135	132	127	120	-5.5%
	39.5"W	VA/IPS	FHD	1920x1080	Open-Cell	-	-	-	-	-	131	131	131	131	129	126	121	-4.4%
	32"W	VA/IPS	HD	1366x768	Open-Cell	92	94	94	94	94	91	88	85	81	74	69	66	-4.3%
	Average					86	88	88	88	88	93	93	92	90	87	178	170	-4.6%

Application	Size	Type	Format	Resolution	BLU	14.11	14.12	15.01	15.02	15.03	15.04	15.05	15.06	15.07	15.08	15.09	15.10	MoM
Monitor	27"W	TN	FHD	1920x1080	Edge-LED	124	123	122	121	120	119	118	117	114	112	110	106	-3.2%
	23.8"W	IPS	FHD	1920x1080	Edge-LED	-	-	-	-	-	85.9	84.8	83.4	81.7	79.7	77.8	75.5	-3.0%
	23"W	TN	FHD	1920x1080	Edge-LED	81.2	80.9	80.3	79.6	79.2	78.5	77.7	76.5	74.9	73.3	71.9	70.1	-2.5%
	21.5"W	TN	FHD	1920x1080	Edge-WLED	70.6	70.3	69.6	68.9	68.2	67.3	66.1	64.4	62.5	60.4	58.5	55.5	-5.0%
	20"W	TN	HD+	1600x900	Edge-LED	62.3	62.0	61.6	61.0	60.6	59.9	59.2	57.9	56.4	54.8	53.7	52.5	-2.2%
	19.5"W	TN	WXGA+	1440x900	Edge-LED	60.7	60.3	59.7	59.1	58.5	57.8	56.9	55.5	53.9	52.2	50.7	48.2	-4.9%
	18.5"W	TN	HD	1366X768	Edge-WLED	54.6	54.3	53.9	53.3	52.9	52.3	51.5	50.3	48.9	47.2	45.9	43.5	-5.2%
	Average					75.5	75.1	74.5	73.8	73.3	74.4	73.5	72.0	70.4	68.5	66.9	64.5	-3.7%

Application	Size	Type	Format	Resolution	BLU	14.11	14.12	15.01	15.02	15.03	15.04	15.05	15.06	15.07	15.08	15.09	15.10	MoM
Note PC	17.3"W	LED	HD+	1600x900	Wedge-WLED	53.2	52.6	52.1	51.5	51.0	50.3	49.7	49.1	48.3	47.3	46.4	45.6	-1.7%
	15.6"W	TN	HD	1366x768	Flat-LED	41.5	40.8	40.1	39.5	38.9	38.1	37.0	35.8	34.8	33.7	32.8	31.8	-3.0%
	14.0"W	TN	HD	1366x768	Flat-LED	36.1	35.5	34.9	34.3	34.0	33.4	32.6	31.7	30.8	29.9	29.1	28.2	-2.9%
	13.3"W	TN	HD	1366x768	Slim-WLED	42.1	41.6	41.1	40.5	40.0	39.4	39.0	38.6	38.2	37.7	37.2	36.7	-1.5%
	13.3"W	TN	WXGA	1280x800	Flat-LED	40.0	39.5	39.0	38.4	37.9	37.3	36.8	36.4	36.0	35.6	35.1	34.6	-1.6%
	12.5"W	IPS	FHD	1920x1080	Ultraslim-LED	-	-	-	-	-	68.5	68.1	67.8	67.6	67.4	67.3	67.2	-0.1%
	11.6"W	TN	HD	1366x768	Flat-LED	36.9	36.5	36.0	35.4	34.9	34.2	33.6	32.8	31.9	30.9	30.1	29.2	-2.8%
	Average					41.6	41.1	40.5	39.9	39.4	43.0	42.4	41.7	41.1	40.3	39.7	39.0	-1.9%

Source: Witsview, Hi-investment Security[207]

In addition, LCD TV panel inventory has been increasing since October 2014 after dropping to three weeks (see Figure 6-1).

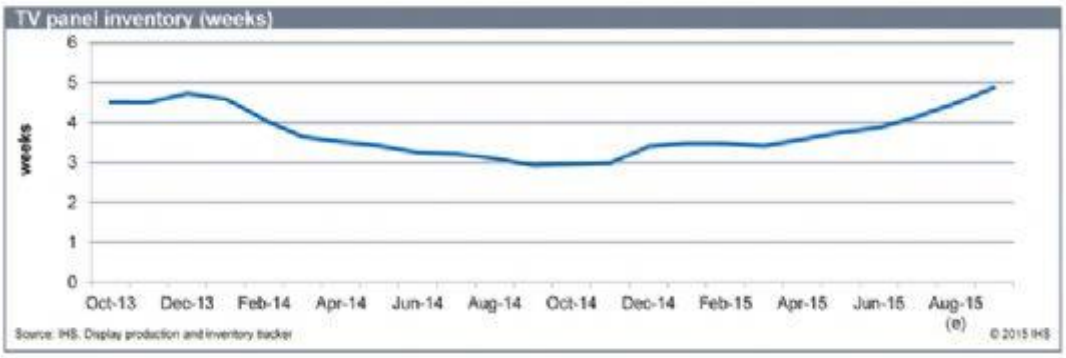

Figure 6-1: TV panel inventory (Unit: weeks)
Source: IHS[208]

