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Corporate diversification strategies and their effects on firm performance - The case of Samsung's venture into healthcare

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Abstract

The question of how and why firms diversify has been a focal point of strategy research for several decades. However, results have been contradictory, especially in regard to the diversification-performance dichotomy. While there is a certain acceptance for the curvilinear relationship between the degree of relatedness of the target industry and firm performance i.e. performance increases in (constrained) related cases, and decreases with decreasing levels of relatedness, some studies have found reverse effects. This thesis investigates the nature of unrelated diversification through a case study on Samsung's venture into healthcare. By comparing Samsung's recent diversification into the medical device and biosimilar industries in terms of industry relatedness, market entry strategies, and firm performance, the thesis will present a case in which the unrelated diversification target (biosimilars) is outperforming the (constrained) related one (medical devices). As such, this thesis will present an alternative to the established theory on corporate diversification strategies. Based on a combination of the external, internal, and financial perspectives of diversification theory, this thesis finds that the case of Samsung's venture into healthcare contradicts several prior findings from the external and internal perspectives, while confirming most of the theories from the financial perspective. As diversification research has historically been grouped into studies on firms from developed and emerging markets respectively, the case of Samsung presents the opportunity to analyze a conglomerate that has developed in the context of an emerging economy, which is currently transitioning quickly towards a developed country. As such, Samsung needs to adapt its approach to conducting business in globalized and hyper competitive markets.

Keywords: Corporate diversification strategies; firm performance; related and unrelated diversification, Samsung, healthcare.

Table of Contents

1.0 INTRODUCTION 1

1.1 DIVERSIFICATION APPROACHES 2

2.0 RESEARCH QUESTIONS 5

2.1 MEASURING FIRM PERFORMANCE 5
2.2 MEASURING RELATEDNESS 7

3.0 RESEARCH DESIGN AND RESEARCH METHOD 12

4.0 LITERATURE REVIEW 13

4.1 THE EXTERNAL PERSPECTIVE 14
4.1.1 The institutional perspective in emerging economies 16
4.2 THE INTERNAL PERSPECTIVE 18
4.2.1 The RBV in the context of emerging economies 19
4.3 THE FINANCIAL PERSPECTIVE 21
4.3.1 The financial perspective in the context of emerging economies 22
4.4 SYNTHESIS OF THE THREE VIEWS 24

5.0 CASE STUDY: SAMSUNG'S VENTURE INTO HEALTHCARE 25

5.1 OVERVIEW OF THE SAMSUNG GROUP 25
5.1.1 History & Culture 26
5.2 SAMSUNG'S NEXT BIG BET 29
5.2.1 The current situation: leadership crisis, product recalls, and sales records 33
5.2.2 Organizational structure 36
5.3 THE HEALTHCARE SECTOR 37
5.3.1. The medical device industry 40
5.3.2 The biopharmaceutical industry 43
5.3.3 Sector and industry relatedness: healthcare, medical devices, and biosimilars 48
5.4 MEDICAL DEVICES VS. BIOSIMILARS: A DIVERSIFICATION STRATEGY ANALYSIS 53
5.4.1 Medical Devices 53
5.4.2 Biopharmaceuticals 57
5.5 SAMSUNG'S VENTURE INTO HEALTHCARE IN LIGHT OF THE THREE PERSPECTIVES OF DIVERSIFICATION THEORY 64
5.5.1 The external perspective 64
5.5.2 The internal perspective 67
5.5.3 The financial perspective 69

6.0 CONCLUSION 70

7.0 REFERENCES VI

8.0 APPENDIX XVIII

Table of Figures

Figure 1: Types of diversification strategies (adapted from Hitt, Ireland & Hoskisson, 2007, p.174) 3
Figure 2: The curvilinear relationship between diversification and firm performance (adapted from Hitt, Ireland & Hoskisson, 2007, p.185) 4
Figure 3: Measures of product-market relatedness (adapted from Bryce & Winter, 2006, p. 33) 9
Figure 4: Measures of resource-relatedness (adapted from Bryce & Winter, 2006, p. 34) 10
Figure 5: Summary of the three research perspectives (adapted from Purkayastha, Manolova & Edelmann, 2012, p. 33) 24
Figure 6: Samsung's evolution (adapted from Song & Lee, 2014, p. 24). 26
Figure 7: Samsung's target businesses (The Economist, 2011) 30
Figure 8: Circular chaebol structure (The Economist, 2011) 37
Figure 9: Medical device industry outlook (Frent, 2017a, p. 6) 41
Figure 10: Top 10 medical device companies (Frent, 2017a, p. 25) 42
Figure 11: Differences between biosimilars and generics (Iyer et al., 2015, p. 3) 44
Figure 12: Patent expiration on major biologics (Iyer et al., 2015, p.1) 45
Figure 13: Pharmerging markets (IMS Institute for Healthcare Informatics, 2013b, p. 4) 47
Figure 14: Samsung's medical device acquisitions (Author's own) 54
Figure 15: Global biologics manufacturing market (Samsung BioLogics, 2017b, p.14) 58
Figure 16: Samsung BioLogics production facilities (Samsung BioLogics, 2017b, pg. 16) 59
Figure 17: Samsung Bioepis biosimilar pipeline (Samsung BioLogics, 2017b, pg. 35) 60
Figure 18: Samsung BioLogics operating segments (Samsung BioLogics, 2016, pg. 17) 63
Figure 19: Samsung BioLogics Income Statement (Samsung BioLogics, 2016, pg. 8) 63

1.0 Introduction

Diversification is a common growth option for firms in developed and emerging economies because it enables firms to increase revenues, spread risks, and create shareholder value through economies of scope as well as efficient internal capital and labor markets. Against the backdrop of intensified global competition (i.e. BRICS and other emerging economies) and innovations in information technology during the past decades, which have not only revolutionized the exchange of information but the way business is done, companies are increasingly challenged on their capability to successfully cope with accelerated change in their business environment. Due to the forces of globalization, product and industry life cycles have been continuously decreasing. As such, companies that have been successful in the past and even ones that still are today, more so than ever, must deal with the question of industry choice and corporate portfolio composition.

Within this context, March's (1991) theory of "Exploitation & Exploration" has triggered a field of research that focuses on the relationship between simultaneously exploiting existing assets and capabilities and exploring novel areas to operate in. Due to decreasing industry and product life cycles, firms are forced to focus strongly and invest heavily into exploring new possibilities. When it comes to exploring new industries, firms are confronted with a strategic choice between diversifying into areas related to its core business, which may be prone to similar life cycles and competitive forces, or entering industries without any meaningful synergies but also not affected by external forces in the same way.

A prime example of companies that are explorative by nature are conglomerates, as they have typically grown by diversifying into both related and unrelated industries. Examples of successful conglomerates can be found within Japanese Zaibatsus and Korean Chaebols but also within diversified firms from developed western economies such as General Electric, Siemens, and Philips. One of the most successful conglomerates of the past three decades looks back on a long history of related and especially unrelated diversification. Today, Samsung is the world's leading supplier of semiconductors and the largest consumer electronics company with a corporate portfolio that comprises businesses in information

technology, electronics, shipbuilding, engineering and construction, life insurance, theme parks, advertising agencies, and healthcare. In its latest 10-year strategy, Samsung has laid out an ambitious plan to diversify into a number of industries, both related and unrelated: solar panels, LED lighting, e-vehicle batteries, medical devices, and biotech drugs (The Economist, 2011). A particularly bold move was Samsung's decision to venture into healthcare on a relatively broad scale. Since 2010, Samsung has made inroads into two new industries in this field: medical devices with a focus on imaging and in-vivo and in-vitro diagnostics and biopharmaceuticals, specifically biosimilars. This thesis will focus on how Samsung is implementing this twofold diversification into healthcare and seeks to investigate the nature of unrelated diversification. The two diversification strategies pursued by Samsung within the healthcare sector are distinctly different with respect to Samsung's internal capabilities and absorptive capacity, the underlying industry structures as well as institutional and regulatory environments. As this thesis will show, the success of unrelated diversification strategies depends on a multitude of internal and external factors and the distinct capabilities of a firm.

1.1 Diversification approaches

When analyzing diversification behavior of firms, a fundamental distinction can be made between two directions of diversification strategies: vertical and horizontal. Vertical diversification refers to a firm moving along (upwards or downwards) the value chain within an industry to secure access to critical resources and to counteract bargaining power of suppliers and/or customers. As this form of diversification is aimed at improving the competitive situation of a firm within the industry it already operates in, vertical diversification does little to counter the dynamic forces discussed above. Horizontal diversification on the other hand refers to a firm establishing itself along similar steps of the value chain but within a different industry (Grant, 2010; Hitt, Ireland & Hoskisson, 2007).

Within the area of horizontal diversification (the product scope), a further distinction can be made between the degree of relatedness of the home and target industries. While diversification into related industries enables firms to potentially exploit the most synergies, they are also prone to react in a correlated manner to market forces. Unrelated diversification, entering industries with no meaningful

value chain relationship or demand-side synergies with the original business, on the other hand, offers the potential benefits of diversifying business risk and achieving an optimal and information-asymmetry-free capital allocation. However, it comes at the risk of increased coordination costs (from managing unrelated businesses), the lack of industry specific know-how, and moral hazard (Grant, 2010; Hitt, Ireland & Hoskisson, 2007).

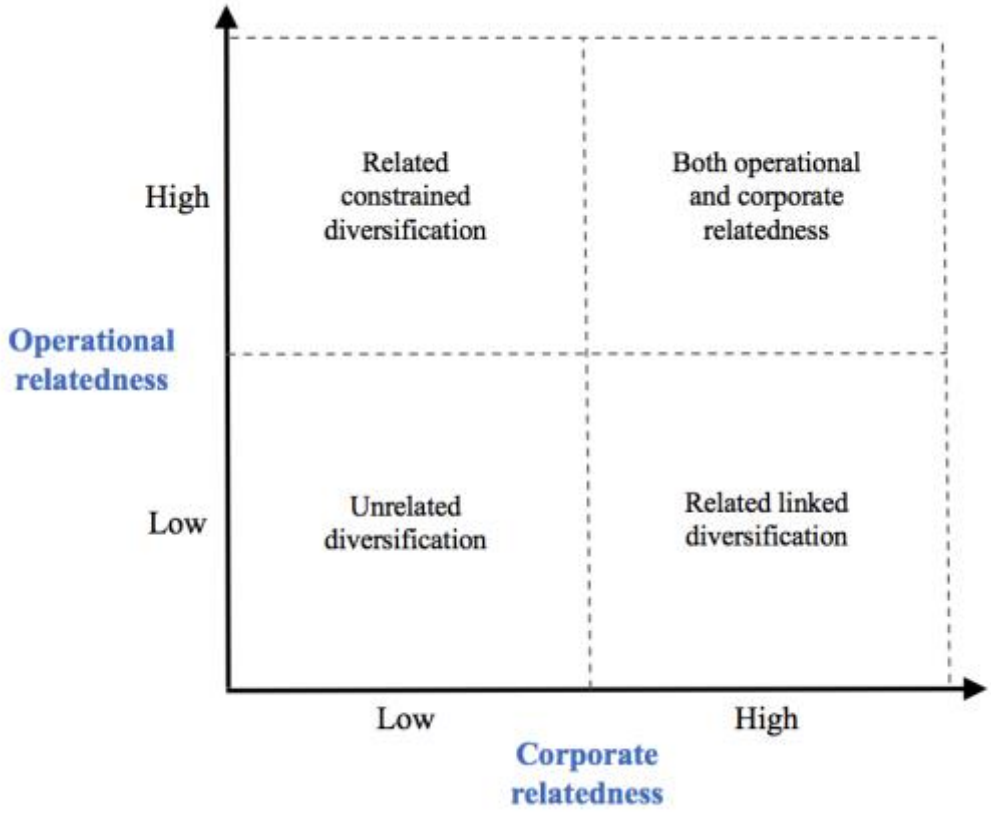

Figure 1: Types of diversification strategies (adapted from Hitt, Ireland & Hoskisson, 2007, p.174)

When analyzing relatedness, a further distinction can be made between operational and corporate relatedness. The former refers to the sharing of operational activities, while the latter refers to the transfer of core competencies between individual businesses. The vertical axis of Figure 1 depicts a firm's capability to manage operational synergies and share assets between businesses of a group, the most extreme form being vertical integration. The horizontal axis depicts a firm's ability of sharing core competencies between its businesses, which is primarily a task of corporate headquarters. Both diversification approaches seek to create value through the sharing of resources i.e. by exploiting economies of scope. The key difference is the types of assets being shared. While operational relatedness is typically based on sharing physical assets, corporate

relatedness stems from the transfer of intangible assets such as specific know-how, brands, or patents. (Hitt, Ireland & Hoskisson, 2007).

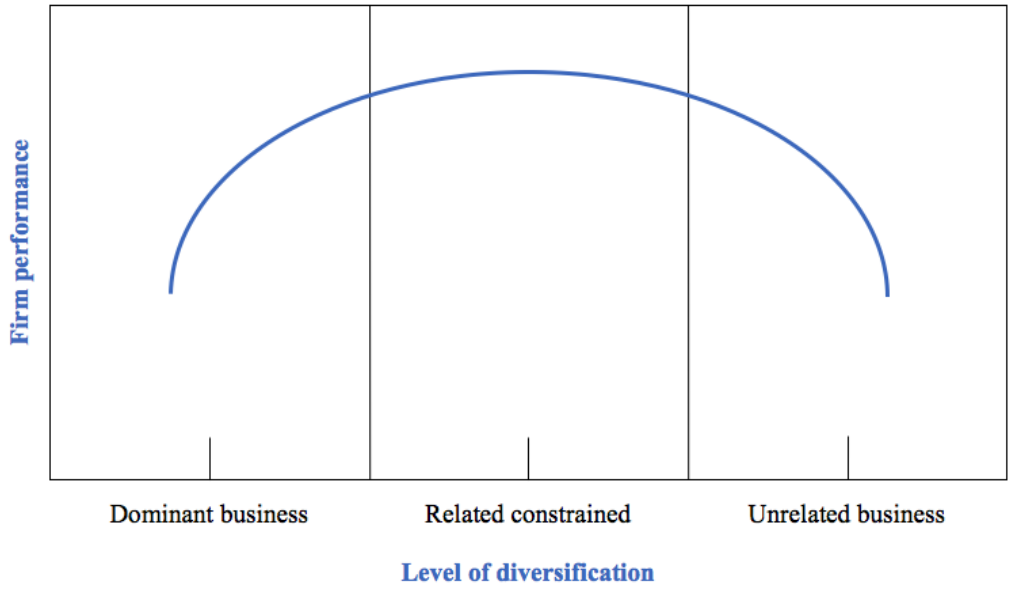

Figure 2: The curvilinear relationship between diversification and firm performance (adapted from Hitt, Ireland & Hoskisson, 2007, p.185)

The background to this thesis and the reasoning behind it stems from a long line of research on corporate diversification strategies. In this context, theory differentiates between related and unrelated diversification. Diversification into related industries is traditionally viewed as a firm's preferred mode of portfolio expansion since it allows the company to take advantage of existing knowledge, technologies, and resources and as such is deemed less risky. Although extensive research on the relationship between diversification and firm performance has been conducted, the results are contradictory. Nonetheless, a certain acceptance for the curvilinear relationship between diversification and firm performance has established itself as the predominant paradigm throughout the years. This concept argues that firm performance increases when a company engages in related diversification and decreases with decreasing levels of relatedness between the core and target industry (Grant, 2010; Hitt, Ireland & Hoskisson, 2007).

2.0 Research questions

The overall structure of this thesis will be guided by four overarching research questions:

1) *What are Samsung's cultural foundations and how has its strategy and portfolio management approach developed over time?*

2) *Which diversification strategy is Samsung pursuing in the healthcare sector as a whole and within the designated industries specifically?*

3) *How does the chosen diversification strategy affect the market-entry strategy and firm performance within the respective industries?*

4) *Are the prerequisites and success factors, which guided Samsung's diversification strategies in the past, still valid and applicable in a hypercompetitive and globalized environment?*

To answer these questions, it is necessary to clearly define what the term "firm performance" means and how it is measured. Additionally, as indicated above and as will be detailed later in the thesis, diversification strategies are not absolutes, but can take many forms, ranging from directly related to entirely unrelated industries, with numerous nuances and alterations in between these two points. As such, it is necessary to define both the different types of relatedness and to specify when a diversification strategy can no longer be considered a related diversification, but a move into an unrelated industry.

2.1 Measuring firm performance

To answer the research questions, it is necessary to define "firm performance" as it will be used, among other factors, to assess the effectiveness and success of the diversification strategies in question. In the past, researchers have used both accounting- and market-based measures to examine the relationship between diversification and firm performance. Empirical studies, especially in developed economies, have reached conflicting results when firm performance was measured with accounting ratios, such as return on assets (ROA) or return on sales (ROS) in comparison to share price ratios, such as the Sharpe or Treynor ratio. For instance,

firms diversifying into related businesses have the highest ROA, while firms diversifying into unrelated businesses have the highest share price ratios. It is clear that firm performance is a multi-dimensional concept with at least two agreed upon dimensions: risk and return (Purkayastha, Manolova & Edelman, 2012). Historically, firm performance was only measured based on returns. Only recently was more attention given to risk measurement since diversification that results in improved returns but comes at the cost of higher levels of risk does not necessarily make a firm better off than diversification, which results in lower returns and lower risk (Bettis & Mahajan, 1985). Additionally, if risk were to be excluded as a relevant dimension, it would assume that motives of diversification for the purpose of risk reduction do not exist. This, as will be covered in section 4.0, is not the case. The other central aspect to consider when analyzing firm performance is that both return and risk can be measured using either accounting- or market-based data. Accounting data is backward-oriented and therefore may be more vulnerable to manipulation. Although past research indicates a strong positive correlation between accounting- and market-based measures of firm performance, these lead to conflicting results when evaluating diversification strategies. This may be attributable to the time it takes for a firm's diversification strategy to be fully reflected in accounting-based performance measures or to the greater volatility of stock market returns to external forces. The assumption of superiority of market-based measures rests on the belief that markets act efficiently, and all future benefits of diversification strategies can be fully anticipated and as such are reflected in a firm's stock price (Purkayastha *et al.*, 2012).