Market demand is expected to stagnate for some time because of such oversupply, reduced sales volume due to the global economic recession and increased panel inventory. The oversupply (sufficiency ratio) will reach about 7% beginning in 2016 when new investment by Chinese panel companies begins at full scale. The LCD panel industry will face difficulties from worsening profitability due to the increased

[207] 정원석 (Jang, Won-suk), "디스플레이, LCD 패널 출하 및 가격 동향" (Display, Trend of LCD Panel's Shipments and Price), Industry Brief, *Hi Research Center*, October 21, 2015, p. 2.
[208] 송주영 (Song, Joo-young), "고개 숙인 TV…LCD 패널 재고 쌓인다" (TV's Downturn … Stock of LCD Panels Piling up), ZDNet Korea, August 21, 2015.

bargaining power of customers and decreasing trend of panel prices caused by excessive panel supply. The Korean LCD panel industry, which is growing only in the Chinese market, will suffer from increased competition with Chinese panel companies.

Table 6-3: Forecast of supply and demand by applications (Unit: thousand pcs, thousand m^2)

			1Q15	2Q15	3Q15	4Q15F	1Q16F	2Q16F	3Q16F	4Q16F	2015F	2016F	2017F
Demand	Shipment	TV	66,573	66,072	68,757	70,127	65,547	66,662	70,187	72,715	271,529	275,111	291,026
		MNT	36,516	38,469	38,720	39,077	36,889	35,801	36,249	36,249	152,782	145,188	139,829
		NB	46,418	49,035	48,953	46,807	45,782	45,782	46,240	46,240	191,213	184,044	175,381
		Mini	20,740	17,480	23,715	23,715	23,715	14,426	16,019	16,340	85,650	70,500	60,180
		Others	4,637	5,125	5,557	5,063	4,625	4,724	5,081	4,810	20,383	19,240	17,876
		Total	174,884	176,181	185,702	184,789	176,559	167,394	173,776	176,353	721,556	694,082	684,292
		S/M	515,910	535,644	546,968	560,608	493,581	536,726	593,299	614,248	2,159,129	2,237,853	2,283,413
	YoY	TV	16%	3%	6%	5%	-2%	1%	2%	4%	7%	1%	6%
		MNT	-1%	-2%	0%	-4%	1%	-7%	-6%	-7%	-2%	-5%	-4%
		NB	5%	1%	-2%	-2%	-1%	-7%	-6%	-1%	0%	-4%	-5%
		Mini	-12%	-28%	2%	-21%	14%	-17%	-32%	-31%	-15%	-18%	-15%
		Others	-21%	-7%	-5%	-11%	0%	-8%	-9%	-5%	-11%	-6%	-7%
		Total	4%	-3%	2%	-3%	1%	-5%	-6%	-5%	0%	-4%	-1%
		S/M	3%	1%	-6%	-5%	-4%	0%	8%	10%	-2%	4%	2%
	Shipment Area	TV	27,080	27,686	28,851	29,220	27,510	28,635	30,512	31,818	112,837	118,475	129,859
		MNT	4,292	4,521	4,565	4,608	4,354	4,215	4,275	4,275	17,987	17,118	16,547
		NB	2,797	2,972	2,994	2,849	2,797	2,797	2,825	2,825	11,612	11,244	10,714
		Mini	578	495	508	518	477	421	470	479	2,099	1,848	1,766
		Others	612	651	709	709	682	667	722	751	2,680	2,821	2,860
		Total	38,602	39,778	41,260	41,729	39,238	40,445	42,945	44,477	161,369	167,105	178,449
		S/M	3,243	3,453	3,633	3,824	3,419	3,711	4,141	4,328	14,154	15,599	16,703
	YoY	TV	18%	6%	5%	3%	2%	3%	6%	9%	7%	5%	10%
		MNT	0%	-1%	0%	-3%	1%	-7%	-6%	-7%	2%	-5%	-3%
		NB	2%	0%	-3%	-3%	0%	-6%	-6%	-1%	1%	-3%	-5%
		Mini	-10%	-25%	-22%	-36%	-17%	-15%	-7%	-7%	-13%	-12%	-4%
		Others	-16%	-1%	0%	-5%	11%	2%	2%	6%	-6%	5%	1%
		Total	13%	3%	3%	1%	1%	1%	3%	6%	4%	4%	7%
		S/M	8%	3%	-3%	-3%	5%	7%	14%	13%	1%	10%	7%
Supply	Supply Area		44,989	45,793	46,817	47,305	46,491	48,425	49,816	50,842	184,903	195,574	210,583
	YoY		12%	7%	5%	3%	3%	6%	6%	7%	7%	6%	8%
Demand Area (including S/M)			41,846	43,230	44,894	45,553	42,658	44,156	47,086	48,805	175,523	182,705	195,152
Demand - Supply			3,143	2,562	1,923	1,751	3,833	4,269	2,730	2,037	9,380	12,870	15,431
Sufficiency Ratio			8%	6%	4%	4%	9%	10%	6%	4%	5%	7%	8%

Source: Hana Financial Investment[209]

Quantitative growth will stagnate for a while, but qualitative growth is expected from the trend of increasing panel size and increasing ratio of premium products like UHD. In fact, the percentage of UHD TV panels among all LCD panels for TVs increased from 8% in January 2015 to 21% in October 2015, representing an increase of 2.5 times in terms of market share and 2.9 times in terms of shipment quantity.[210]

[209] 이원식 (Lee, Won-sik), "디스플레이: 악순환의 연속"(Display: Continuation of the Vicious Circle), Equity Research, *하나대투 증권* (Hana Daetoo Securities), October 19, 2015, p. 35.

[210] 성문재 (Sung, Moon-jae), "LCD 공급 과잉 속 UHD 비중 증가..삼성디스플레이 출하 1위" (UHD's Ratio is Increasing under Oversupply of LCDs…SDC's Shipment No. 1), *이데일리* (E-daily), November 11, 2015.

6.4 Recommendations

6.4.1. Recommendations for Korean companies considering FDI

Investment in ASEAN is suggested as a post-China strategy since the merits of investment in China have lessened recently with the slowdown of the Chinese economy, rapid growth of wages and increased investment expenses due to reduced benefits. In particular, after the Korea-ASEAN FTA came into effect in January 2007, ASEAN has been a close partner that recorded a total trade volume with and foreign investment by Korea of 138 billion and 4.4 billion, respectively, in 2014, following China and the United States.[211] Although ASEAN's annual growth rate is not as high as China's yet, this is a region with large growth potential for production, consumption, resource development and infrastructure, especially with the official launching of the ASEAN Economic Community (AEC) on December 31, 2014. Vietnam is particularly noteworthy because its FTA with Korea came into effect in December 2014. It is a member of the Trans-Pacific Partnership (TPP),[212] the world's largest trade and investment partnership, with an abundant and young labor force, relatively low wages, and low rate of wage increases. Vietnam also has strategic value in terms of becoming a bridgehead for advancement beyond the ASEAN market and into the global market.

6.4.2 Recommendations for the Korean LCD panel industry

1) In 2015, 40–50-inch TVs accounted for over 50% of the market in Korea, but in China, 30–40-inch displays made up the majority of sales.[213] This not only shows the potential for enlargement of the Chinese market but also suggests the possibility of being covered by the existing 8G line. Therefore, instead of competing with China in terms of capacity through new investment, it would be necessary to pursue competitive advantage in quality and enhancing profitability by focusing on premium products (focus strategy) such as UHD displays and reinforcing differentiated

[211] Korea Broadcasting System, "9 pm News" Seoul, December 31, 2015.

[212] The agreement aims to economic integration of the Asia-Pacific as elimination of trade barrier including tariffs and non-tariff. It was concluded by the U.S.A., Japan, Australia, Canada, Peru, Vietnam, Malaysia, New Zealand, Brunei, Singapore, Mexico and Chile in October 7, 2015.

[213] 최종희 (Choi, Jong-hee), "중국 'LCD' 최강자 노린다… "BOE 앞세워 2018년 생산량 한국추월"" (China Aims for Top of 'LCD' Market … "Over Taking Korea by BOE's Leading"), *뉴데일리 경제* (Newdaily Kyung-jea), November 3, 2015.

products and services (differentiation strategy).

2) Since Chinese TV makers are rapidly growing by dominating the domestic market, it is important to secure stable customers with large potential through strategic alliances with major Chinese set companies. A market survey company called IHS forecasted that the major customers of panel companies will shift to Chinese TV makers, presenting survey results indicating that the quantity of LCDs for TVs that display panel makers supplied to Samsung Electronics and LG Electronics has decreased and the ratio of supply to Chinese TV makers has increased greatly (see Figure 6-2).[214] This means that Chinese TV makers have been growing in the TV market recently, which makes up the biggest part of the LCD panel market, and will gradually show increasing purchasing power and importance in the future.