As both types measures have their advantages and disadvantages, this thesis will follow a hybrid approach pioneered in more recent studies by Kakani (2000) and Khanna and Palepu (2000a; 2000b), which combines both accounting- and market-based measures when appropriate. As the case(s) being studied within the context of this thesis are ongoing, a more holistic assessment of firm performance in relation to diversification strategies is required. A strategic, forward facing component needs to be introduced that considers both global megatrends, industry forecasts, and the organizational structure of Samsung and its corporate strategy, including the company's current knowledge and asset base as well as potential

synergies, in order to fully assess the future potential of Samsung's operations in the medical device and biosimilar industries.

2.2 Measuring relatedness

It is commonly agreed upon that diversification, as a growth strategy for firms, is based on the benefits of leveraging existing resources. However, which resources this specifically refers to is largely open to interpretation and strongly depends on the context i.e. particularities of the industry, the firm, technologies, products, customers, and a range of other dimensions. This makes it very difficult to identify the determinants of diversification decisions and creates problems when testing more complex theories, such as the resource based view, due to the absence of a uniformly applicable measure for relatedness (Bryce & Winter, 2006).

It is believed that, among others, industry relatedness affects firm performance, the direction of diversification, the entry mode, organizational structures, and financing and as such is a core concept of corporate strategy. Nonetheless, there is no clear definition of and approach to measuring industry relatedness that captures the full complexity of the topic. The fundamental challenge in analyzing relatedness is that the same factors that drive diversification decisions also cause other actions, making it difficult to differentiate cause and effect when it comes to firm performance (Lien & Klein, 2009). More recently, Villalonga (2004) has attempted to deal with this problem by examining diversified firms before they diversified and by applying self-selection and instrumental variables models. However, research on industry relatedness is confronted with an even more fundamental difficulty: the concept of relatedness in itself is difficult to conceptualize and place within clearly defined parameters. This makes it challenging to measure consistently across multiple industries. Numerous continuous and categorical measures based on distances between *Standard Industrial Classification (SIC)* codes (see Appendix 1) have been used, but not consistently, which may explain the measurement problem and the inconsistent and contradictory findings regarding the effects of relatedness on firm performance (Lien & Klein, 2009).

Originally, the concept of relatedness in the field of strategy research was used to analyze the linkage between diversification strategy and firm performance (Chandler, 1962). From there, scholars of strategic management have argued that firm portfolios, which are comprised of interrelated businesses, should result in higher firm performance than portfolios comprised of unrelated businesses because of economies of scope. However, these economies are only one (albeit important) source of performance differences between related and unrelated firm portfolios. Since corporate diversification strategies are an aggregated product, relatedness measures typically combine different levels of inter-activity relatedness within the firm, based on a predefined explicit or implicit weighting scheme, to reach an aggregated relatedness measure on the portfolio level. As such, the most common relatedness measures consist of at least two components:

- A component that assesses the degree of relatedness among activities;
- A component that weights these activities according to the proportion of the business they are a part of (Bryce & Winter, 2006).

Industry relatedness measures can be placed into one of three broad groups: categorical measures, continuous SIC-based measures, and a group of more recent, diverse approaches. Categorical measures, which go back to the work of Rumelt (1974), are based on three ratios:

- Specialization ratio: the proportion of a firm's revenue attributable to its largest single business;
- Related ratio: the proportion of a firm's revenue attributable to its largest group of related businesses;
- Vertical ratio: the proportion of a firm's revenue arising from all byproducts, intermediate products, and end products of a vertically integrated sequence of processing activities;

and four broad categories of diversification strategies (nine, if subcategories are included): single-business firms, dominant-business firms, related firms, and unrelated firms. The largest drawback of categorical measures is the subjectivity with which businesses are classified as related or unrelated. This is based on similarities in production technology, distribution channels, customers, and inputs. Categorical measures capture relatedness on a nominal level, which only allows for comparisons within group averages (Lien & Klein, 2009). Furthermore, they neglect the concept of transaction costs and indivisibilities, which are

necessary to measure economies of scope. As such, categorical measures tend to over- or underestimate relatedness in certain instances (Foss & Christensen, 2001).

Measures	Empirical base	Relatedness component	Primary usage	Source
Herfindahl Index	Patterns of firm revenue within portfolio.	None in the base measure. Gollop and Monihan include Euclidean distances among product class input shares.	Diversification research: Berry, 1971; 1975.	Berry, 1971.
Entropy Index	Patterns of firm revenues within portfolio; Standard Industrial Classification (SIC) hierarchical structure.	Entropy calculated separately for 2-digit and 4-digit industries; difference in these scores is relatedness.	Diversification research: Palepu, 1985.	Jacquemin and Berry, 1979.
Wrigley-Rumelt Classifications	Patterns of firm revenues within portfolio – categorization into one of nine categories based on three ratios: specialisation, vertical and related.	Business is related if revenue from largest group of related activities (defined by researcher) is greater than 70 percent (related ratio) while no single industry's revenue is greater than 70 percent (specialization ratio).	Diversification research.	Wrigley, 1970; Rumelt, 1974.
Concentric Index	Patterns of firm revenues within portfolio; Standard Industrial Classification (SIC) hierarchical structure.	Based on distances in the hierarchy of the SIC system; pairwise relatedness decreases as codes share only the same 3-digit, the same 2-digit, or different 2 digit codes, respectively.	Diversification research e.g. Montgomery and Wernerfelt, 1988.	Caves, Porter, and Spence, 1980.

Figure 3: Measures of product-market relatedness (adapted from Bryce & Winter, 2006, p. 33)

Continuous SIC-based measures are the most established approach when it comes to industry relatedness and include the entropy index and the concentric index (see Figure 3). Although there is some subjectivity involved in the assignment of SIC codes by the U.S. Census Bureau, the degree of subjectivity remains constant across studies that follow this approach. Additionally, continuous measures introduce the concept of a relatedness scale, which allows relatedness to be measured in intervals (2-, 3-, and 4-digit levels in the SIC system). This however, introduces different shortcomings. Continuous measures assume that industries are homogenous within category levels, which causes problems as the breadth of the industry classifications vary. Furthermore, continuous measures are built on the premise that industries equally distant within the SIC hierarchy are equally related/unrelated, which in reality is highly unrealistic. Even though SIC codes are a good indicator for the substitutability of resources between industries they tend to exaggerate relatedness (Lien & Klein, 2009). Since SIC-based measures have a bias towards economies of scope, they are less likely to capture complementarities

and as such underestimate this aspect of relatedness. Overall, SIC-based measures are not better than categorical ones in capturing transaction costs and indivisibilities (Foss & Christensen, 2001).

Due to the gaps in the relatedness measures discussed above, recent studies have focused on resources that are especially likely to generate excess capacity, positive spillover effects, and perform positively in terms of transaction costs. The reasoning behind this approach is that if these types of resources can be identified, the probability that these resources enhance efficiencies, increases. Most prominent among this line of research is the approach that uses data from patent filings to analyze technology flows between industries, which indicates how valuable technological resources from one industry are in another. While most technological resources tend to be imperfectly divisible, some, like patents, can be considered quasi-public goods. This means that their use in one industry does not preclude their use in others if the technology/knowledge can be applied at low marginal costs in the other industry. These technology flows may additionally indicate dynamic complementarities among industries and there is research indicating that such transfers are subject to high transaction costs. In short, measuring the flow of technological resources touches on multiple aspects of relatedness that have been established in the literature (Breschi, Lissoni & Malerba, 2003).

Measure	Empirical base	Relatedness component	Primary usage	Source
Scherer input- output-matrix	R&D flows based on patent usage data.	Based on similarity between profiles of technology inflows.	Tests of the resource-based view.	Robins and Wiersema, 1995; Scherer, 1982.
Occupational categories	Occupational classes.	Based on similarity between occupational classes between industries.	Tests of the resource-based view.	Farjoun, 1990; 1994.
Technological distance	Patents.	Based on assignments made by the Canadian Patent Office of patents to industries of likely use, which in turn are matched to the US SIC system using Silverman's (1996) U.S. Patent Class - U.S. SIC concordance.	Tests of the resource-based view.	Silverman, 1996; 1999.
Present measure	All diversification moves in the US manufacturing economy.	Implicit in methodology and arising from economy of scope arguments.	Tests of the resource-based view; examination of longitudinal expansion decisions.	Current study.

Figure 4: Measures of resource-relatedness (adapted from Bryce & Winter, 2006, p. 34)

The findings of this line of research are generally aligned with the literature on industry relatedness and are considered more accurate than categorical and continuous measures. Other measures that fall into this more recent approach to measuring relatedness include human resource profiles, commodity flows, and input ratios. These measures have limitations of their own. Most significantly, they can only capture relatedness associated with their respective measure i.e. technology, human resources, commodities etc. Additionally, these measures may only be applicable in certain industries e.g. technology flows can only be measured in patent-heavy industries. Finally, these measures are based on assumptions that do not always hold in reality i.e. not all patents are quasi-public goods and not all the technological resources can be easily replicated. This approach measures a different kind of relatedness than continuous and categorical measures. While the older approaches capture relatedness of products or markets, the newer approaches measure relatedness of resources (Lien & Klein, 2009).

In an attempt to combine the advantages and remedy the shortcomings of the measures discussed so far, Lien and Klein (2009) have developed a survivor-based approach that is able to capture the complexity of relatedness more comprehensively. The survivor principle, which goes back to the works of Alchian (1950) and Friedman (1953), argues that competition removes inefficient firms from the market. This in turn allows hypotheses about efficient behavior to be tested based on what firms actually do. This measure is based on the assumption that the choice of industries included in a diversified firm's portfolio will affect firm performance. These combinations indicate the *relatedness* of a given industry to others in the portfolio. As such, the fundamental logic of survivor-based relatedness measures is that related industries are more frequently combined in firms than unrelated industries. Originally developed by Teece, Rumelt, Dosi, and Winter (1994), this approach estimates how much the frequency of combinations of four-digit SIC industries deviates from expected random diversification patterns. Research shows that survivor-based relatedness measures are a good indicator of firms' decisions to exit businesses, indicating that this approach reveals something about the efficiency of certain industry combinations in successful (surviving) firms. In short, frequently combined industries and businesses, on average, represent more efficient combinations than those that are rarely combined. The major downside of this approach to measuring

relatedness is that it does not reflect how relatedness varies over time, either exogenously through technological advances, or endogenously through the emergence of new industries and the entry of new firms that change the relatedness dynamics in existing industries (Lien & Klein, 2013).

3.0 Research design and research method

The choice of research design, which is defined as a framework for the collection and analysis of data, reflects priorities given to the different dimensions of the research process (Bryman & Bell, 2015). This thesis will follow a case study research design, building on both qualitative and quantitative data, with a focus on the former. While a case study, in its most basic form, is a detailed and intensive analysis of a specific person, event or organization, the "case" is the focus of interest while the location/setting simply provides context. For this thesis, the case of interest is the relationship between (unrelated) diversification and firm performance, while the example of Samsung provides the context to analyze said case. Case study research designs most often face issues of external validity i.e. uncertainty whether the results from one/a few cases can be generalized to a larger population. However, as some might argue that the point of conducting research is to examine specifics rather than to generalize, this thesis aims to examine the specific case of Samsung diversifying into healthcare because it seems to run contradictory to the popular concept of a curvilinear relationship between diversification and firm performance. As such, this can be considered a black swan case study. However, it certainly is not the only example of unrelated diversification strategies yielding different results in terms of firm performance than what is to be expected according to the majority of literature on this subject.

As this thesis will incorporate primary and secondary data, it is important to be aware of the advantages and disadvantages of both. Data collected by researchers, which is tailored for a specific purpose and where the researcher has complete knowledge of the data collection process, is considered primary data. In this context, one of the most common concerns raised is that of subjectivity, as the data may rely heavily on the point of view of the researcher. Additionally, replicability can be an issue, as the lack thereof makes results difficult to generalize. Secondary data, on the other hand, offers the advantage of having access to verified, high-quality information through numerous data sets. In

general, secondary data has the advantage of being far less time consuming to gather, thus leaving the researcher more time to focus on analyzing the data and providing the opportunity to expand the scope of the research either longitudinally or comparatively. An obvious downside is the lack of familiarity and control over the data set (Bryman & Bell, 2015). This thesis will follow a case study approach that will expand the single case nature of "Samsung" both on a comparative and longitudinal level, as comparisons will be drawn between two distinct businesses within the Samsung conglomerate and will be analyzed over a period of time. As such, this thesis will make use of a wide range of sources as well as qualitative and quantitative data. These include prior case studies on Samsung, financial data from annual reports (among others), market studies, press releases, and unbiased external data sources (information from third parties). Although several attempts at arranging interviews with personnel at Samsung were made, the current situation (see section 5.2.1) at Samsung and its culture in general, resulted in contacts not being able or willing to share information. As such, primary data within this study is limited to inputs from industry experts and consultants.

4.0 Literature review

The relationship between diversification and firm performance has important implications for many fields of study such as strategic management, industrial organization, and financial management. Traditionally, research on the relationship between diversification and firm performance has been focused on developed economies, while more recent studies have looked at this relationship in the context of emerging markets and how these findings compare to the traditional perspectives. Although the potential advantages of diversification are known, the relationship with firm performance is not clear, as it is not possible to easily generalize the findings of past empirical studies. Both for developed and emerging economies, studies have shown positive (Rhodes, 1973; Chatterjee, 1986; Chang & Hong, 2000), negative or non-existent (Bettis & Hall, 1982; Perry, 1998; Kakani, 2000; Saple, 2000; Chu, 2004), and curvilinear (Rumelt, 1974; Markides & Williamson, 1996; Khanna & Palepu, 2000a; Khanna & Palepu, 2000b) relationships between diversification and firm performance. The empirical literature can be divided into three broad categories, which this review will follow: the external, the internal, and the financial perspective.

4.1 The external perspective

The primary focus of most of the early studies (pre-1974) in this field was on the extent and motives of diversification. Rumelt's (1974) seminal study introduced a new categorical measure of diversification, which influenced this line of research for the following decades. Rumelt's major contribution was the finding that firms with portfolios diversified into related areas outperform other types of diversification by benefiting from economies of scope. Although there is strong support for Rumelt's findings from numerous subsequent studies on related diversification, other research (e.g. Demsetz, 1974; Montgomery, 1985) has shown that performance in diversified firms is related to the industry structure. Bettis (1981) showed that diversification can lead to the creation of entry barriers, which in turn leads to higher industry profitability. Starting with the research of Bettis and Hall (1982), several studies found that the differences between the profitability of Rumelt's categories disappears when accounting for the industry bias in the sample used, concluding that there is no significant relationship between diversification and firm performance.

Due to the contradicting results from the post-Rumelt studies, researchers started examining other performance measures. Michel and Shaked (1984) and Dubofsky and Varadarajan (1987) looked at the increase in shareholder value, a market-based measure. Both studies found that unrelated diversification was superior to related diversification regarding firm performance. Building on these findings, Wernerfelt and Montgomery (1986) found that industry profitability and industry growth have different implications for related and unrelated diversification. Their findings suggest that related diversification is better in highly profitable industries, while unrelated diversification is preferable in high growth industries. In contrast to market-measures, Hoskisson (1987) and Hill, Hitt, and Hoskisson (1992) examined the relationship between diversification and firm structure in a group of related studies. Their findings suggest that related diversification requires co-operative organizational forms, while unrelated diversification requires competitive structures. Thus, the authors argue that vertically integrated firms achieve economies by reducing transaction costs. Related diversified firms benefit from exploiting synergies, while unrelated diversified firms achieve financial economies by risk reduction, portfolio management, and internal capital markets. Teece *et al.* (1994) on the other hand examined the environments effect

on firm structures. They argue that due to low path dependence, slow learning, and weak selection, conglomerates will continue to exist. However, in environments characterized by rapid learning and fast technological advances, networked firms may arise.

Since no clear conclusion about diversification and performance could be derived from the research on different performance measures and firm structures, studies began to focus on the effect of synergies and economies of scope on diversification. According to Perry (1998), two businesses are said to have synergies if the combination of the two creates opportunities that are not available to either of them separately. Such synergies may stem from the sharing of infrastructure, tangible, and intangible resources (e.g. marketing and R&D operations, brand names, production and distribution facilities/systems) (Teece, 1982). Carter (1977) was among the first to examine the difference in performance between diversified and undiversified firms in this context with the conclusion that diversified firms outperform undiversified ones. Carter (1977) argues that the reason for the difference in performance stems from the synergies that diversified firms can utilize unlike their specialized counterparts. However, there are also downsides to diversification and there is a limit to the level of diversification that positively influences firm performance. Deneffe (1993) found that diversified firms postponed entry into new markets compared to undiversified firms in order to take advantage of cost externalities from experience transfers from their core product to new markets. Economies of scope are a specific form of synergy that are usually considered in terms of cost savings of producing two or more goods for a diversified firm relative to an undiversified firm. According to Teece (1980), only if economies of scope are based on the use of a common and reoccurring set of proprietary know-how or specialized and indivisible physical assets, can a diversified firm achieve performance benefits.