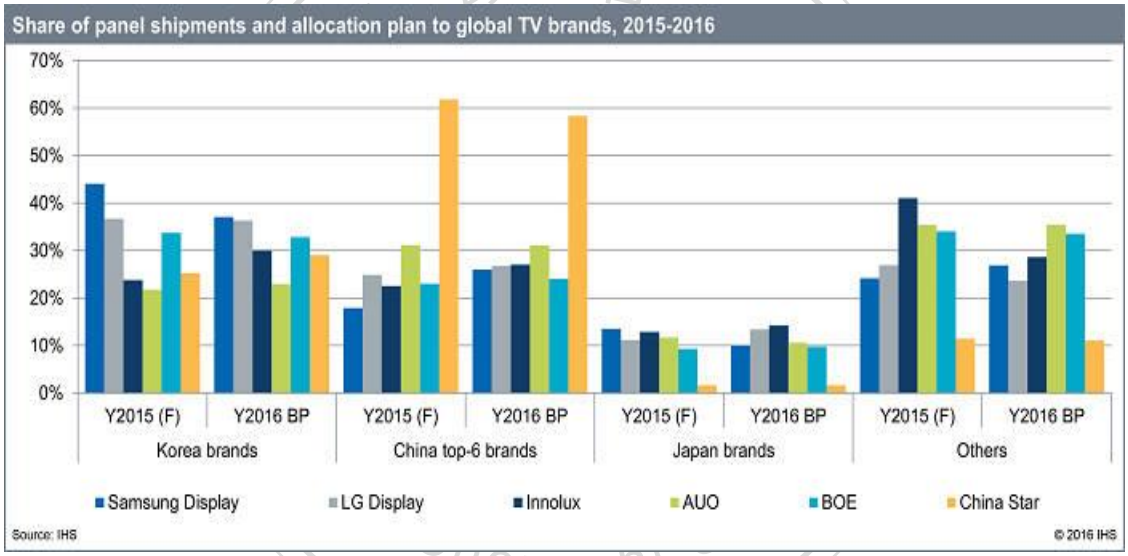

Figure 6-2: Share of panel shipments and allocation plan to global TV brands (2015–2016)
Source: IHS[215]

3) Since the markets of major products such as TVs and mobile phones have matured to the level that growth has stagnated, new markets should be created as new engines for growth to increase competitiveness. Such markets include signage, wearable devices and automobile display systems, the last of which is expected to more than double in revenue, reaching 18 billion USD in 2021 (see Figure 6-30).

[214] 배옥진 (Bae, Ok-jin), "TV용 LCD 패널 제조사들, 삼성.LG 비중 줄이고 중국 늘렸다" (LCD Panel Makers for TV, Decreased Share of Samsung and LG, Increased Share of Chinese Customers), *전자신문* (Et news), February 21, 2016.
[215] *Ibid.*

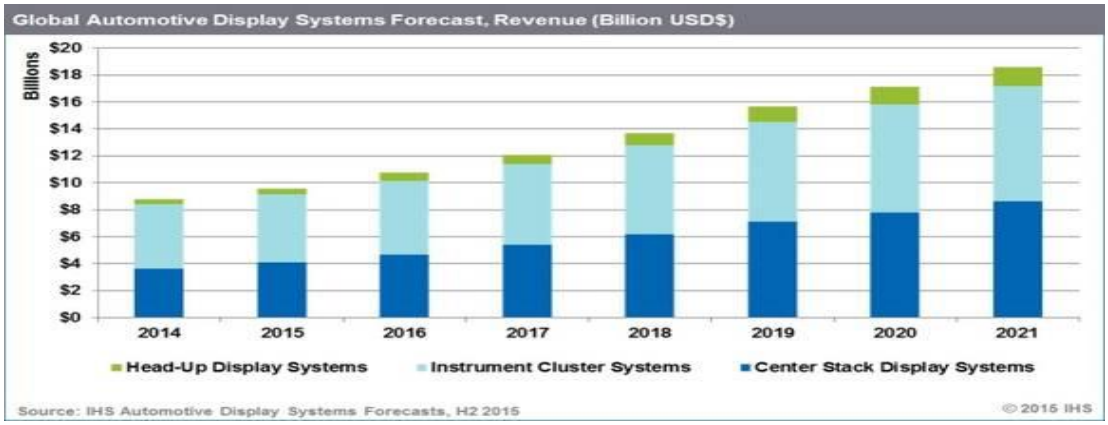

Figure 6-3: Global automotive display systems forecast, revenue (Billion USD)
Source: IHS (H2 2015)[216]

4) Whereas 55-inch UHD LCDs were the major product of the 8G factories in Korea in 2015, China, with 32-inch HD LCD as the major product, lags with a technology gap of about a year. However, China will produce 55-inch products in 2016 to reduce the technology gap to six months or less, and the gap is expected to be mostly eliminated by 2017.[217] Thus, Korea needs to be the first mover and preemptively occupy the OLED market, which is growing rapidly and receiving great attention as a post-LCD market. A two-track strategy can be applied for qualitative growth through premium LCD products and preemptive occupation of the OLED market.