A different approach to understanding the effect of diversification on firm performance is to analyze the market power a diversified firm has opposed to an undiversified firm. According to Markham (1973), market power refers to the ability of a market participant to influence the price and the nature of the product in the market. The foundation of market power is the existence of entry barriers (Baumol, Panzer & Willig, 1982) and according to Montgomery (1994) these are

created by diversified firms through cross-subsidization, mutual forbearance, and reciprocal buying. Some studies (Edwards, 1955; Hill, 1985) on the other hand, argue that if a firm is larger than its competitors it will have more market power regardless of the type of diversification strategy it follows. Nonetheless, both perspectives conclude that diversification based only on market power is positively related to firm performance. However, other studies, most prominently Singh and Montgomery (1987), disagree. They argue that firms expanding into businesses related to their core product will transfer skills in technology, marketing, or specialized management, which in turn help in developing expertise and market power relative to the competition. Related diversifiers are more likely to create entry barriers based on economies of scope, patents, experience advantages, and brand reputation than unrelated diversifiers (Singh & Montgomery, 1987). Although Markham (1973) argues that the increase in market power for unrelated diversifiers can stem purely from the size of the firm, these benefits should also apply to related diversifiers (Singh & Montgomery, 1987) and as such related diversifiers have more market power than their unrelated counterparts. However, Gribbin (1976) raises the point that a diversified firm (both related and unrelated) with an insignificant position in numerous markets will not have any market power.

4.1.1 The institutional perspective in emerging economies

The studies covered so far have investigated the effect of industry structures on the performance of diversified firms in developed economies. The respective researchers have based their hypotheses on one crucial assumption: markets are efficient due to competitive forces. This assumption, which is already debatable in developed countries, does not hold in emerging economies due to the absence of intermediary institutions (Khanna & Palepu, 1997), the lack of well-defined property rights (Devlin, Grafton & Rowlands, 1988), and weak legal frameworks, resulting in opportunistic behavior, bribery, and corruption (Nelson, Tilley and Walker, 1998). Due to these constraints, the *Industrial Organization Perspective* has been expanded through the *Institutional Perspective*. This approach highlights the influence of systems around organizations that impact social and organizational behavior (Scott, 1995). In this context, several studies argue that organic growth of firms in emerging economies is limited by the institutional constraints mentioned above and, as such, diversified (network-based) growth is

more viable (e.g. Peng & Health, 1996; Child & Lu, 1996; Guillen, 2000; Khanna & Palepu, 2000a; Khanna & Palepu, 2000b) The argument behind this series of studies is that due to the lack or inefficiency of intermediate institutions (financial and market intermediaries), diversified firms can achieve scale and scope advantages from internalizing those lacking, intermediate functions (Chakrabarti, Singh & Mahmood, 2007). Building on this concept, Khanna and Palepu (1997; 1999; 2000a; 2000b) postulated that increasing degrees of diversification may increase firm performance in emerging economies due to the slow development of markets and institutions. They argue that through increased (unrelated) diversification firms may be able to create internal markets that are more efficient than external ones. Due to the lack of intermediaries in developing economies, internalization can be viable and lead to higher profitability. In more developed economies, diversified firms do not gain equally from internalizing operations because it becomes increasingly difficult to match the efficiency of relatively developed markets. A similar relationship can be observed in terms of the costs of diversification. Building on this line of reasoning, Villalonga (2004) and Leaven and Levine (2007) argue that diversified firms in developed economies have higher costs of diversification, which in turn results in lower firm performance. A specificity related to the case of Samsung is discussed in the line of research conducted by Backman (1999), who argued that within many Asian firms, diversification is driven by factors not captured by the research on market inefficiencies. These factors include aspects such as the exploitation of privileged access to information, licenses, and markets. Again, this advantage decreases in more developed economies with better developed institutional environments (Kock & Guillen, 2001).

Although there are numerous studies supporting the institutional perspective, research has been done that provides contradictory results. While Kakani (2000) found an inverse relationship between diversification and firm performance measures, Saple (2000) found that diversification has no effect on firm performance at all. However, she discovered an inverted-U-shaped relationship between synergy (a proxy for diversification in the economic model) and firm performance. As such, these results do not differ from those of firms in developed economies. These discrepancies in the performance of diversified firms are addressed by Khanna and Rivkin (2001). They argue that an inability to profit

from diversification indicates a lacking selection environment, in which weak organizational structures are not removed. There are two problems with this line of research. First, it is questionable if it is possible to empirically prove that diversified firms arise because of market failure (Gould & Lewontin, 1979). It seems plausible that diversified firms may arise due to completely different reasons, such as a set of special skills and abilities of entrepreneurs (Granovetter, 1994). Secondly, the assumption of the existence of an ideal point, in which no market inefficiencies exist and as such firms do not need to diversify, is very difficult to confirm. This theory would postulate that once economies reach this ideal (developed) point, diversified firms would split apart. However, a number of diversified firms still exist in developed economies, which can be considered market driven and "efficient", raising considerable doubt about the rationale that diversified firms arise due to market failures (Purkayastha *et al.*, 2012).

4.2 The internal perspective

The internal perspective grants new insights into the diversification-performance relationship by looking at how firms gain competitive advantages. The resource based view (RBV) argues that there are no long-term advantages of diversification that are based on generic resources since they are imitable and abundantly available and lose value if they are transferred to markets that are different to the ones that they originated from (Wernerfelt & Montgomery, 1988). Markides and Williamson (1996) argue that diversification strategies that are based on valuable, durable, inimitable, and non-substitutable inputs provide the foundation for sustainable competitive advantages. Collis and Montgomery (1995) found that such firm specific inputs can be utilized when diversifying into related industries. They also argue that firms need to continuously upgrade existing and acquire new resources since market forces and competition may quickly render a certain competitive advantage useless. Building on these findings, Prahalad and Hamel (1990) argue that resources and capabilities that are utilized beyond the products they were developed for, create an opportunity for diversification. Three mistakes that companies make when trying to diversify by leveraging resources are: (i) managers overestimating the transferability of specific assets and capabilities, (ii) managers overestimating their own capabilities to compete in other industries, and (iii) managers falsely assuming that generic resources are a source of competitive advantages in new markets, regardless of the market/industry dynamics (Collis &

Montgomery, 1995). In short, the RBV states that firms will only then have sustainable competitive advantages when they diversify into products that are related to the resources and capabilities that they already possess (Teece *et al.*, 1994).

On a theoretical level the RBV provides a clear link between diversification and firm performance, however there are only few empirical studies that research this connection. This is primarily due to the difficulty of measuring the concepts of resources and capabilities. One empirical study that has used the RBV is that of Robins and Wiersema (1995), which measures the flows of technology between businesses as an indicator of relatedness. They found that the greater the technological interrelationships, the higher the performance of the firms. Similar research was conducted by Ilinitich and Zeithmal (1995), who studied the relationship between managerial relatedness and the performance of diversified firms. They found that there is a significant, positive relationship between the degree of managerial relatedness of the business areas and the firm's performance. Markides and Williamson (1994; 1996) developed measures of relatedness based on brand recognition, organizational systems, customer and brand loyalty and found a positive relationship with firm performance. Finally, Brush (1996) studied the extent of resource sharing between acquired and acquiring firms and concluded that the most successful acquisitions had the highest level of resource sharing. The results of these studies have shown that firms following a highly related diversification strategy outperform firms following a more unrelated diversification approach.

4.2.1 The RBV in the context of emerging economies

The country and industry context in which firms operate directly influence the types of resources they acquire over time (Porter, 1990). This can be seen in the example of the emerging economies of East Asia, Latin America, and Southern Europe that developed in the 1960s and 1970s and that primarily entered mature industries (e.g. simple assembled goods, electrical appliances, rubber, steel, and chemicals). As the governments of these emerging economies sought to nurture local businesses they protected them from foreign competition, which allowed these businesses to leverage both local and foreign contacts to acquire foreign technology and resources with which they could serve their domestic markets

(Haggard, 1990). This has lead Kock and Guillen (2001) to argue that such protectionist behavior and other barriers in emerging economies not only distort the value of firms' resources and capabilities but expands them to incorporate factors such as political and bureaucratic contacts and connections, which they argue are important drivers of firm performance in emerging economies. Furthermore, the ability to build and leverage contacts and connections can not only be used in a multitude of industries but actively leads to an organizational form characterized by following unrelated diversification strategies: the business group. This organizational structure has led to the formation of some of the leading conglomerates from emerging economies that have dominated the private sectors in these countries (Ghemawat & Khanna, 1998). Khanna and Rivkin (2001) define business groups as a set of firms that are bound together through a combination of formal and informal ties and that take coordinated actions, while legally remaining independent. The research on business groups in the context of the resource based view, although limited, can be divided into three general streams.

The oldest and most extensive stream of research began with the study of Leff (1976), which explains business groups as a response to the lack of intermediary institutions and the resulting market imperfections. In the context of emerging economies, Chang and Hong (1998) discovered that Korean chaebols benefit from value-enhancing internal product and labor markets, while Khanna and Palepu (1999) found a positive correlation between product, labor, and capital market intermediation for Chilean and Indian business groups for both accounting and stock market measures of firm performance. Furthermore, both Chang and Hong (2000) and Yiu, Bruton, and Lu (2005) found that Korean and Chinese business groups respectively have a higher firm performance than focused companies. The second stream of research argues from a more sociological standpoint and views business groups as an arrangement of formal and informal relationships that connect affiliates (Granovetter, 1994). The resulting network of relationships, also defined as social capital by other lines of research (Adler & Kwon, 2002; Bhappu, 2000), is built on mutual trust and the concept of reciprocity. Violating these fundamental values can permanently damage the relationship and can result in both social and economic exclusion, which in turn functions as a form of negative reinforcement for the members of the network to adhere to the norms. Adler and

Kwon (2002) consider the processing of high quality information among the participants, exerting mutual influence and power, and resource sharing as the primary benefits of such networks. The downside to business groups is the risk of becoming overly entrenched in said networks, which can lead to parochialism, xenophobia, isolationism, and inertia, which run counter to organizational performance, especially in a globalized world (Chung, 2004). The third stream takes a more critical stance towards business groups and argues that they are counterproductive as they allow a small number of firms to receive preferential treatment from the ruling forces of a country and as such are a barrier to the allocation of resources through competitive forces (Ghemawat & Khanna, 1998). Additionally, this close connection to the power structures of the respective countries leads to bail outs of firms in times of distress. This is especially problematic when firms are considered too large to fail (Fisman, 2001).

4.3 The financial perspective

The role of finance regarding the diversification-performance relationship covers three areas. The first is focused on the aspect of risk reduction, the second covers the economies of internal capital markets, and the third is based on agency theory. Amit and Linvat (1988) argue that firms diversify into unrelated areas because the earnings from these businesses are negatively correlated and as such reduce the overall variance (risk) of the firm. Lewellem (1971) and Perry (1998) claim that a firm's goal is to ensure stable earnings and as such should follow an unrelated diversification strategy to reduce its overall business risk. However, several researchers argue that a conglomerate merger does not yield economic advantages (Levy & Sarnat, 1970). No additional value is created from minimizing unsystematic risk in unrelated diversified firms since investors can achieve the desired levels of personal portfolio risk at a much lower cost (Montgomery & Singh, 1984) and consequently firms should not be concerned with such strategies as they are not valued by the stock market and the shareholders (Lubatkin & O'Neill, 1987). Although firms can reduce their systematic risk through related diversification, Lubatkin and Chatterjee (1994) argue that these benefits stem from synergies and the sharing of resources in related businesses rather than risk diversification.

Williamson (1975) argues that internal capital markets are an explanation for diversification as they enable diversified firms to reduce the transaction costs of raising and allocating capital. Caper (2003) extends this line of research by showing that undiversified firms are more dependent on external sources for raising capital, which are not only more expensive than internally generated funds but also result in a less efficient allocation within the firm (Stein, 1997). Additionally, corporate headquarters within a diversified firm, which act as internal capital markets, have more information about their business units and auditing systems allowing them to control managers through incentive systems, whereas managers in undiversified firms more often behave opportunistically due to information asymmetries (Jones & Hill, 1988; Williamson, 1975). Nonetheless, internal capital markets also have disadvantages: they reduce entrepreneurial incentives of managers (Gertner, Scharfstein & Stein, 1994), they create agency problems (Stein, 1997), and they can lead to inefficient capital allocations if the business areas are not financially independent (Lamont, 1997) and as such cross-subsidization is not always effective (Berger & Ofek, 1995; Shin & Stulz, 1998).

Agency theory offers a different explanation for the diversification behavior of firms, suggesting that diversification may occur because of managers striving for personal gains. Some researchers in this field argue that diversification may stem from the power and prestige of managing a large firm (Jensen, 1986), the lower risk of managers being unemployed (Amihud & Lev, 1981), and the relationship between the compensation of managers and firm size (Jensen & Murphy, 1990). Additionally, Jensen (1986) postulates that excess cash flows can also lead managers to diversify. He argues that managers can be hesitant to use excess capital as dividends as this would decrease the resources under their control. Nevertheless, most empirical evidence suggests a different explanation for diversification. Denis, Denis, and Sarin (1997) propose that firms run by managers tend to diversify less than owner-controlled firms and there is a clear relationship between diversification and the intensity of ownership.

4.3.1 The financial perspective in the context of emerging economies

When research in the field of the financial perspective is conducted on emerging economies it focuses on the areas of transaction cost economics and agency theory. In this context, transaction cost economics argue that when the costs of

doing business in the open market are low resource allocation should follow open market mechanisms, but when these costs are relatively high firms should internalize the transactions (Todorova, 2007). In the context of emerging economies, market failure can be caused by a variety of reasons: opportunistic behavior of suppliers, inefficient information processing, ineffective price mechanisms, or lacking contractual obligations (Chang & Hong, 2000). As these market inefficiencies make it more difficult for firms to conduct day-to-day business, finding ways to mitigate these costs will lead to better firm performance. Business groups represent the predominant method of reducing transaction costs in emerging economies as they offer the affiliated firms three advantages. First, the organizational structure of business groups allows for appropriating quasi-rents, which are accumulated due to the low transaction costs of accessing rare and imperfectly marketed resources such as capital and information (Chung, 2004). Second, in the absence of developed capital markets, business groups represent an alternative to portfolio diversification. Third, business groups also integrate vertically to eliminate problems arising from bilateral monopolies or oligopolies (Chang & Choi, 1988). As discussed before, one reason for the development of business groups can be found in the theory of social capital (section 4.2.1), with the benefits of such organizational structures being high quality information processing among the participants, mutual influence and power, and solidarity (Tsai & Ghoshal, 1998). From a financial perspective, this means that if members of a business group can capitalize on the benefits mentioned above they will be able to reduce transaction costs and thus improve the firm's performance.

Agency theory, a line of research by Jensen and Meckling (1976), Fama and Jensen (1983), Claessens, Simeon, Joseph, and Larry (1999), and Thomsen and Pedersen (2000), states that professional managers with very small personal equity stakes in the company may pursue actions such as diversification that reduce shareholder value, while firms with a concentrated ownership base outperform those with dispersed ones as they have a stronger incentive to monitor the performance of their managers and discipline them. Building on this line of research, Gong and Kim (1999) reason that business group managers are more efficient than professional managers as the former have an ownership incentive. However, this does not eliminate agency problems. In emerging economies,

conflicts between owner-managers (those who have corporate control of the business) and minority shareholders of the affiliated firms are common. More specifically, managers of business groups may transfer resources i.e. capital from one affiliate to another to strengthen its competitive position without compensating the shareholders of the affiliate firm that is providing the resources (Chung, 2004). Often, the founder families also manage these business groups, which means that abusing insider information and expropriating minority shareholders through intra-group business transactions are common practices (Chang, 2003). Although agency problems also occur in developed countries, corporate governance mechanisms in emerging economies are still weak and can bring entire business groups down, as evidenced by the Asian financial crisis in the 1990s (Lim, Das & Das, 2009).

4.4 Synthesis of the three views

Due to the long-lasting interest, numerous studies from different schools of thought have been conducted on the topic of diversification strategies over the last 60 years. While all theories cover important aspects of the diversification-performance dichotomy, some tend to over-simplify the real-life complexity or over-emphasize particular parameters of diversification strategies.

Perspectives	External	Internal	Financial
Predominant findings in developed economies	• Related diversification yields the best results if accounting measures are used to assess firm performance. • Industry profitability plays a major role. • Unrelated diversification yields the best results if market measures are used to assess firm performance.	• Related diversifiers that are able to create structures through which strategically important resources can be transferred, will be successful.	• As systematic risk is not diversifiable, diversification is not beneficial. • A diversified firm can benefit from internal capital markets. • Diversification decisions may be motivated by managers seeking personal gains.
Predominant findings in emerging economies	• As institutions are inefficient, greater diversification can be beneficial.	• As emerging markets mature, diversified firms must learn not only to acquire, but also to share intangible resources and capabilities across other firms within the same business group.	• Un- or underdeveloped capital markets lead to the development of diversified, hierarchical firms.

Figure 5: Summary of the three research perspectives (adapted from Purkayastha, Manolova & Edelmann, 2012, p. 33)

As the results of these studies are often contradictory between the different perspectives as well as within (especially in the context of developed vs. emerging economies), the table above summarizes the predominant conclusions that can be drawn from each of the three schools of thought (internal perspective, external

perspective, financial perspective). As the following case study will show, a complex set of factors, from all three theoretical perspectives, influences the success of diversification strategies.