Table 6-4: Competitiveness of the Chinese LCD industry (Unit: based on Korea as 100)

	LCD			OLED		
	Mass production	Products	Clients	Mass production	Products	Clients
2015 F	90	80	80	50	50	50
2016 F	95	90	90	55	55	60

Source: Shinhan financial investment[218]

5) Two representative companies, LGD and SDC, must pursue a positive-sum game based on well-intentioned competition instead of a zero-sum game by forming strategic alliances. This could include cross-purchasing (purchase each other's panels when needed), using KDIA as a platform. In particular, since the success of the

[216] 이수환 (Lee, Soo-hwan), "급성장하는 자동차용 디스플레이 … 21조원 규모로 확대 (Automobile Displays Increasing Sharply … Market Size Expected to Grow to 2.1 billion Won), *디지털 데일리* (Digital Daily), January 3, 2016.
[217] 기업분석부 (Department of Company Analysis), "한중 산업경쟁력 비교" (Comparison of Industry Competitiveness between Korea and China), Research Center, *신한금융투자* (Shinhan Financial Investment), October 20, 2015, p. 12.
[218] *Ibid.*, pp. 13-14.

OLED panel industry depends on growth in market demand, they need to push set companies in the major markets (e.g., TVs and mobile phones) to increase their adoption rate and grow the pie by leading the industry through the establishment of standards for related technology specifications.

6.4.3 Recommendations for the Korean government

The import tariff on LCD panels is 5% in China and 8% in Korea. Tariffs will be reduced to 2.5% and 4% on January 1 of the ninth year after the Korea-China FTA came into effect on December 20, 2015, and the two countries will become tariff-free starting on January 1 of the 10th year.[219] Furthermore, next-generation OLED displays, which have a 6% import tariff in China, were excluded from concessions by China's request. The Korea-China FTA reflects China's strong will to foster its domestic display industry.[220] Capacity (fab) of SDC and LGD in China as of 2014 are 55,000/month and 60,000/month, respectively, corresponding to 7% and 9% of domestic production.[221] Therefore, China's lowering and elimination of tariffs will greatly help Korean panel companies. In particular, Korean companies' excessive dependence on investment in the display industry in China is a critical and controversial issue that may lead to a hollowing of the manufacturing industry in Korea. In order to prevent this phenomenon and enhance the export competitiveness of domestic companies, the Korean government needs to make an effort to ease tariff (i.e., import tariff) and non-tariff barriers (i.e., self-sufficiency rate policy) for the display industry through the Korea-China-Japan FTA or Information Technology Agreement (ITA) of the WTO. In the midst of unlimited competition in the global era, it is necessary to remove barriers so that Korea, Taiwan, China and Japan can grow the pie and form an efficient specialization structure through strategic alliances and cooperation based on comparative advantages instead of starting a game of chicken. Lastly, intellectual property rights must be better protected by preventing technology leakage so that all involved can compete fairly.

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[219] 이경호 (Lee, Kyung-ho), "LCD패널 강세 지속 … 車내비 가격경쟁력↑" (LCD Panels Continuously Strong, Price Competitiveness of Navigation for Automobiles ↑), *아시아경제* (Asia Kyungjea), December 8, 2015.

[220] 송주영 (Song, Joo-young), "中, 디스플레이산업 보호 육성 실리 챙겼다" (China Obtained Conservative and Promotive Benefits of Display Industry), ZDNET Korea, February 25, 2015.

[221] 전병기 (Jeon, Byung-ki), "디스플레이-30. 시진핑 방한과 패널 관세" (Display: Xi, Jin-ping's Visit and the Panel Tariff), Issue comment, *이트레이드 증권* (E-trade Security), July 9, 2014, p. 2.

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中华人民共和国商务部，
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Appendix I

Interviewee: A

Date: February 11, 2016

Location: Park Tower, Yongsan, Seoul, Korea

Affiliation: LG Display

Position: Assistant manager

1. What is the strategy of the Korean LCD panel industry in China?

The Korean LCD panel industry has been making the most active and largest foreign investments in China for more than ten years, and its key strategy lies in 'localization' through the creation of a batch production system. The localization strategy was completed by focusing on investment in back-end process [module] lines, which are highly dependent on labor, in the early stages of investment and shifting to investment and expansion in front-end process [fab] lines in the early 2010s, which require a relatively large amount of investment, even though there was risk of advanced or core technology leakage. For example, LGD established LG Display China, the representative overseas business site with front-end processes, near LG Display Guangzhou, which was the existing back-end process line, to set up the batch production system. This was a strategic investment which has not only aimed to create synergistic effects such as raising productivity through the batch production system but also considered group-wide vertical integration and LCD industry clustering with affiliates or partners of upstream industries and the major customers based on close cooperation with local governments since in the early stages of investment.