5.0 Case study: Samsung's venture into healthcare

The following case study of Samsung's venture into healthcare will have two industries and as such two Samsung subsidiaries as focal points. It will examine Samsung's corporate diversification strategy, the differences between the medical device and biosimilar industries, and how the factor of "relatedness" reflects in the firms' performance in these respective areas. After a brief overview of Samsung, its history, culture, and organizational structure, the respective industries in terms of size, competition, and general trends will be analyzed. Following, Samsung's different diversification strategies will be analyzed and compared. Finally, an attempt at a future outlook regarding Samsung's venture into healthcare will be made.

5.1 Overview of the Samsung Group

The Samsung Group is South Korea's largest and most influential chaebol (business conglomerate), which comprises over 80 subsidiaries and affiliates, ranging from ship building over microchip and semiconductor manufacturers to insurance providers and hospitals. Around the world, Samsung is primarily known as a technology company, manufacturing smartphones, LCD televisions, and other electronic appliances. At home however, Samsung touches (almost) every aspect of a person's life. South Koreans can be born in the Samsung Medical Center, grow up using Samsung tablets and phones, study at Sungkyunkwan University (a Samsung affiliate), live in Samsung-built housing equipped with Samsung appliances, use Samsung Life Insurance, and can even find themselves in Samsung funeral parlors at the end of their lives. Samsung touches so many parts of people's lives that South Korean's half-jokingly refer to their country as the "Samsung Republic". The Samsung Group, all of the subsidiaries and affiliates, account for more than 20% of the entire market value of the Korean Stock Exchange (most of it coming from Samsung Electronics) and around 15% of South Korea's Gross Domestic Product (Ullah, 2017). Samsung Electronics employs over 300,000 people in over 79 countries and generates annual revenues of nearly $175 billion and net profits of almost $20 billion, largely from sales outside of South Korea (not considering other group affiliates) (Samsung

Electronics Co., Ltd. and Subsidiaries, 2016). Nonetheless, Samsung, in terms of corporate culture and structures is very "Korean" with a strong hierarchical organization, a low number of foreign employees (relatively speaking), and an overall skeptical attitude to anything coming from outside the Samsung Group (Song & Lee, 2014).

5.1.1 History & Culture

"Change everything except your wife and children"
Lee Kun-Hee, Former Chairman of the Samsung Group
(Song & Lee, 2014, p. vii)

The Samsung Group looks back on remarkably humble beginnings and a history that can be divided into four periods (see Figure 6), at the center of which one finds the Lee family.

Time period	Samsung's growth stages		Major events at Samsung
1938 – mid-1950s	Foundation and establishment of Samsung's management system.	Small and midsized company (foundation and formation of core businesses).	• Entry into manufacturing (1953-1954).
Mid-1950s – late 1960s	Growth into a large, domestic company.	Large company (initial stage as a business group).	• Diversification (electronics, heavy industry, and chemicals); • Beginning of open competitive recruitment for entry-level positions.
Late 1960s – late 1980s	Emergence as Korea's leading company.	Large business group (upgrading/diversification of the business portfolio).	• Commencement of the semiconductor business.
Late 1980s - present	Emergence as a world-class company.	Global business group.	• New Management Initiative (1993); • Restructuring (late 1990s); • Global number one products (in electronics, ship building, heavy industry, and chemicals).

Figure 6: Samsung's evolution (adapted from Song & Lee, 2014, p. 24).

Founding and establishment of the management system (1938 to mid-1950s)

Samsung's story begins in 1938 when Lee Byung-Chul started a small trading company in Daegu named Samsung Sanghoe. As the trade with groceries, dried fish, and noodles prospered, Lee moved his company to Seoul in 1947 but was forced to leave shortly after when the Korean War broke out in 1950. This triggered Samsung's first diversification wave: Lee started a sugar refinery in Busan called Cheil Jedang and in 1954 founded Cheil Mojik, which operated the

largest woolen mill in Korea. These early hardships were central to the development of the three principles that would guide Samsung's management style: "contribution to the nation through business," "people first," and "pursuit of rationality" (Song & Lee, 2014).

Growth into a major domestic corporation (Mid-1950s – Late 1960s)

Samsung's development in the post-war period was marked by diversification into largely unrelated industries such as financial services (acquisition of Ankuk Fire and Marine Insurance in 1958), life insurance, distribution, papermaking, and media in the mid 1960s. Lee was determined to establish Samsung as a leader in multiple industries and was aided by President Park Chung Hee's efforts to rapidly industrialize South Korea. Hee's economic strategy, the export promotion and import substitution policy, supported Samsung's development into a large company. Due to its rapid expansion, Samsung needed to adapt its management system in order to deal with the increasing degree of complexity. Samsung not only implemented and adapted management strategies from Japanese companies but also introduced "open competitive recruitment" in 1957. By doing this, Samsung eliminated its previous practice of ad hoc recruitment through personal connections and guaranteed a continuous stream of talent coming into the company. Additionally, Samsung created a secretariat as a professional staff organization in 1959. This secretariat acted as the de facto headquarters of the Samsung Group and was known under various names throughout the company's history (e.g. Strategic Planning Office, Corporate Strategy Office etc.) (Song & Lee, 2014).

Becoming a domestic leader (Late 1960s – Late 1980s)

From today's perspective, this was one of the pivotal periods of Samsung's history as most of the key businesses that are driving sales today were established then. Most notably, with the founding of Samsung Electronics in 1969, Samsung began investing heavily into electronics. With the shift of the South Korean government towards chemicals and the heavy industry in 1973, Samsung diversified into petrochemicals, ship building, and construction and additionally tested the waters in hotels and advertising. The 1980s are marked by Samsung's move into the high-tech industries i.e. semiconductors, aviation, computers, and telecommunications, which it entered in 1980 through the acquisition of Hanguk

Jeonja Tongsin, a company specialized in telephone and fax manufacturing that would later evolve into the center of Samsung's mobile phone division. In this period, Samsung was able to achieve complete vertical integration of the electronics industry, laying the foundation of its current dominance in the consumer electronics industry (Song & Lee, 2014).

The growing size of the Samsung Group made it increasingly difficult to centrally manage, which is why Samsung restructured into divisions in 1975. As each division became responsible for its own performance, the division heads effectively became CEOs of their businesses. From that point on, new businesses were usually created by forming legal entities, which were independent of the other companies in the group. In many cases Samsung allowed the shares of these companies to be publicly traded, which meant these firms were not entirely owned by Samsung or the Lee family. The restructuring process was accompanied by the implementation of a management control system (audits, cost analyses, business evaluations, strategic planning etc.), the establishment of the Human Resources Development Center, the Economic Research Institute, and the Advanced Institute of Technology, which serve as support functions for headquarters (Song & Lee, 2014).

Becoming a global corporation (Late 1980s – Present)

The fourth, still ongoing phase of Samsung's development, depicts the company's ascension from the uncontended domestic powerhouse to a global player. This period can be divided into four sub-periods and began with the death of Samsung founder Lee and the transfer of control to his third son, Lee Kun-Hee in 1987 (Song & Lee, 2014).

In the late 80s and early 90s Chairman Lee declared the "Second Foundation", a new vision of Samsung as a world-class company that extends far beyond the Korean peninsula. In order to achieve this goal, Lee streamlined Samsung by integrating all of its electronics-related businesses, expanding its heavy industry and chemical businesses, investing in its financial services, and pursuing rapid market entries overseas (Song & Lee, 2014).

The second period lasted from 1993 to 1997 and began with the *New Management Initiative* and was brought to an end by the Asian Financial crisis. Chairman Lee was convinced that Samsung's management attention needed to shift from a focus on quantity to an unwavering dedication to quality. With radical changes, such as the 7 a.m. to 4 p.m. workday for office employees and a "line-stop system" designed to weed out defects during the assembly of products, the *New Management Initiative* impacted everything from Samsung's vision, its strategy, HR policies, management control to its organizational culture. During this period, Samsung also established several headquarters and manufacturing facilities abroad, which were accompanied by a number of brand image campaigns to establish Samsung as a global producer of world-class products in multiple industries (Song & Lee, 2014).

The third sub-period begins in 1998 after the Asian Financial crisis. Unlike many other Korean and Asian firms, Samsung had weathered the currency shock relatively well and was able to move forward quickly afterwards. It aggressively entered a number of emerging markets, strengthening its global operations. Nonetheless, it used the aftermath of the crisis to further restructure the Group. With the switch from analog to digital in the electronics industry, Samsung announced the *Digital Management Initiative*, implementing policies like performance-based pay and promotions (Song & Lee, 2014).

The fourth phase began in 2003 and is still ongoing. By investing heavily in marketing, design, branding, R&D, and software development, Samsung was able to close the competitive gap it had towards western companies in the electronics industry. Beginning in 2006, these measures started to pay off and Samsung was able to create new markets by converging technologies e.g. groundbreaking memory chips and digital TVs. Once again, Chairman Lee presented a new vision for Samsung, forcing the conglomerate to continue to change (Song & Lee, 2014).

5.2 Samsung's next big bet

At the outset of this millennium, Samsung began manufacturing batteries for electronic devices. By the end of the first decade of the 21st century Samsung was the world's largest information-technology firm, Apple's biggest supplier, and simultaneously greatest competitor in the hardware space (i.e. Samsung

components account for ca. 16% of the value of an iPhone). In 2001, Samsung ventured into flat-panel televisions. Within four years Samsung was the market leader. In 2002, Samsung invested heavily into "flash" memory, a technology that has enabled the rise of mobile devices. In these 10 years, Samsung evolved from a multinational company into a true global heavyweight, surpassing sales of $135 billion in 2010. It was at this point in time, when Samsung was dominating its competitors, that Lee Kun-Hee, Samsung's former chairman and patriarch, announced Samsung would need to target five new business areas, in which it barely had a presence at the time, and move away from "infotainment" in the long run in order to remain competitive. The initial plan foresaw investments of $20 billion, over the course of 10 years, into solar panels, light emitting diodes (LEDs), electric-vehicle batteries, medical devices, and biotech drugs (biosimilars) (The Economist, 2011).

Fresh fields

Samsung's new business areas

Sector	Investment, $bn	Ownership	Targets for 2020 Sales, $bn	Jobs	Status
Solar panels	5.1	100% Samsung SDI	8.5	10,000	Production began in January
LED lighting	7.3	50% Samsung Electronics, 50% Samsung Electro-Mechanics	15.2	17,000	Already selling in South Korea
E-vehicle batteries	4.6	50% Samsung SDI, 50% Bosch	8.7	7,600	Initial operations began in November 2010
Biotech drugs	1.8	40% Samsung Electronics, 40% Samsung Everland, 10% Samsung C&T, 10% Quintiles	1.5	1,000	Factory to begin in 2013; developing biosimilars now for patents expiring in 2016
Medical devices	1.0	100% Samsung Electronics	8.5	10,300	Blood-testing unit available, X-ray machine ready in 1-2 years, acquired ultrasound maker

Sources: Samsung; *The Economist*

Figure 7: Samsung's target businesses (The Economist, 2011)

Although Samsung Electronics is the largest consumer electronics company in the world, has dethroned Nokia as the biggest mobile phone manufacturer, and is ranked before Sony and Nike in terms of brand value, Samsung seeks not only to diversify out of consumer electronics, but into predominantly unrelated industries. With falling prices, razor thin margins, short product lifecycles, and demanding customers, Samsung runs the risk of suffering the same fate from Chinese rivals, as Western and Japanese firms did in the past from Samsung. The underlying rationale of chairman Lee was to move from infotainment to lifecare, or in other terms, from easily substitutable electronic devices and parts to more essential areas of society, namely green technology and health care, in order to cover a broader spectrum of future needs. Chairman Lee warned that the majority of

Samsung's current products would be gone in 10 years, an alarmist though not entirely unwarranted statement. In order to survive, Samsung does not only have to diversify into new, unrelated businesses, it also has to adapt its culture and open itself up to work with partners, both domestic and foreign. On the one hand, this diversification strategy can be viewed in light of Samsung's longstanding role as South Korea's economic powerhouse, wanting to further develop its home country and grow as a conglomerate. On the other hand, this was a risky decision that set Samsung on a confrontational course with some of the world's biggest companies (The Economist, 2011).

The ambitious goal set out by chairman Lee stated that by 2020 the five new business areas need to generate $50 billion and Samsung Electronics $400 billion in revenue (this figure includes continued, substantial sales in the mobile phone, LCD-TV, and flash memory industries). This seems like a steep target for any company to meet, however chairman Lee had proclaimed a similar goal in 2001, stating that Samsung, at that time generating annual sales of $23 billion, would surpass $100 billion in revenues by 2011 and become the world's largest technology company. In 2009, Samsung achieved Mr. Lee's target two years ahead of schedule (The Economist, 2011).

Although not all of the five new business areas are closely related to Samsung's core competence of technology and consumer electronics, they all have a need for substantial capital investments and present the opportunity of quickly scaling up manufacturing capacity. Both are factors that Samsung has built on in the past. Typically, Samsung's diversification strategy can be described as one that is based on spotting small, preferably capital-intensive, areas with high growth rates. Initially, Samsung will test out the new technology to get accustomed to the industry and wait for the right moment. For example, in 2001, when liquid-crystal displays reached a size of 40 inches, Samsung went "all in" and started manufacturing LCD televisions on a large scale. A similar strategy can be observed in the flash memory industry. Once Samsung has identified a suitable industry to diversify into, and it believes that the right moment has come, it will heavily invest capital in order to quickly ramp up production volumes, which not only results in price advantages over incumbent firms but also positions Samsung as a key partner for equipment manufacturers. As such, the exploration aspect of

Samsung's strategy is tailored more towards buying technology than building it. By entering markets as a "fast follower", Samsung eliminates the innovation risk and focuses on execution i.e. heavy investments to overtake first movers through much larger scale of production. Historically, Samsung has preferred capital intensive industries due to its access to cheap financing from the domestic banking sector, which was backed through implicit government guarantees (The Economist, 2011).

Out of the five target business areas for Samsung's current 10-year plan (solar panels, LED lighting, e-vehicle batteries, medical devices, and biosimilars), some are more closely related to its current core business than others. Its know-how and experience in manufacturing semiconductors and LCD televisions is directly applicable in the areas of solar panels and LED lighting as the materials, technologies, and production processes are similar. In the field of solar energy, Samsung is targeting both domestic and industrial applications. The rationale being that producing panels for "utility-scale" products will allow Samsung to lower prices for the residential market. Additionally, Samsung seeks to build on the "brand halo effect", hoping that customers that already use consumer electronic products from Samsung will opt for the same brand for their solar panels. Due to Samsung's leading position in the television market, it is already the world's second largest manufacturer of LED components. With a market growth rate of 65%, LED lighting is expected to replace compact fluorescents in the foreseeable future and Samsung's strategy once again aims at quickly building production capacity and becoming the prime supplier of components. Similarly, with Samsung's expertise in manufacturing batteries for mobile devices and laptops, making batteries for electronic vehicles seems like a natural progression (The Economist, 2011). By partnering with Bosch, the largest supplier of car parts, the joint venture SB LiMotive developed Lithium-Ion batteries for cars (the joint venture was ended in 2012, with Samsung retaining the production facilities in South Korea for a payment of €45 million to Bosch) (Financial Times Germany, 2012). Samsung expects that not all car manufacturers will follow Toyota's example and manufacture their own batteries, and as such plans to target the demand arising from the global shift towards e-vehicles (The Economist, 2011). Entering these three industries can be classified as related diversification strategies since existing know-how (on top of business-process expertise),

technologies, and organizational structures can be exploited to facilitate diversification.

The two remaining and distinctly different industries within the broad field of healthcare will be the focal point of this case study. Two distinctions need to be made at this point. First, the two healthcare industries, medical devices and biosimilars, are further removed from Samsung's current core business of consumer electronics than the three industries discussed above and as such cannot be classified as related diversification targets. Second, a distinction in terms of industry relatedness needs to be drawn between medical devices and biosimilars. Although it can be argued that Samsung can build on existing know-how and apply it to manufacturing medical devices, the similarities are limited and as such the move into the medical device industry can be considered as a constrained-related diversification, the exact degree depending strongly on the level of device complexity and degree of information technology integration. In contrast, biosimilars and the manufacturing of biopharmaceuticals have very little in common with consumer electronics apart from the scalability of manufacturing processes. As such, the venture into biosimilars can be viewed as a truly unrelated diversification (as far as that is possible in the context of one of the world's largest conglomerates). As the case study aims to compare Samsung's diversification strategy into medical devices and biosimilars, the industries will be discussed in greater detail in section 5.3 in terms of relatedness, market structure, trends, and future outlook.