2. Why is the batch production system focused in Guangzhou?

Mainly (1) to pursue synergistic effects between front-end and back-end processes by establishing the fab [LG Display China] near the module line [LG Display Guangzhou], 2) to be near major Chinese customers such as Skyworth, (3) to achieve cluster effects through joint advancement with related affiliates and partners of upstream industries who could provide the core materials, equipment, and components, which are critical for LCD panel manufacturing and production efficiency. In sum, this strategic investment aimed to achieve tangible and intangible

effects including the synergistic effects of front-end and back-end processes and cluster effects with upstream and downstream industries in order to provide different services targeted to major customers. Specifically, tangible cost effects such as a reduction in logistics and packing expenses and intangible effects like shortened delivery and lead times, speedy support/service by being close to customers, flexible production/purchasing plans, minimization of dead stock by efficient production/stock management based on the fast acquisition of information were taken into account.

3. What are the changes of investment strategy in China?

The Korean LCD panel industry's strategy in China could be divided into in the early and mid-2000s and after the end of the 2000s. First, investment mainly focused on the back-end process lines, which are highly dependent on labor, in the early 2000s and shifted to investment and expansion mainly in front-end process lines including increasing capacity, which depends relatively more on automation equipment and require a relatively large amount of investment. This strategy aims to enhance competitiveness through the synergistic effects of establishing a local batch production system as the ratio and the importance Chinese sales are increasing. Furthermore, it is the result of the investment purpose gradually shifting from saving on labor costs to exporting to the Chinese domestic market. In addition, the impact of the Chinese government increasing tariffs could not be overlooked. Once the tariffs were increased, the export products made in Korea or existing 'manufacture open-cells in Korea → export to China → assemble modules in China → supply' model became less competitive in the Chinese market. Furthermore, these products had already been facing difficulties due to the greatly increased competitiveness of the Chinese companies resulting from the government's various forms of support including increase of self-sufficiency rate policy. Second, the investment types have gradually been diversified from wholly-owned-oriented to joint ventures with local partners like customers. This change of strategy aims to enhance competitiveness by teaming up with local partners because not only it is able to reduce capital investment, burden and risk, but the partner can also provide knowledge of local customs and familiarity with compliance in the emerging Chinese market as it becomes the biggest market and increases in terms of the proportion of revenue generated. Lastly, the Korean LCD panel industry's target customers shifted gradually from global IT set

companies with production bases in China in the early 2000s to local set companies in China. This is the result of China's gradually changing role from 'manufacturing base' for global companies to 'market' based on its economic growth and increasing purchasing power. In particular, Chinese local brands' (set makers) increasing market share based on their fast growth in the market was also decisive contribution.

4. What is the future strategy of LGD?

The Chinese market is nearly the only market showing growth based on 2015 data despite the recent slowdown of the global TV market, and it also has the greatest potential for future growth due to the increasing purchasing power from its large population. In addition, China has become the biggest customer and a competitor at the same time for the Korean LCD panel industry as the Chinese local set companies increase in importance. Therefore, firstly, we intend to continue to seek more diverse strategic alliance opportunities in strategic locations by deepening our market penetration, achieving economies of scale, increasing our customer base, and reducing the costs in order to enhance our competitive advantages. In particular, LG Display China, which is our first overseas fab, will actively respond with flexible production plans such as product mixing to adapt to the trend of the Chinese market and also strengthen the differentiation strategy by providing premium products such as UHD that meet market needs and have close sales/service. For example, we are planning to add 60-inch and 65-inch displays to the lineup and enlarge the ratio of UHD panels to match the trend toward larger and premium displays in the Chinese market. Moreover, we are focusing more on such premium items based on our technological advantages to enhance our profitability and differentiation. Secondly, we will adopt a customization strategy that is able to respond to customers' needs efficiently by providing differentiated products and services (differentiation strategy) in order to strengthen cooperation with customers. For example, Chinese customers prefer open-cell to modules whereas Japanese customers prefer the opposite. Lastly, we will focus more on establishing an effective strategy for Chinese customers as they gradually increase in share and importance in the global market.

Appendix II

Interviewee: B

Date: July 14, 2015

Location: KDIA office, Seoul, Korea

Affiliation: Korea Display Industry Association (KDIA)

Position: Director

1.What factors have contributed to the Korean LCD panel industry's success?

I think the major factors include the following: First, there was Korean government support for the localization of panels, components and materials through various channels including KDIA and tariff reductions for core production facilities. Second, the preemptive investment of panel companies despite the Asian financial crisis in 1997 and collapse of the IT bubble in 2001 helped them to gain a dominant foothold in the market. Third, Korean companies made timely and risk-taking investments through fast, efficient decision making by owner management based on confident and accurate forecasts of future demand in the market even during periods of recession. Fourth, manufacturers increased production efficiency and profitability through consistent technological innovations such as the first implementation of the One Drop Filling (ODF) method based on the expertise and learning from the semiconductor industry. Fifth, the industry localized and enhanced competitiveness through technology transfer, support and sharing through a self-sufficiency strategy (vertical integration) with group-wide investment in the upstream and downstream industries. Sixth, stable captive markets within groups have emerged. Seventh, aggressive investment and technology development resulted in new applications, thus opening new markets or expanding existing markets. A virtuous cycle was formed by reinvestment in companies creating increased profitability. Lastly, well-intended competition between Samsung Group and LG Group as traditional rivals in Korea has also made a positive contribution in changing the Korean LCD industry from a fast-follower into a first mover.

2. How did the tariff increases impact investment?

In April 2012, the Chinese government increased tariff rates on 32-inch and larger

LCD panels and polarizers, which play large roles in terms of cost as core parts, from 3% and 5% to 4% and 6%, respectively. This decision was favorable for Chinese panel companies but negative for Korean companies. The primary purpose of such increases was to encourage investment by competing nations in China's next-generation line, thereby creating a technology transfer effect while also protecting Chinese companies that had started mass production. Although increasing tariffs may be a burden in the short term for China's downstream industries, it increases the competitiveness of the Chinese panel industry by increasing its self-sufficiency rate in the long term. There is even the possibility of additional rate increases in the future.

4. Any advice for the Korean display industry regarding sustainable development?

First, a 'win-win cooperation model' should be set among upstream, midstream, and downstream industries. For example, cross-purchasing and supplying of the equipment, materials and panels and joint research and development for preceding /advanced technologies can be based on cooperation between the major players, Samsung group and LG group. Second, [the industry should] activate a 'network' by sharing the core patents among [companies in] the industry, universities, and research institutes and strengthen their collaboration. Third, [it should] improve its training system to train more professional manpower in the display industry. Lastly, [it should] more aggressively promote and seek opportunities for cooperation, such as strategic alliances with partners including customers and competitors to enlarge the 'whole pie' and prevent a 'game of chicken.'

Appendix III

Interviewee: C

Date: October 16, 2015

Location: Nangang Exhibition Center, Taipei, Taiwan

Affiliation: A Korean Equipment Company

Position: General Manager

1. What is the current status of the Korean LCD upstream industry?

The upstream industry experienced a boom for about the past ten years thanks to the Korean LCD panel industry, which became the global leader because of the active investment efforts of SDC and LGD, but Korean equipment companies are now facing difficulties in terms of survival due to reduced investment by the two companies. They turned their eyes to investment in Chinese panel companies, which have received increasing ratios of investment in the global LCD industry since 2010, but this ended up creating excessive competition among Korean companies and Japanese companies, which was further accelerated by the depreciation of the yen.

2. How did this excessive competition start?

In the past, the Korean upstream LCD industry increased its competitiveness by investing in the vertical integration of Samsung Group and LG Group. As the two competitors tried to prevent technology leakage, companies in the upstream industry had difficulty in cross supply. Specifically, LG affiliates mainly focused on transactions with LGD whereas Samsung affiliates mainly focused on transaction with SDC. Although there were disadvantages, this allowed domestic companies to avoid competition and gain advantage over Japanese companies with their relatively expensive products, since the priority was placed on equipment made by affiliates of the same group. However, companies trying to supply their products to Chinese companies are required to compete against [Chinese] domestic companies, as well as Japanese companies with excellent technologies and price competitiveness due to the depreciation of the yen. Such difficulties are further intensified by the request of the Chinese market for “advanced technology” and “localization.”

3. What is the demand for advanced technology and localization?

The display industry is a key industry for the Chinese government, and the government is focused on localization. It is easier to obtain government permission for investment in panel companies that received direct or indirect investment of local government if the investment is related to advanced technology or localization. Therefore, Korean equipment companies must demonstrate the advanced technology of their equipment or propose a localization plan (technology transfer) when they participate in tenders for the investment projects of Chinese panel companies. Deepening competition, as mentioned earlier, led to a great reduction in prices, and the pressure to transfer technologies increased. Recently, there are some companies that not only reduce profits but even bid with negative profits in order to survive. If this phenomenon continues, it will cause a greater boomerang effect enhancing competitiveness of the Chinese upstream industries in the long term.

4. What will the solution be?

I believe that Korean equipment companies place foremost priority on internalization of core values through technical innovation based on cooperation with Korean panel companies, which still have the best technologies in the world. Korean panel companies were able to become the global leaders because of close connections with downstream and upstream industries. Since the next-generation display industries such as OLED will be led by the current players due to the high entry barriers, technological innovation through continued research cooperation with panel companies is key to the formation of a win-win relationship in the long run.