5.2.1 The current situation: leadership crisis, product recalls, and sales records

In order to understand the current situation of Samsung as a whole, it is necessary to be aware of several crises that have shaken the chaebol in the last couple of years. The most impactful occurred in 2014 when the almost legendary chairman Lee Kun-Hee suffered a heart attack, which has left him hospitalized ever since. With Chairman Lee incapacitated, control of the Samsung empire fell to his son and vice-chairman Lee Jae-yong (Jay Y. Lee). With the greatest advocate of the proclaimed 10-year plan no longer able to steer Samsung's strategic shift and Jay Y. Lee's power and control not fully cemented, Samsung has been caught in a leadership struggle ever since (Martin, Cheng & Jeong, 2017). The situation became even more critical for Samsung when Jay Y. Lee was arrested in February

2016 on allegations of bribery, perjury, and embezzlement in connection to the prosecution of South Korea's former president Park Geun-hye. Jay Y. Lee is accused of funneling $36 million in bribes to a confidante of president Park, who was impeached on December 9th, 2016 (Kong & Lee, 2017). Although the Lee family has faced prosecution in the past, most served little to no jail time. Chairman Lee himself was convicted and pardoned. This time however, things could be different. After the impeachment of their president and the surrounding corruption scandal in their government, the people of South Korea have conflicting feelings towards Samsung and other chaebols: pride for all that these conglomerates have accomplished and done for their country and revulsion for all the privileges and advantages that they have enjoyed. As the political landscape in South Korea is changing and the young democracy rises, these advantages could deteriorate significantly (Martin *et al.*, 2017). After Jay Y. Lee's imprisonment, Kwon Oh-hyun, head of Samsung Electronics' highly profitable semiconductor division, became board chairman of the Samsung Group. Only a month after the group's de facto leader, Jay Y. Lee, was incarcerated, Kwon resigned in October 2017. Kwon stated that Samsung is "confronted with [an] unprecedented crisis inside [and] out" and that he believes the "time has now come for the group [to] start anew, with a new spirit and young leadership." This has left investors and analysts questioning Samsung's long-term growth potential, as the company is not willing or able to currently present any concrete plans (Harris & Jung-A, 2017)

During the second half of 2016 and early 2017 Samsung has literally come under fire due to faulty batteries in its Galax Note 7 line exploding while being charged. The timing was less than ideal, first reports surfacing only a week before the launch of Apple's iPhone 7 and just as the outlook for Samsung Electronics' smartphone division started to turn around after two tough years. Not only did this cause Samsung to lose its first mover advantage over Apple's iPhone 7 ahead of the holiday season, it also left Samsung vulnerable to the already highly aggressive Chinese competitors such as Huawei, Lenovo, and Oppo. Although Samsung immediately acknowledged the problem and issued a recall on 1 million sold phones (2.5 million had been produced at that time), the Galaxy Note 7 issue did not remain a small setback (Jung-A & Bradshaw, 2016; Bradshaw, 2016). Experts estimated that Samsung lost over 4 million unit sales worth $5 billion in revenues, or 5% of annual net profit. Additionally, the recall cost Samsung north

of $1 billion, roughly 1,7% of its $59 billion net cash reserves. Overall, analysts expected a decrease of Samsung's smartphone revenues by $5 billion and of the smartphone profit margins by 1.5% (Jung-A, 2016a). Samsung's reaction included switching battery suppliers from its Samsung SDI affiliate to China's ATL (Jung-A, 2016b). Nonetheless, Samsung announced a 5% increase of quarterly earnings, primarily driven by strong component sales. After several months of recalls, tests, and replacements, Samsung was unable to fix the battery issue and abandoned its, at that time, flagship phone. At the end of the day the Note 7 fiasco cost Samsung Electronics $5.3 billion (Financial Times, 2017a), destroyed $19 billion dollars of company value (of the entire Samsung Group), and left a significant dent in Samsung's image (Fildes & Jung-A, 2016).

As of July 2017, just over half a year later, the Note 7 crisis was offset by booming electronic component sales, namely semiconductors, memory chips, and flexible displays. Samsung not only rebounded from the Note 7 crisis but announced record quarterly profits for Samsung Electronics and ended Intel's reign (since 1992) as the largest chip manufacturer (in terms to total sales). Furthermore, analysts stated that Samsung's quarterly operating profit had surpassed that of its greatest rival Apple and that Samsung's profits would exceed those of the big four US tech firms (Facebook, Amazon, Netflix, and Google) combined. This turnaround was made possible because increased demand for smartphones, smart cars, and numerous other devices as well as the advent of the Internet of Things have led to capacity shortages for memory chips, which has triggered a super cycle of unprecedented dimensions in the semiconductor industry (Jung-A, 2017). Although this boom is driving Samsung's current success and is likely to make it the world's most profitable non-financial company, fears of the boom ending in a bust are growing. Due to the supply-demand imbalance prices of memory chips have doubled in the last year alone. This has attracted countless incumbents, especially from China, that are investing heavily in building up production capacities. Although the government has already invested over $150 billion since 2014, experts estimate that it will take China several years to become a major producer. The greatest risk Samsung is currently facing is that overcompensation of the current supply shortage (through increased investments into capacity) will cause the bubble to burst (Financial Times, 2017b). In the best case, Samsung will find itself confronted with low-cost

competitors from China in a couple of years. This example, like no other, underlines Samsung's need to explore new options, while simultaneously exploiting the businesses that are currently responsible for its success.

5.2.2 Organizational structure

"The Lees have held sway over the group's 74 companies through a web of shareholdings, though they own less than 2 percent of the total stock."
(Lee, 2014)

Through its long history of growth, the Samsung Group has evolved into an exceedingly diversified conglomerate that embodies the archetypical chaebol with its complex cross-shareholdings between individual affiliates and the founding family. On the one hand, this creates important internal markets for financial and human capital as well as know-how. On the other hand, the complexity of the Samsung Group's structure is a source of inertia, conflicts of interest, and legal disputes, such as the one relating to inheritances of the Lee family. The complexity arises due to a combination of two types of ownership: direct stakes of members of the Lee family and indirect stakes through companies that they control. Although the Lee family's control of the Samsung Group is not absolute, they are extremely difficult to remove (Lee, 2014). This topic alone would warrant an entire thesis and as such this section will merely attempt to provide a general overview in order to further the understanding of Samsung's venture into healthcare.

The Samsung Group's organizational structure has undergone significant changes between 2014 and 2016. Historically, the Samsung Group was structured as a circular conglomerate (see Figure 8), with significant cross-holdings between all major entities of the Samsung Group (Lee, 2014). In May 2015, Cheil Industries (formerly Samsung Everland), the Lee family's previous holding vehicle, made an offer to take over Samsung C&T far below market value, which was met by opposition from investors. In an attempt to further solidify family control over the Samsung Group, the Lee family used all of its influence in South Korea to get the deal passed (69.5% in favor, 66.7% were required). Through these substantial restructuring efforts, including mergers of several previously independent

affiliates, the Samsung Group is now organized as a holding company with Samsung C&T and Cheil Industries functioning as holding vehicles through which the Lee family controls all of the affiliates within the group (Ray, 2014).

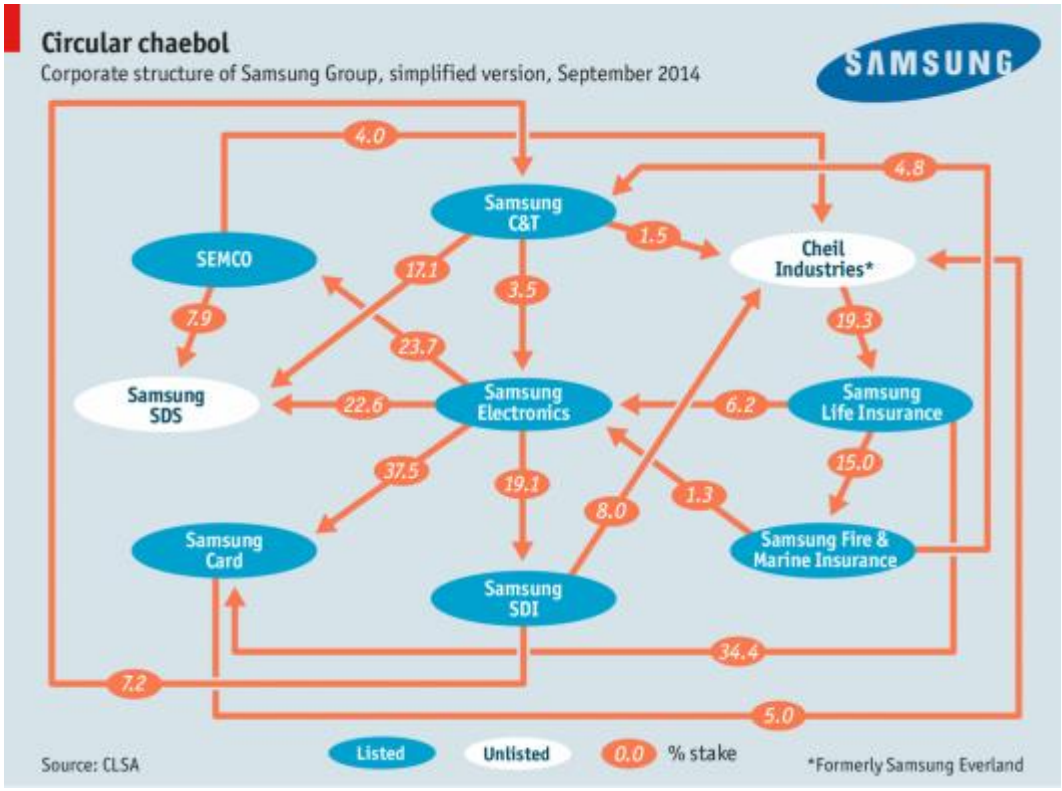

Figure 8: Circular chaebol structure (The Economist, 2011)

As of today, Samsung's Medical Device Division is a subsidiary of Samsung Electronics and Samsung's Biopharmaceutical operations (Samsung Biologics) are a subsidiary of Samsung C&T. This already gives an indication of how the two industries compare in terms of relatedness. While Samsung clearly sees a link between its Electronics business and the manufacturing of medical devices (indicating a certain degree of relatedness i.e. constrained related diversification), Samsung's biopharmaceutical operations are part of Samsung C&T, nominally dedicated to construction and trading, in reality however serving as the parent company of the group. This in turn at least indicates that biopharmaceuticals do not directly fit into Samsung's current portfolio and as such can be classified as an unrelated diversification target.

5.3 The healthcare sector

The healthcare sector refers to a broad spectrum of industries and businesses ranging from care providers, such as hospitals and nursing homes, over manufacturers of surgical equipment to pharmaceutical and biotech companies. As such, the healthcare sector is filled with a plethora of heterogeneous players,

customers, and stakeholders, making it difficult to clearly define. According to both the Industry Classification Benchmark (ICB) and the Global Industry Classification Standard (GICS), the healthcare sector can be categorized into two industry groups:

- *Healthcare Equipment and Services*
    - Samsung Healthcare and Medical Devices including Samsung Medison.
- *Pharmaceuticals, Biotechnology and Life Sciences*
    - Samsung Biologics and its subsidiaries (MSCI, 2017; FTSE Russell, 2017).

As of 2015, global healthcare expenditure amounted to $7 trillion and is expected to rise to $8.7 trillion by 2020, primarily due to a combination of improving treatments in therapeutic areas and rising labor costs as well as an increasing life expectancy. More specifically, forecasts predict that life expectancy will increase by one year by 2020, which would result in an increase of 8% in the aging population (over 65 years of age). Due to urbanization, inactive lifestyles, changing diets, and higher obesity levels, 50% (ca. $4 trillion) of global healthcare expenditure in 2020 will be spent on chronic diseases. Other growth drivers of the healthcare sector include rising prevalence rates of dementia (the number is expected to double every 20 years, reaching 74.7 million in 2030), diabetes (especially in China and India), and communicable diseases such as HIV-AIDS. Many of the world's current megatrends are directly influencing the development of the global healthcare sector by increasing the demand for and the access to healthcare:

- *Shifting demographics*: As both the world population and ageing society continue to grow and the prevalence of chronic diseases rises more patients than ever before require medical attention.
- *Increased access to healthcare in developing countries*: as countries with underdeveloped healthcare systems transition towards developed economies, the growth markets of the future will come from East Asia (especially China), India, and other transitioning countries with large populations.
- *Connected healthcare*: digitization will play a central role in the future of healthcare, both from patient and provider perspectives, as it will reduce

costs, enable novel treatments, increase productivity, and support home care treatment settings (Morris *et al.*, 2017).

However, this increasing demand is simultaneously causing governments to search for ways to control the surging healthcare costs and reign in their expenditure, confronting players in the healthcare sector with several challenges:

- *Increasing regulation*: State agencies control the development, testing, approval, and distribution of healthcare products, which increases in complexity with the associated risk of the products. Overall, the breadth of these controls has been expanding in recent years. Additionally, in several key growth markets such as China, additional requirements (both healthcare specific and generally applicable to foreign firms) are increasing time-to-market and costs.
- *Cost control*: Governments are shifting the focus of their healthcare systems towards disease prediction and prevention in order to cut costs in the long run. A move towards value-based outcomes is introducing more cost-control mechanisms such as quality-based performance payments, bidding and tender processes, and comparative studies to assess the effectiveness of therapies (Morris *et al.*, 2017).

Overall, the healthcare sector will grow in importance and size and in the years to come and as such sustained mid-digit growth rates in combination with high operating margins (compared to other industries) are expected (Morris *et al.*, 2017). This is not only increasing the competition between incumbents, but is attracting heavy-weight entrants from the technology sector. In 2015, IBM acquired Merge Healthcare, a medical imaging software company, for €1 billion and in September of the same year IBM established Watson, an artificial intelligence platform, with numerous applications in the field of healthcare. Google's venture capital arm (Google Ventures) has been increasing its investments in healthcare and life sciences and has entered into a partnership with Novartis to develop smart contact lenses that monitor blood sugar levels (Frent, 2017a).

For a conglomerate such as Samsung, with its current core expertise in electronics and information technology, the most obvious entry point into the healthcare

sector would be the manufacturing of medical devices. Biopharmaceuticals on the other hand have very little in common with the manufacturing of semiconductors, smartphones, or LCD televisions and as such would not seem to be an obvious choice. As the healthcare sector is very large and encompasses a diverse array of industries, the following section will highlight the key characteristics of both the medical device and biosimilar industries in order to reach a classification regarding the degree of relatedness to Samsung's core operations.

5.3.1. The medical device industry

The medical device industry produces a wide array of equipment that can be grouped into four main product categories:

- *Imaging diagnostics*
    - Diagnostic imaging systems
        - X-ray machines, CT scanners, MRI systems, Ultrasound devices etc.
- *In vitro diagnostics*: systems to measure and monitor vital functions
        - Blood pressure measurement equipment, endoscopes, electrocardiographs, hematological tests, urine test instruments etc.
- *Therapeutic devices*
    - Orthopedics, cardiovascular, ophthalmology, general surgery, neurological urology
        - Artificial internal organ apparatuses and support devices, medical apparatuses for home use etc.
- *Surgery supplies*
    - Surgical equipment and supplies; research and other equipment
        - Injection and puncture devices, tubes and catheters, orthopedic and operating supplies, microscopes and other research equipment etc. (Frent, 2017a).

Global annual healthcare spending reached €7 trillion at the end of 2016, which corresponds to nearly 10% of global GDP. With estimated revenues of €335 billion in 2015, the medical technology market accounts for a little over 4.3% of global health care expenditure. In 2015, 23% of global medical device expenditure came from emerging economies, a trend that is expected to increase

in the future, as these countries have relatively underdeveloped healthcare systems and as such a low penetration rates of medical devices (Frent, 2017a).

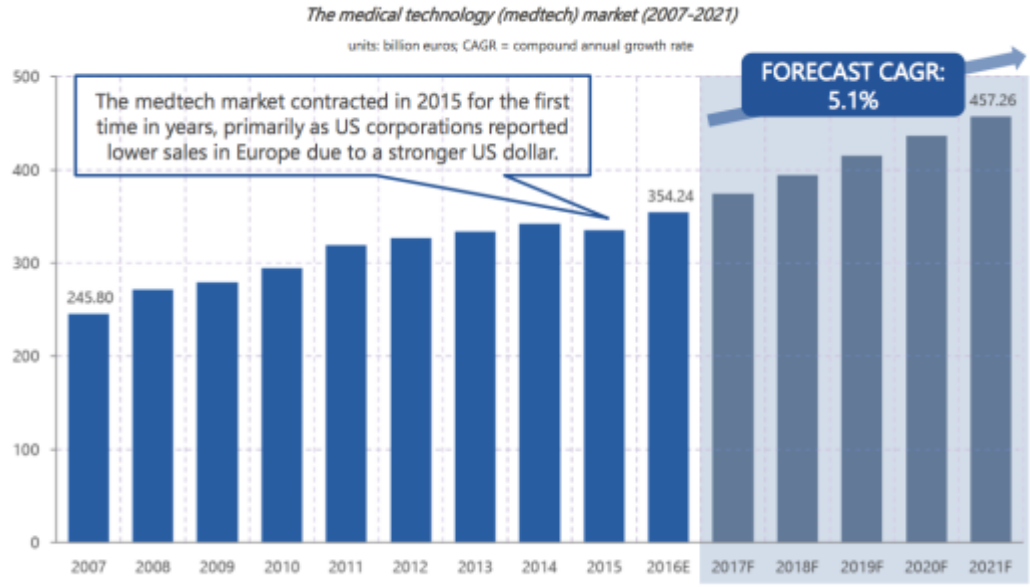

Figure 9: Medical device industry outlook (Frent, 2017a, p. 6)

The medical device industry is expected to grow at a 5% CAGR and exceed $450 billion euros by 2020. This growth will primarily be driven by increasing healthcare expenditure in emerging economies and, to a lesser extent, by an ageing population in developed countries. As the primary growth drivers for the medical device industry will be found in emerging markets, low- and middle-class devices will increase in demand and importance, while simultaneously lowering industry margins. A major challenge, especially for the market leaders from the US, Europe, and Japan, will be that developed country governments with low economic growth and high public debt levels will be looking to curb healthcare spending. This cost-containment pressure is forcing companies to provide more value-based solutions. Although the established firms in the industry will continue to rely on developed markets, it comes as no surprise that especially China and other BRICS countries present vast growth potential (Frent, 2017b).

The medical device industry is dominated by firms from developed economies with companies from Europe and the United States occupying the top 10 spots. These companies can be split into two general groups: diversified technology groups like Siemens, General Electric, and Philips and healthcare specialists such as Roche, Johnson & Johnson, and Medtronic. Amongst the healthcare specialists, companies such as Abbott, Johnson & Johnson, and Roche are active in both the

medical device and pharmaceutical industries, while pure medical device players such as Medtronic, Becton Dickinson, and Stryker tend to focus on specific therapeutic areas that require specialized medical expertise. Diversified technology groups on the other hand have typically entered the medical device industry through the imaging market, which allowed them to capitalize on their core capabilities and know-how (technology, engineering, etc.). From there, they diversified into more complex and unrelated fields. Additionally, Siemens, General Electric, and Philips are also the leading healthcare IT service providers, which puts them in direct competition to large tech companies like IBM and Google (and potentially Samsung) entering the medical device industry (Frent, 2017a).

unit: revenues in billion euros

COMPANY	Country	Revenues	Main medtech activities
Medtronic		26.06	Wide range of therapeutic devices
Philips*		24.52	Imaging devices and healthcare IT
J&J Medical Devices		22.70	Wide range of therapeutic devices
Abbott Laboratories*		18.84	Diagnostics and cardiovascular devices
GE Healthcare		16.54	Imaging devices, life sciences and healthcare IT
Siemens Healthineers		13.54	Imaging devices, life sciences and healthcare IT
Becton Dickinson		11.28	Surgical devices
Roche Diagnostics		10.52	In vitro diagnostics and diabetes care
Stryker		10.23	Orthopaedics, surgery supplies, neurology
Boston Scientific		7.58	Cardiovascular, medical surgery instruments

Figure 10: Top 10 medical device companies (Frent, 2017a, p. 25)

The medical device industry, although still very fragmented, has experienced a wave of consolidation in the past couple of years. Until recently the modus operandi has been that of slow, organic growth. This changed with Medtronic's acquisition of Covidien in January 2015, which made Medtronic the largest player in the medical device industry with sales of over €26 billion in 2016 (Medtronic, 2015). Further examples of increased M&A-activity in the medical device industry include Becton Dickinson's €12.2 billion acquisition of CareFusion (a medical instrument manufacturer) as well as a series of smaller deals made by

Roche Diagnostics, Stryker, and the Boston Scientific Corporation. As of 2016, the top 10 firms in the medical device industry account for 39% of the global market and have an aggregated operating margin of 15.2% (Frent, 2017a).

5.3.2 The biopharmaceutical industry

The biologic market is part of the pharmaceutical industry, which can be generally divided into four broad areas:

- *Branded prescription drugs:* require strong R&D-capabilities and a global sales and marketing infrastructure.
- *Branded "Over the Counter" (OTC) drugs:* require strong direct marketing capabilities to the consumer.
- *Generics:* require supply chain management capabilities and a low-cost manufacturing infrastructure to reach cost leadership.
- *Biotech drugs:* highly dependent on intellectual property rights; focused on specific/specialized fields of research (Bátiz-Lazo & Holland, 2004).

Biosimilars, also referred to as *follow-on biologics* or *subsequent entry biologics*, which have introduced new treatments to life threatening illnesses, are one of the fastest growing areas in the pharmaceutical industry. Biosimilars are a subgroup of biopharmaceuticals and as such belong to the category of biotech drugs. A biological drug is made from the cells of living organisms including humans, animals, and microorganisms such as bacteria and yeast. These products are manufactured with the use of genetic engineering and are typically derived from natural sources although synthetic production is possible in certain cases. Unlike conventional drugs, which are made purely from chemical substances and have distinct structures that can be identified, biological drugs tend to have a higher structural complexity and as such are more difficult to identify and characterize. Biologics are a newer type of drug, the early forms such as insulin, erythropoietin (EPO), and growth hormones, are used to treat chronic illnesses like diabetes, anemia, and renal diseases. Newer and more complex biologics such as monoclonal antibodies (mAbs), cytokines, and therapeutic vaccines are revolutionizing the treatment of autoimmune disorders, cancer, and other chronic diseases (U.S. Food & Drug Administration, 2017).

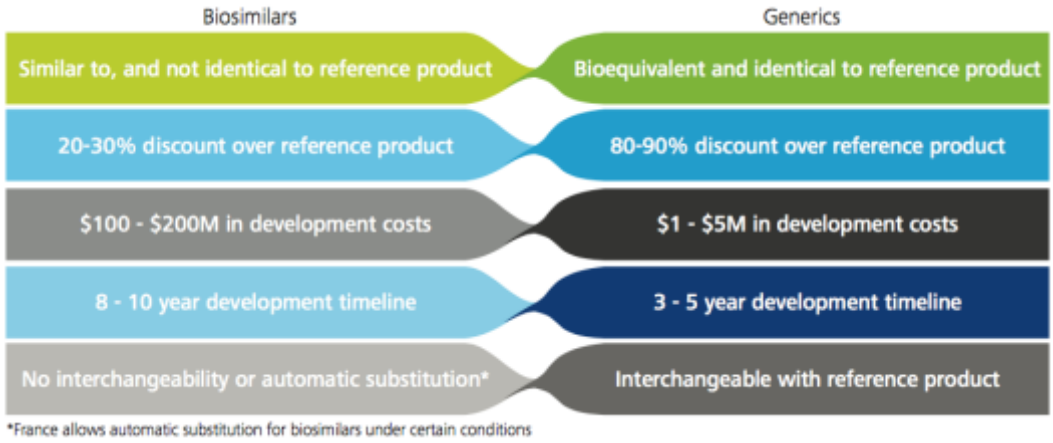

Figure 11: Differences between biosimilars and generics (Iyer et al., 2015, p. 3)

Especially for more complex disease areas that are associated with higher costs, biosimilars will be central in bringing therapies to populations that cannot afford them today. The World Health Organization (2009) defines a biosimilar as "a bio-therapeutic product which is similar in terms of quality, safety, and efficacy to an already licensed bio-therapeutic product. Biosimilars, as the name already suggests, are nearly identical copies of an original biological drug, normally manufactured by a third party (not the original developer) once the patent has expired. Biosimilars receive licensing/approval by national drug regulation authorities such as the Food and Drug Administration (FDA) in the U.S. and the European Medicines Agency (EMA) if the similarity to an already approved biological drug, the biological reference product, is given and there are no significant clinical differences in terms of safety and effectiveness. This in turn considerably reduces costs and time-to-market as fewer clinical trials and less R&D expenditure are required (see Figure 11) (Iyer, Jacoby, Peltre, Smith & Wilkins, 2015).

As of 2016, the global pharmaceutical market is estimated to be worth over $1.1 trillion with the biologics industry accounting for 18.5% ($204.8 billion). It is expected that overall growth of the pharmaceutical industry will primarily be driven by high annual growth rates of the biomedicine industry, which is expected to average around 9% per year until 2025 (Samsung BioLogics, 2017b). Since the early 2000s, the share of biologic sales (compared to the overall pharmaceutical industry) has nearly doubled from 11% in 2002 to 20% in 2017. The biologics industry is estimated to be worth $221 billion, up from $150 billion in 2013 (IMS Institute for Healthcare Informatics, 2013a).

Figure 12: Patent expiration on major biologics (Iyer et al., 2015, p.1)

The overall market is expected to be worth almost $300 billion in revenue and account for 27% of the pharmaceutical industry by 2020 and over 30% by 2025 (ca. $488.8 billion). As of 2017, 48% of sales are generated by 11 biologics that are approaching their respective patent cliffs within the next seven years (see Figure 12). The first biosimilar received approval in 2006 in the European Union. Since then, over 450 others have been approved and about 250 are in the pipeline globally. Biosimilars are growing in acceptance and popularity due to their value-focused pricing, cost-effective production, and quality in comparison to the biological reference product. Analysts predict that the global biosimilars market will be worth $25-$35 billion by 2020 (Iyer *et al.*, 2015).

Despite the evident potential and promising outlook, the adoption of biosimilars faces four challenges:

- *Regulatory uncertainty*: the regulatory guidelines governing biosimilars are still being established with major growth markets like China lacking formal and clear approval pathways.
- *Production complexity*: compared to generics, the cost, time, and risk associated with biosimilar production are higher, which are typically passed on to the consumer.
- *Interchangeability*: The lack of clearly defined guidelines on substitutability and interchangeability will likely result in physicians being more cautious in prescribing biosimilars until they are familiar with their quality and efficacy.
- *Competition*: biosimilars face competition from non-original biologics (NOBs) and bio-betters. It is expected that biosimilars will primarily engage in "brand-on-brand" competition within their respective therapeutic areas.
    - *Non-original biologics*: copies of innovator drugs that are predominantly found in markets with less strict intellectual property rights and/or markets without dedicated approval pathways.
    - *Bio-better*: incremental improvements of innovator drugs with the same regulatory pathways. Manufacturers of original biologics regularly use this strategy to strengthen their market position with an improved product, while still charging premium prices (Iyer *et al.*, 2015).

As cost-containment is a key objective of most governments, both of developed and emerging countries, biosimilars present an opportunity for significant cost reduction without sacrificing quality, efficacy, or safety (Senior, 2011). Especially the price premium, which is typically associated with biologic drugs, make them a prime target for government savings. As such, pathways for biosimilars have been established in Europe, the U.S., and a growing number of "pharmerging" markets (see Figure 13) in order to increase competition and lower costs (IMS Institute for Healthcare Informatics, 2013a).

Even though there are significant differences between individual countries, a number of common trends within developed and emerging markets can be identified. Developed markets, with the exception of the U.S., represent the majority of the global biosimilars industry and most manufacturers remain focused on these markets due to their current size (EU), their future potential (U.S. and Japan), and their established and dedicated pathways, which simplify the approval process. They also have the highest number of biosimilar molecules in development – ca. 29 in Europe, 19 in the U.S., and seven in Japan. However, commercial returns have so far remained below expectations. Another commonality within developed countries is that the adoption of biosimilars has primarily been driven by payers, which is especially true in Europe, due to the growing pressure to contain public health care expenditure. Nonetheless, adoption has been slowed down by a degree of skepticism among prescribers and low patient awareness (Iyer *et al.*, 2015).

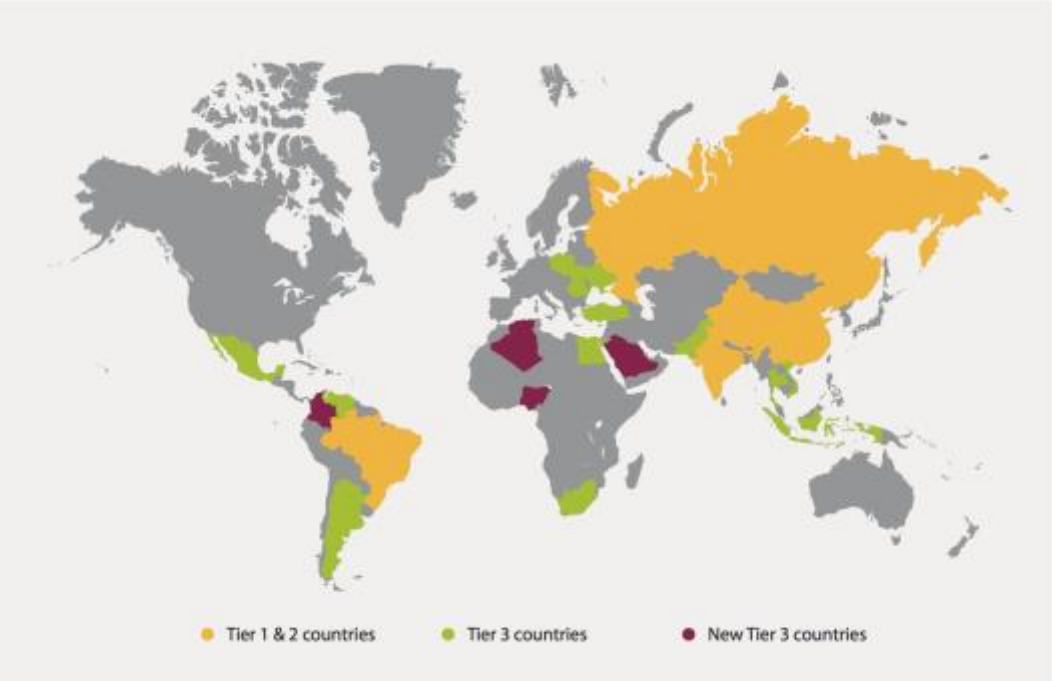

Figure 13: Pharmerging markets (IMS Institute for Healthcare Informatics, 2013b, p. 4)

"Pharmerging" markets are characterized by lower buying power for drugs, both in terms of government healthcare expenditure and per capita healthcare spending. As such, the markets for biosimilars and non-original biologics are growing very quickly. As of 2017, biosimilars account for less than 0.5% of the expenditure on biologics in mature markets, while they account for over 10% in "pharmerging" markets (IMS Institute for Healthcare Informatics, 2013b). To a large extent, the difference in penetration rates can be attributed to the limited access of patients to

affordable biologics and a greater openness of physicians to low-cost therapies. Although most emerging markets have established biosimilar pathways (they are still subject to change in China and Russia) and tend to be faster and more efficient than in developed markets (due to less stringent comparability criteria), sales of biologics are impeded by high out-of-pocket costs and consumer's low ability to pay. This results in sales growth depending strongly on the appropriate pricing of biosimilars (Iyer *et al.*, 2015).

5.3.3 Sector and industry relatedness: healthcare, medical devices, and biosimilars

Section 2.2 covers the most widely spread relatedness measures. In the context of this case study these will be used to assess the fit of the healthcare sector within Samsung's aggregate corporate portfolio of businesses i.e. the level of diversification represented by entering the healthcare industry, and to compare Samsung's businesses within the healthcare sector i.e. the biosimilar and medical device industries in terms of interindustry relatedness. As all relatedness measures have their inherent shortcomings and not all data is readily available (e.g. financial data to compute Wrigley-Rumelt diversification ratios, patent/technology flows between the industries in question) to apply all approaches, this thesis will use a combination of categorical, continuous, and survivor-based measures in an attempt to present a holistic and comprehensive analysis.

Categorical measures

In order to assess product-market relatedness using categorical measures, four areas of comparison can be used:

- *Production technology*
    - Consumer electronics: scalable mass-production of relatively cheap devices.
    - Healthcare:
        - Medical devices: lower production volumes, single units can be worth millions of USD (e.g. imaging machines)
        - (Bio)Pharmaceuticals: multi-tier production process (i.e. formulation, fill and finish etc.), requires highest sanitary standards to avoid contamination.

- *Distribution channels*:
    - Consumer electronics: large wholesalers and retailers.
    - Healthcare:
        - Medical devices: specialized medical wholesalers and hospitals (medical devices are primarily a replacement business), doctors and KOLs are very important; national health insurance providers and regulatory bodies play a significant role.
        - (Bio)Pharmaceuticals: radio pharmacies, hospitals - short shelf life needs to be taken into account; doctors and KOLs are very important; national health insurance providers and regulatory bodies play a significant role.
- *Customers*:
    - Consumer electronics: large wholesalers and retailers, customer can also be final consumer.
    - Healthcare:
        - Medical devices: customer is usually not final consumer i.e. medical wholesalers, hospitals (i.e. head of procurement, radiology, cardiology etc.)
        - (Bio)Pharmaceuticals: hospitals, radio pharmacies, clinical research organizations - customer is usually not the final consumer.
- *Inputs*:
    - Consumer electronics: focus on cost efficient resources, economies of scale and scope. Plastics, metals, semiconductors etc.
    - Healthcare:
        - Medical devices: require high quality inputs, rare earth metals etc.
        - (Bio)Pharmaceuticals: require chemical and biological substances as well as radioactive materials.

Based on the classification criteria of categorical measures it becomes apparent that apart from production inputs for medical devices there are no direct overlaps or complementarities between consumer electronics and the healthcare businesses

Samsung decided to diversify into. Additionally, this rudimentary analysis indicates a larger distance between consumer electronics and biopharmaceuticals than medical devices, especially considering production inputs and customers.

Continuous measures

The SIC structure is split into ten divisions (lettered A to J), which represent the highest, most general classification tier (see Appendix 1). Due to the nature and degree of diversification of the Samsung Group, it operates businesses in Division C (Construction), Division D (Manufacturing), Division G (Retail Trade), Division H (Finance, Insurance, and Real Estate), and Division I (Services) effectively covering half of all available divisions. Currently, the core of Samsung's business i.e. consumer electronics can be found in Manufacturing (Division D) with a focus on Industries 3500 (Industrial and Commercial Machinery and Computer Equipment) and 3600 (Electronic and Other Electrical Equipment and Components, Except Computer Equipment). As the healthcare sector is very large and encompasses a diverse number of businesses, it is not directly defined within the divisional structure of the SIC system. However, as discussed in section 5.3, the healthcare sector can be roughly split into two divisions: medical devices and equipment and pharmaceuticals. When applied to the SIC system it can be seen that pharmaceuticals are a subcategory of 2800 (Chemicals and Allied Products), while medical devices are part of 3800 (Measuring, Analyzing, and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks). The SIC code classification gives an initial indication of the degree of relatedness. While it comes as no surprise that Samsung's venture into healthcare takes place within the area of Manufacturing (Division D), both the pharmaceutical and the medical device industries are listed under separate categories. Furthermore, a distinction can be drawn between the biosimilar (pharmaceutical) and medical device industries. While the medical device industry is only removed from Samsung's current core business by two categories on the 2-digit scale, the distance to the pharmaceutical industry encompasses 7-8 categories. This indicates that in terms of product-market relatedness the consumer electronics industry is more closely related to the medical device than the biosimilars industry. This supports the initial hypothesis that the diversification into medical devices can be considered a constrained-related diversification relative to the move into biosimilars.