Appendix IV

Interviewee: D

Date: October 9, 2014

Location: Park Tower, Yongsan, Seoul, Korea

Affiliation: Samsung Electronics in China

Position: Former President

1. What was the background for and strategy of Korean companies' investment in China in the 1990s?

In the 1990s, Korean companies in labor-intensive industries showed increased investment in China in order to overcome the weakened price competitiveness of export products caused by increased domestic wages. In particular, the Korea–China diplomatic relationship in 1992 functioned as a catalyst for the full-scale growth of investment in China by offering the Investment Promotion and Protection Agreement [Bilateral Investment Treaty, or BIT] to Korean companies, as well as intangible effects such as the removal of uncertainties. Abundant labor with relatively lower wages and Chinese government incentives were the major reasons for investment. They offered many benefits and incentives, especially for high-tech or advanced technology [investments], including tax exemption. However, the costs of withdrawal from China were also as high as the benefits.

2. What was the change of strategy in the 2000s compared to the 1990s?

China joining as a member of the WTO was an especially strategic turning point for investment and motivated Korean companies because of the resulting visible institutional improvements for fairness and transparency, such as the reduction of tariffs, removal of non-tariff barriers, guarantee of autonomy of corporate management, equal treatment of domestic and foreign companies, protection of intellectual property rights, and the psychological effect of removing uncertainties. Whereas the primary purpose of investment in the past was to take advantage of low wages, investment by large enterprises has rapidly grown and expanded since 2003 with investments of over one billion USD per case. With China joining as a member of the WTO, the growth of purchasing power and the domestic market resulting from

economic growth, and changes to the government's foreign investment attraction policy [selective attraction focused on service industries and high-tech industries], investment in China by large [Korean] enterprises was revitalized by the transition from investments in labor-intensive manufacturing industries as a production base to large-scale facility investments in domestic markets.

3. What was Samsung's investment Strategy?

Investment in the 1990s also considered the future [Chinese] domestic market, but investment focused on back-end processes centered on assembly lines that placed great importance on the labor force. Investment after the 2000s started to target the domestic market at full scale, and the most important strategy was localization. Japan also showed active investment in China at the time, but its local management was ineffective because of its assembly-line-centric focus, Japanese language management and hostility [between the two countries] because of historical events. On the contrary, Korean companies gradually expanded the scope of investment while shifting the focus away from assembly lines and placed greater emphasis on localization through language training before sending resident employees accompanied by family to China. In addition, the president of the holding company in Beijing was appointed as the general president in China to lead manufacturing companies in Weihai (fax), Tianjin (TV), Tianjin (VTR), Suzhou (domestic appliances / display) and Huizhou (audio), and the president promoted products through service bases in many regions. Moreover, products made in China at the time were mostly provided for the growing Chinese domestic market with only some of them exported overseas whereas the products made in Korea were exported overseas (especially to developed nations).

4. What was the key to Korean LCD companies' success?

Chairman Lee Byung-chol, who was the founder of Samsung group, conducted extensive studies on advanced technology such as that of the semiconductor industry by inviting professional engineers from Japan and the U.S.A.. He used to emphasize manpower, budgeting and preemptive investment to surpass Japan. In 1990s, Lee, Kun-hee and Koo, B. J. the chairmen of Samsung and LG [LG Philips LCD] at the time, conducted extensive studies on the LCD industry by recruiting domestic and overseas experts and made unsparing investments in relevant technology. These

efforts enabled the Korean companies to make timely and risk-taking investments through fast, efficient decision making by owner management based on confident and accurate forecasts of future demand in the market, even during periods of recession. Despite the downturn in the LCD market caused by the Asian financial crisis and collapse of the IT bubble, they made quick, preemptive, and even countercyclical investments with the belief that there would be an expansion of product applications and a trend of increasing panel sizes. This was a risky large-scale investment that could have decided the fate of companies, and Japanese competitors hesitated to make investments as they failed to reach board resolutions. Meanwhile, Korea made a successful move based on quick decision making and investment by Korean conglomerates.

5. What are some precautions regarding investment in China?

There were many restrictions on investment in the early stages of investment in the 1990s, such as the prohibition of wholly owned investment and featherbedding. Since it is difficult for joint stock and joint venture companies to make changes after establishment, the conditions of investment must be reviewed thoroughly upon establishment, and negotiations with local partners and communication with local governments are extremely important. In addition, investment in China must consider competition with Chinese companies in the rapidly growing Chinese domestic market. Companies are required to improve internal R&D capabilities for survival. For instance, they must have an advanced technology that is at least one generation (or equivalent) ahead of Chinese competitors. They need to remember the past when Korean semiconductor companies suffered hardships as Japan moved on to the next generation after reducing the prices of semiconductor products.