Survivor principle based measures

As discussed in section 2.2, the survivor principle, as a measure of industry relatedness, looks at successful firms and analyzes possible commonalities between their diversification behavior i.e. industries that successful firms enter more frequently tend to show a higher degree of relatedness than others. In the context of Samsung, it makes sense to look at other conglomerates, especially those from developed economies such as the U.S., Europe, and Japan. This approach yields an indicative reference group comprising General Electric, Siemens, Philips, and Toshiba. All of these companies have developed, both through organic and inorganic growth, into highly diversified conglomerates that hold leading positions in a number of markets. Additionally, all four conglomerates have core businesses in areas related to technology and electronics and operate in the healthcare industry. Although this indicates that, in the context of the survivor principle, the healthcare sector is a common diversification target for conglomerates with a background similar to Samsung's, it is important to differentiate between individual segments. While all four conglomerates chose medical devices as their first step into the healthcare sector, only one has entered the pharmaceutical industry subsequently (General Electric).

Both General Electric and Siemens look back on a longstanding presence in the medical device industry and beginnings in healthcare, which go back to the invention of x-ray devices pre-World War I. Both General Electric and Siemens built on their expertise in manufacturing electronic devices and experience with x-ray machines to become one of the leading players in the diagnostic imaging industry, producing ultrasound (US), electrocardiography (ECG), computer tomography (CT), positron electron tomography (PET), single-photon emission computed tomography (SPECT), and magnetic resonance imaging (MRI) devices. From there both conglomerates expanded into the areas of clinical consumables, life sciences, and more recently into imaging software and cloud-based healthcare solutions (GE Healthcare, 2017; Siemens Healthineers, 2017).

A similar development can be observed for Philips, which began by manufacturing light bulbs and radios/radio components. Philips entered the medical device industry in 1927 through the acquisition of *C. H. F. Müller*, a Hamburg-based manufacturer of X-ray devices. Similar to both General Electric

and Siemens, Philips became a world leading manufacturer of both consumer electronics (televisions, home appliances etc.) and medical devices (imaging devices, in vitro diagnostic equipment, nuclear medicine devices) and is now also providing healthcare IT solutions (post processing software, clinical IT) (Philips Healthcare, 2017).

Toshiba emerged out of a merger between *Shibaura Seisaku-sho* (an electronics manufacturer) and *Tokyo Denki* (a consumer goods manufacturer) in 1939. From there Toshiba followed a development similar to Samsung's, entering the heavy industries in the 1940s, chemicals in the 1970s, and lighting technology in the late 1980s. Like its western counterparts, Toshiba entered the healthcare sector through the medical device industry and started manufacturing X-ray machines in the early 1940s. Subsequently, Toshiba specialized on manufacturing high quality medical imaging devices (X-ray, US, CT, MRI etc.) and imaging software but did not expand into other healthcare industries (Toshiba Medical Systems, 2017).

As an exception within the peer group, General Electric has diversified further into more unrelated healthcare industries. Starting with contrast media to accompany its imaging devices, General Electric entered the pharmaceutical industry and currently markets five contrast media agents (two for X-rays, two for MRI, and one for ultrasound). From there, General Electric diversified into the broad field of Life Sciences where it operates in four segments:

- *Research Tools:* Protein Research, DNA & RNA Research, Cell Imaging & Microscopy, Laboratory Filtration.
- *Discovery & Development:* Drug Discovery & Development, Cell Therapy Processing, Diagnostic Development, and Process Analytics.
- *Bioprocessing:* Upstream and Downstream Bioprocessing, Single-Use Bioprocessing, Integrated Solutions, and Services.
- *Quality Testing & Forensics:* Environmental Monitoring, Human ID & Forensics, Food and Beverage Testing, and Pharma QC-Testing (GE Life Sciences, 2017).

Unlike the other conglomerates in the selected peer group, General Electric has used medical devices as a stepping stone to diversify into more unrelated healthcare fields i.e. the pharmaceutical industry via contrast imaging agents and subsequently the manufacturing of biological products.

The survivor-principal, as a relatedness measure, indicates that the distance between manufacturing (consumer) electronics and medical devices is not as large as other relatedness measures suggest. Additionally, the fact that all four conglomerates have entered the medical device industry and form there have successively diversified into less related fields of the healthcare sector but not into biopharmaceuticals or biosimilars specifically (except for General Electric to a certain degree), indicates a lower degree of relatedness of the biosimilar relative to the medical device industry. As such, the survivor-based principle suggests that medical devices can be considered a related diversification target in contrast to biosimilars, which can be classified as an unrelated industry.

5.4 Medical devices vs. biosimilars: a diversification strategy analysis

Samsung's decision to diversify into healthcare stems from increasing competitive pressure in the field of consumer electronics and the large degree of volatility and seasonality associated with the industry. Both medical devices and biosimilars are attractive growth markets with high entry barriers, which are currently undergoing fundamental shifts that can be capitalized upon. Additionally, the medical device industry presents the possibility of creating synergies by exploiting Samsung's existing capabilities in manufacturing (also applies to biopharmaceuticals to a certain extent), IT, and product design and usability.

5.4.1 Medical Devices

Samsung Electronics moved into the medical equipment business in 2009 by entering the fields of in vitro diagnostics (IVD) and digital radiography (X-ray machines) by conducting internal research. Samsung set the goal of becoming "one of the 'Big 4 medical equipment companies" (Jae-Moon Jo, Team leader in medical equipment development and Senior Vice President of Samsung Electronics) by being the market leader across ultrasound devices, X-rays and MRIs (health-care-in-europe.com, 2012). Samsung Electronics announced that it would invest 1.2 trillion Korean Won into its medical equipment business in order to generate $10 billion in revenue by 2020 (Reuters, 2013).

In addition to internal development efforts, Samsung Electronics has acquired five companies in an attempt to establish itself as a global player in the medical device industry and take on the likes of Siemens, General Electric, and Toshiba since 2009:

2010:

- Acquisition of Medison, a leading player in the field of diagnostic ultrasound - was renamed Samsung Medison.
- Acquisition of Prosonic, a manufacturer of ultrasound transducers.

2011:

- Acquisition of Ray, an X-ray/CT manufacturer with a focus on dental applications.
- Acquisition of Nexus, active in the field of IVD and focused on cardiovascular diagnostics.

2013:

- Acquisition of NeuroLogica, a manufacturer of portable CT and SPECT devices with a strong background in design, development, and manufacturing. Focused on adapting stationary CT devices into portable solutions (BGM Associates, personal communication, July-August 2016)[1].

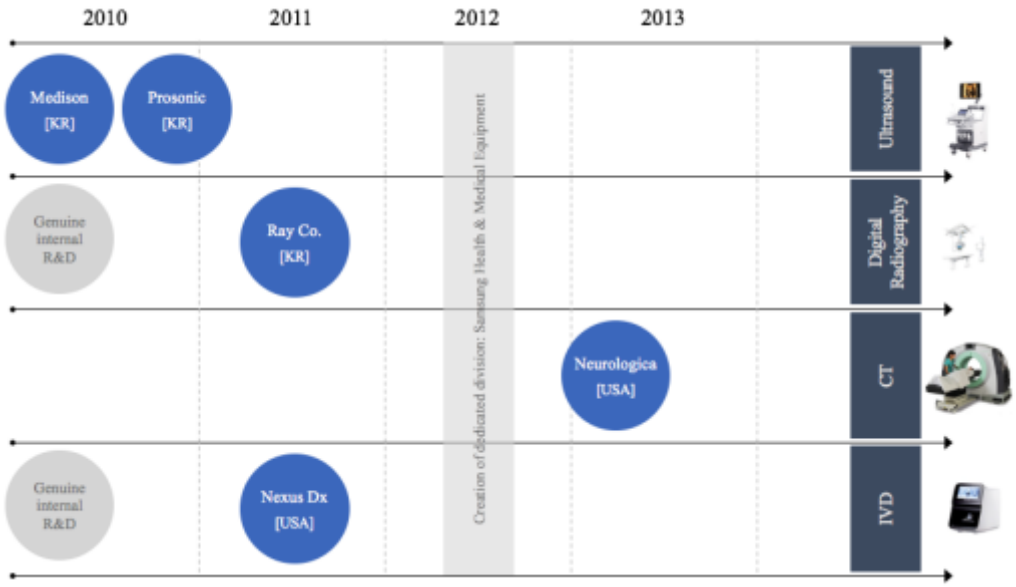

Figure 14: Samsung's medical device acquisitions (Author's own)

During this three-year acquisition spree, Samsung Electronics decided to set up a sub-division, dedicated solely to medical devices, in order to create more efficiencies and focus among the individual businesses. Samsung Health and Medical Equipment Business (HME) has integrated Samsung Medison's international operations in order to consolidate and strengthen its global

[1] BGM Associates is a strategy and transaction advisory firm with an industry focus on healthcare and life sciences with offices in Berlin, Germany and Seoul, South Korea.

salesforce. Apart from facilities in San Diego and Boston (Nexus and NeuroLogica) Samsung's medical equipment manufacturing is located in Korea and leverages Samsung Medison's existing global sales channels. Simultaneously, HME has expanded its sales and service infrastructure in Europe by establishing country operations in Germany, France, and Italy and a European regional headquarter in London (health-care-in-europe.com, 2012).

Samsung's product strategy in the medical device business is centered around four aspects:

1. *Full product range*: Samsung wants to target the entire market by offering the full product range from low-end devices for emerging markets to high-end devices to compete against the established players from developed countries in the industry.
2. *Technological advances*: Samsung does not simply want to compete on a scale basis, pushing its competitors out through more efficient production processes, but seeks to invest into R&D itself in order to innovate and compete on the basis of product differentiation.
3. *Optimized handling and workflow*: In order to compete on the basis of product quality, Samsung wants to focus on producing easy-to-use devices that can be fully integrated with software solutions and artificial intelligence.
4. *Digital convergence*: In the long term, Samsung wants to create a competitive advantage by becoming the leading provider of fully integrated healthcare solutions that connect healthcare professionals and patients (BGM Associates, personal communication, July-August 2016).

Overall, Samsung's market entry strategy into the medical device industry can be split into four phases that, to a large extent, are representative of previous diversification moves. Initially, Samsung tested the waters by conducting basic research (of the industry and the technology in question) in order to build absorptive capacity. In the case of the medical device industry these first touch points can be found in the fields of in vitro diagnostics and digital radiography (see Figure 14). This was followed by a number of smaller acquisitions, primarily of niche players in the industry, in order to expand the internal knowledge base. As discussed above this phase occurred in 2010 and to a lesser extent in the

following years when Samsung Electronics acquired Medison, Prosonic, Ray (digital radiography), and Nexus (IVD), which all had an extensive knowledge base in their respective fields. The third and current phase is focused on integrating the medical device businesses into the existing R&D structure of Samsung Electronics. A first step in this direction was to consolidate all medical device businesses within the dedicated subsidiary Samsung Health and Medical Equipment. A further step in this direction was the establishment of dedicated research groups within the Samsung Advanced Institute of Technology (SAIT) as well as the creation of the Samsung Advanced Institute for Health Sciences & Technology (SAIHST) in March 2011. Samsung's long-term goal in this regard is to achieve a level of absorptive capacity that generates technology spillovers between businesses and allows for innovations to be developed internally (BGM Associates, personal communication, July-August 2016).

Performance in the medical device industry

As discussed above, Samsung's Health and Medical Equipment Business is a subsidiary of Samsung Electronics and part of its Consumer Electronics division. As such, unconsolidated financial data on Samsung's medical device businesses is not available and cannot be used to measure firm performance. Nonetheless, there have been talks of troubles within Samsung's medical device business since 2014. Industry analysts have stated that Samsung was considering merging its struggling medical device business with Samsung Medison, in which Samsung Electronics holds a 68.45% stake. Although Samsung Medison was the largest manufacturer of ultrasound devices in South Korea at the time, it only accounted for 3.1% of the global market and was struggling financially due to falling sales caused by strong competition from GE, Philips, Siemens, and other established players in the industry. In a statement released in September 2014, Samsung confirmed it was considering this alternative, but ultimately decided against it (Business Korea, 2014).

Throughout the years, reports of Samsung Medison's operating performance have surfaced, showing a downward trend that the company has been unable to reverse. It is reported that Samsung Medison recorded an operating loss of $23.4m in 2015, mainly due to increasing R&D and operating costs combined with weak sales, as Samsung has not been able to successfully penetrate the high-end market

for medical devices. The trend continued in 2016 with Samsung Medison recording an operating loss of $16 million in the first half of the year, down from a loss of $7 million in the first half of 2015 (Hong-Ji, 2016; Lee, 2016b).

It appears that Samsung's initial strategy to address the entire medical device market, both in terms of technologies offered and the quality of products/targeted market segments (e.g. high-end segment vs. portable and low-cost devices for emerging economies), has resulted in Samsung being caught in the middle without making any meaningful inroads in the high-end markets in western economies (i.e. taking market shares away from GE, Siemens, Philips etc.) nor in emerging economies where Samsung has come under pressure from lower priced, Chinese products. In an attempt to reverse this trend and turn around its medical device business, Samsung has refocused its strategy on ultrasound devices and specific (niche) market segments such as animal diagnostic devices. Additionally, Samsung is in the process of restructuring its global production and distribution set-up, closing over 10 subsidiaries in an attempt to rein in costs by using Samsung Electronics' global network (Cho, 2016).

5.4.2 Biopharmaceuticals

In April 2011, only two years after entering the medical device industry, Samsung ventured into biopharmaceuticals by forming Samsung BioLogics, a joint venture with Quintiles Transnational Corp., a healthcare information technology and clinical research company (Samsung BioLogics, 2017a; Samsung BioLogics, 2017c). Samsung's biopharmaceutical set-up follows a two-fold approach. Samsung BioLogics, the groups biopharmaceutical division, (contract) manufactures high-tech biomedicine drugs for pharmaceutical companies. Within the operational set-up of Samsung BioLogics, its subsidiaries Samsung Bioepis Co., Ltd. and Archigen Biotech Ltd. are focused on developing future biosimilars, which would ultimately result in Samsung BioLogics full vertical integration of the biopharmaceutical industry from R&D to manufacturing and distribution. Samsung's venture into the biologics market follows a 2-phase approach, which is marked by extensive collaborations with external partners and stands in contrast to the market entry strategy used in the medical device industry. Initially, Samsung sought to partner with selected experts within the biological industry in order to build up knowledge and absorptive capacity and was solely focused on

manufacturing biologics for the leading pharmaceutical companies. In the second phase, once Samsung felt it had acquired enough expertise, it began developing biosimilars in cooperation with specialized biotech companies (Samsung Bioepis and Archigen Biotech Ltd.) (Samsung BioLogics, 2017b).

Samsung BioLogics Co., Ltd.

Headquartered in Incheon, South Korea, Samsung BioLogics "aims to become a global leader in the biopharmaceutical manufacturing industry" (Samsung BioLogics, 2017c). Samsung BioLogics specializes in the bio-CMO (Contract Manufacturing Organization) business, manufacturing high-tech biological drugs for domestic and foreign pharmaceutical companies. The rapid growth of the biomedicine (biologics) market has created production capacity shortages, which have made it difficult for the leading pharmaceutical companies to secure a stable supply of biologics. This is mainly attributable to high quality standards for production facilities in this industry, which typically require investments between $500 million and $1 billion and five years of construction to become operational (Samsung BioLogics, 2017b).

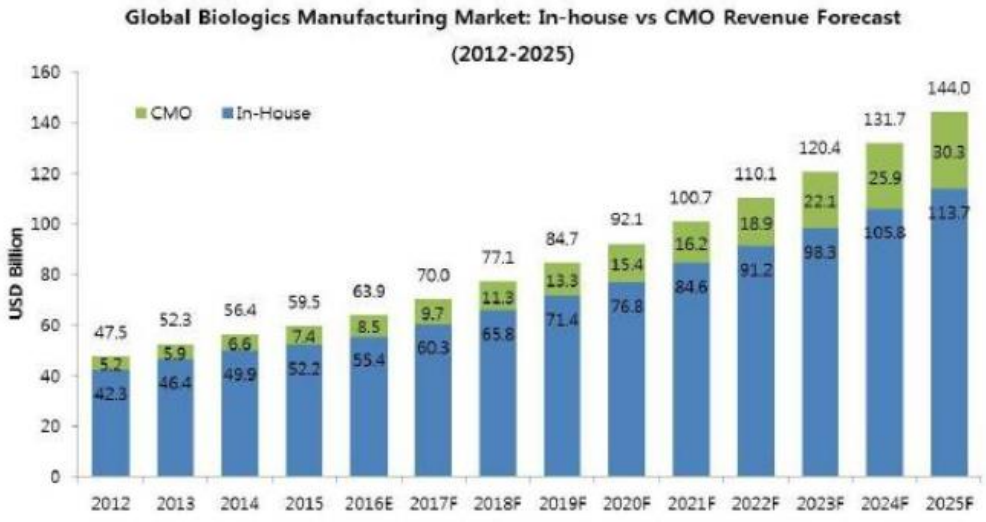

Figure 15: Global biologics manufacturing market (Samsung BioLogics, 2017b, p.14)

This considerable upfront investment is linked to significant risks, especially if the biological drug in question is still in the development stage and commercial results are uncertain. In an attempt to mitigate these risks, pharmaceutical companies are outsourcing large parts of the biological production process to specialized CMOs (Samsung BioLogics, 2017b). As a result, the global biologic CMO market, which has been led by Lonza (Switzerland) and Boehringer

Ingelheim (Germany) for the last two decades, is expected to reach $30 billion by 2025 (Samsung BioLogics, 2017b).

Merely one month after founding of the joint venture, in May 2011, construction on the first of today three manufacturing facilities began. The plant in Songdo, which fulfills the highest standards of the current good manufacturing practice (cGMP; GMP in Europe), was fully operational by August 2013. Simultaneously, on July 18th, 2013, Samsung BioLogics announced its first strategic manufacturing partnership with US-based pharmaceutical company Bristol-Myers Squibb (BMS). This initial partnership with BMS, which was expanded to include "Fill & Finish" operations (April 2014), was followed by an additional manufacturing contract with Roche in October 2013. Construction on the second biological manufacturing facility kicked off in September 2013 and even before it was completed in February 2016, Samsung BioLogics began construction on its third plant in December 2015 (Samsung BioLogics, 2017c). Samsung BioLogics, currently third in terms of market share, is not only the fastest growing player in the bio-CMO market, ramping up its production capacities from 30,000 liters (Plant 1) to 182,000 liters with the completion of the second plant but will also become the largest bio-CMO company in terms of capacity with the completion of its third plant in 2018, which will nearly double Samsung BioLogics production capacity to 362,000 liters per year (Samsung BioLogics, 2017b).

Category	Plant #1	Plant #2	Plant #3
Location	Songdo	Songdo	Songdo
Scope	30,000 L (5,000 liters ×6 units)	152,000 L (15,000 liters×10 units, 1,000 liters×2 units)	180,000 L (15,000 liters ×12 units)
Construction period	25 months	29 months	35 months
Construction cost	350 billion won (300 million dollars)	700 billion won (650 million dollars)	850 billion won estimated (740 million dollars)

※ Construction cost converted to USD was calculated by applying average exchange rate during the applicable plant construction period.

Figure 16: Samsung BioLogics production facilities (Samsung BioLogics, 2017b, pg. 16)

Samsung Bioepis Co., Ltd.

In February 2012, Samsung BioLogics partnered with Biogen Therapeutics Inc., a US-based biotech company, to form Samsung Bioepis. The joint venture, a subsidiary of Samsung BioLogics, pools Samsung's technical production expertise and Biogen's experience in the development of biological drugs in order

to develop biosimilars of blockbuster biologic drugs that are approaching their patent cliffs (see Figure 12) (Biogen, 2017a). By the end of 2013, Samsung Bioepis and Biogen had entered into an agreement to manufacture and commercialize anti-TNF (tumor necrosis factor) biosimilars in Europe for wide-spread therapies to treat rheumatoid arthritis, psoriasis and Crohn's disease. The first two biosimilars from the joint venture between Samsung Bioepis and Biogen received approval from the European Commission in 2016 (Biogen, 2017b).

Research subject			CRO	Research status	Sales
Six biosimilars	SB2	Remicade Biosimilar, Infliximab	Samsung Bioepis	- Dec. 2015. drug license in Korea (released in Jul. 2016) - May 2016. marketing authorization in EU (released in Aug. 2016) - Nov 2016 marketing authorization in Australia - Apr 2017 marketing authorization in the US	Korea and EU, etc.
	SB3	Herceptin Biosimilar, Trastuzumab	Samsung Bioepis	- Sep 2016 application for drug license in Korea - Sep 2016 application for marketing authorization in EU	-
	SB4	Enbrel Biosimilar, Etanercept	Samsung Bioepis	- Sep 2015 drug license in Korea - Jan 2016 marketing authorization in EU - Jul 2016 marketing authorization in Australia - Aug 2016 marketing authorization in Canada	Korea And EU, etc.
	SB5	Humira Biosimilar, Adalimumab	Samsung Bioepis	- Jul 2016 application for marketing authorization in EU - Aug 2016 application for drug license in Korea	-
	SB8	Avastin Biosimilar, Bevacizumab	Samsung Bioepis	- Phase III of clinical trial in progress	-
	SB9	Lantus Biosimilar, Insulin Glargine	Merck	- Dec 2015 application for marketing authorization in EU - May 2016 application for marketing authorization in the US - Jan 2017 marketing authorization in EU	-

Figure 17: Samsung Bioepis biosimilar pipeline (Samsung BioLogics, 2017b, pg. 35)

In total, Samsung Bioepis has developed six biosimilars of blockbuster drugs, which have already reached or are nearing their patent cliffs in the coming years (see Figure 12) (Samsung BioLogics, 2017b):

- *Brenzys (Benepail in Europe):* received marketing authorization from the Ministry of Food and Drug Safety (MFDS) in South Korea in September 2015 and from the European Medicines Agency (EMA) in January 2016. *Brenzys* is based on the biologic *Enbrel* from Pfizer ($2.9bn. revenue FY16) (Pfizer, 2016; Samsung BioLogics, 2017b).
- *Renflexis (Flixabi in Europe):* received marketing authorization from MFDS in South Korea in December 2015 and from the EMA in Europe in May 2016. *Renflexis* is based on the biologic *Remicade* from Johnson & Johnson ($7bn. revenue FY16) (Hopkins, 2017; Samsung BioLogics, 2017b).

- *Lusunda:* received marketing authorization from the EMA in Europe in January 2017. *Lusunda* is based on the biologic *Lantus* form Sanofi ($5.7bn. revenue FY16) (Sanofi, 2017; Samsung BioLogics, 2017b).
- *Humira* (AbbVie, $16bn. revenue FY16) (AbbVie, 2017) and *Herceptin* (Roche, CHF6.7bn. revenue FY16) (Roche, 2017) biosimilars: marketing authorization is currently in progress (Samsung BioLogics, 2017b).
- *Avastin* biosimilar (Roche, CHF6.7bn. revenue FY16) (Roche, 2017): currently in phase II clinical trials (Samsung BioLogics, 2017b).

Archigen Biotech Ltd.

Archigen Biotech Ltd. is a 50/50 joint venture between Samsung Bioepis and AstraZeneca PLC with the aim of developing and commercializing biosimilars. Archigen Biotech is currently developing a Rituxan biosimilar (Roche, CHF7.3bn, revenue FY16) (Roche, 2017) as well as biosimilars to treat non-hodgkin lymphoma (NHL) and severe rheumatoid arthritis. All three biosimilars were approved for clinical trials by the FDA in June 2016 and are currently in phase I (of III) for 30 countries. Archigen Biotech expects phase III of the clinical trials to be completed and the global roll-out to begin by the end of 2019 (Samsung BioLogics, 2017b).

Performance in the biopharmaceutical industry

The quick ramp-up of production capacity in the contract manufacturing business and the rapid expansion of product and service offerings (research and development of new biosimilars) indicate a successful entry into the biological industry. This fast growth created the need for additional capital, which resulted in the initial public offering (IPO) of Samsung BioLogics on the Korea Composite Stock Price Index (KOSPI) in November 2016 (Samsung BioLogics, 2017a). Samsung priced the shares of its BioLogics business at the top of the expected range, raising $1.97 billion (2.25 trillion Korean Won), making it the second largest IPO in Korean history (after the IPO of Samsung Life Insurance for 4.89 trillion won in 2010). In the deal, Samsung BioLogics sold 25% of its shares, which translates into a valuation of almost $7.9 billion (9 trillion won), making Samsung BioLogics the 31st largest listed firm in South Korea with Samsung Electronics and Samsung C&T continuing to be the two largest shareholders. The IPO generated 1.5 trillion won in new capital for Samsung's biopharmaceutical

operations that are going to be invested into further expansion of manufacturing capacities (third manufacturing facility) as well as research and development in the context of Samsung Bioepis and the commercialization of internally developed biosimilars. The rest will be used to repay debt and improve the financial structure of the Samsung Group (Ren, 2016). The high valuation indicates that both domestic and foreign investors have confidence in Samsung BioLogic's future performance and believe that the Samsung Group will continue to invest and grow the business. Some analysts believe that the high price only reflects potential future upsides but not the potential risks, which makes the shares vulnerable to depreciation. However, in the first days of trading, Samsung Biologic's shares were up by 5.2% and have continued to rise since (Khan & Lee, 2016). The valuation of Samsung BioLogics incorporates two fundamentally different businesses. On the one hand, the contract manufacturing business is generating stable, sustainable cash flows, while nearly a third of Samsung BioLogic's value is attributed to Samsung Bioepis ($3 million), a business that is competing in a race to be the first to market biosimilars for blockbuster drugs coming off-patent, where cash flows are not directly attainable and require substantial up-front investments. This means, Samsung Bioepis will be in direct competition with the established players in the industry, especially within the U.S., and will probably be forced to offer price discounts in order to achieve wider market penetration versus the more established pharmaceutical companies (Lee, 2016a).

Due to the recent IPO of Samsung BioLogics, publically available financial data is only available for the fiscal years 2015 and 2016. This, in connection with the current life cycle stage Samsung BioLogics is in, limits the value of profitability analyses. As Samsung BioLogics in essence is a fast-growing start-up, it is not surprising to see negative investing cash flows and operating results as the majority of funds are reinvested in order to further grow the business e.g. construction of a third manufacturing facility in Songdo, a second R&D partnership (Archigen Biotech) with AstraZeneca etc. Especially the long lead times between initial investment and the start of commercial activities (most significantly in terms of internal development and commercialization of biosimilars) is reflected in the current financial statements of Samsung BioLogics.

	2015			
	Biological pharmaceutical manufacturing	Development and commercialization of biosimilar	Total	After consolidation adjustments
	(In thousands of Korean won)			
Operating income	₩ 67,376,232	₩ 23,901,796	₩ 91,278,028	₩ 91,278,029
Operating expenses(*)	110,482,297	184,997,630	295,479,927	294,920,472
Operating profit (loss)	₩ (43,106,065)	₩ (161,095,834)	₩ (204,201,899)	₩ (203,642,443)

Figure 18: Samsung BioLogics operating segments (Samsung BioLogics, 2016, pg. 17)

In 2015, operating income in the contract manufacturing business was nearly three times higher than in the biosimilar segment, while operating expenses were nearly 70% higher for the development and commercialization of biosimilars. On the one hand, this is linked to the fact that Samsung BioLogics started developing and commercializing its own biosimilars a year after it entered the bio-CMO business, but more importantly this reflects the different business models within Samsung BioLogics and the different cash flows that arise from them. While the contract manufacturing segment is a stable business, generating constant levels of revenue, that is primarily dependent on acquiring contracts to ensure close to full capacity utilization, developing biosimilars is linked to much higher upfront investments and levels of uncertainty, but also higher potential returns in the future (Samsung BioLogics, 2016).

	Note	2016	2015
		(In thousands of Korean won)	
REVENUE	4,19,28	₩ 294,622,021	₩ 91,278,029
COST OF SALES	4,9,20,22,28	268,088,358	114,784,617
GROSS PROFIT (LOSS)		26,533,663	(23,506,588)
Selling, general and administrative expenses	4,21,22,28	56,956,302	180,135,856
OPERATING LOSS		(30,422,639)	(203,642,444)

Figure 19: Samsung BioLogics Income Statement (Samsung BioLogics, 2016, pg. 8)

The trend in revenue and gross profit development is positive and indicates a positive growth trend. Samsung BioLogics generated $78.65m in revenue in 2015 and posted a gross loss of $20.25 and an operating loss of $175.47m. In 2016, Samsung BioLogics reported total revenues of $253.87m, more than tripling its sales compared to the previous year and increasing its gross profit by over 200% to $22.86m and reducing its operating loss to $26.21m (Samsung BioLogics, 2016).[2]

[2] Average exchange rate in 2016: $1 = 1160.5 KW (Samsung BioLogics, 2016).

5.5 Samsung's venture into healthcare in light of the three perspectives of diversification theory

The following section will attempt to draw a link between the different schools of thought on diversification theory discussed in section 4 and the case of Samsung's venture into healthcare and the differences between the constrained related business (medical devices) and the unrelated business (biopharmaceuticals) as well as, where applicable, on Samsung as a whole.

5.5.1 The external perspective

The beginnings of this line of diversification research go back to Rumelt (1974), who postulated that firms with portfolios of related businesses outperform those with unrelated business i.e. that related diversification is superior to unrelated diversification in terms of firm performance. As shown in the case of Samsung's venture into healthcare this theory does not necessarily hold. While Samsung's biopharmaceutical business, the unrelated diversification target, is not yet profitable due to it being in the early stages of a steep growth phase, the inroads it is making into the fields of biopharmaceutical manufacturing and R&D and commercialization are evident. Not only is Samsung BioLogics on track to become the largest bio-CMO company in the world, it was also among the first to bring biosimilars of blockbuster biologics onto the market and has further biosimilars lined up in its pipeline awaiting approval. The pay-off of these investments will only become visible in the years to come, but most likely they will be substantial. In contrast, Samsung's medical device business, which is part of Samsung Electronics' Consumer Electronics division, has been struggling since the outset. Although Samsung possess a wealth of internal know-how when it comes to manufacturing electronic devices and has a global network and marketing platform at its disposal, which Samsung Medison and the other medical device subsidiaries are piggy-backing on, firm performance has been deteriorating.

An opposing view to Rumelt's (1974) publications was taken by Wernerfelt and Montgomery (1986), who argued that industry structures have different implications for diversification. They argued that related diversification is better in highly profitable industries, while unrelated diversification is more suited for high-growth industries. These findings hold to a certain degree in the case of

Samsung, as the biopharmaceutical industry is expected to see close to two-digit growth in the coming years, while the medical device industry is expected to grow at a CAGR of around 5%, although differences in terms of profitability are not as great.

In contrast to market-measures, Hoskisson (1987) and Hill, Hitt and Hoskisson (1992) examined the relationship between diversification and firm structure. Their findings suggest that related diversification requires co-operative organizational forms, while unrelated diversification requires competitive structures. This line of argumentation does not hold in the case of Samsung's venture into healthcare, as Samsung BioLogics has entered the biopharmaceutical industry through a number of joint ventures and research/manufacturing collaborations, while Samsung's market entry into medical devices was marked by a combination of internal development and, most importantly, a number of acquisitions. It can be argued that Samsung's determination to enter the medical device industry without outside collaboration can be attributed to an overestimation of the existing absorptive capacity stemming from its background in electronic engineering and manufacturing, which caused Samsung's leadership to underestimate the particularities and difficulties of entering an industry they apparently believed to more closely related to their core expertise. Hoskisson (1987) and Hill and Hitt and Hoskisson (1992) argued that related diversified firms benefit from exploiting synergies, which Samsung however, was not able to achieve to a sufficient degree. The biopharmaceutical industry on the other hand presented a new playing field for Samsung and as such its first prerogative was to accumulate know-how and build absorptive capacity, which it did through the joint ventures with MSD and AstraZeneca, as well as the collaborations with Roche.

A similar approach to understanding the diversification-performance relationship was taken by Carter (1977), who argues that the difference in performance stems from the synergies that diversified firms can utilize unlike their specialized counterparts. Applying this to the case of Samsung, the medical device industry, as the related diversification target, should perform better than Samsung BioLogics due to the presence and utilization of synergies. The attempt to generate and profit from such synergies can be seen in the establishment of dedicated research divisions within the Samsung Institute of Technology (SAIT),

the establishment of the Samsung Advanced Institute of Health Sciences and Technology (SAIHST), and the restructuring of Samsung Medison's operations to take advantage of Samsung Electronics' global network and marketing platform as well as brand name. However, these synergies were not sufficient to counteract the downward trend of Samsung Medison and the medical device business, forcing Samsung to adapt its strategy and refocus on specific geographic markets and niche segments (as opposed to its initial plan to address the entire market). In contrast, Samsung BioLogics and its subsidiaries Samsung Bioepis and Archigen Biotech do not benefit from similar synergies but rather from external partnerships and collaborations.

Deneffe (1993) found that diversified firms postponed entry into new markets compared to undiversified firms in order to take advantage of cost externalities from experience transfer from their core product to new markets. This is true for the case of Samsung, which is a late entrant in the medical device industry but does not hold for Samsung's venture into biosimilars. As the biosimilars segment is a young and quickly growing segment within the pharmaceutical industry and none of the incumbent pharmaceutical companies have established themselves yet (i.e. entry barriers are not as significant as in the medical device industry), Samsung can be seen as a fast follower, if not an early entrant, which they are currently benefiting from immensely. In connection to the topic of market entry barriers, Singh and Montgomery (1987) argue that related diversifiers are more likely to create entry barriers based on economies of scope, patents, experience advantages, and brand reputation than unrelated diversifiers. This theory does not hold in the case of Samsung as it is struggling to establish itself in the medical device industry specifically due to the existing entry barriers and strong competition, while its early move into the biosimilars industry is allowing it to build substantial market power and entry barriers based on the excess demand for production capacities and its fast ramp-up of manufacturing power.

Although it can be argued that South Korea is currently transitioning from an emerging to a developed economy, many of the structural problems and specificities of such developing countries are still affecting Samsung today. As such, the *Institutional Perspective* provides further points of analysis for Samsung's venture into healthcare. In this context, several studies argue that

organic growth of firms in emerging economies is limited by institutional constraints and diversified (network-based) growth is more viable (e.g. Peng & Health, 1996; Child & Lu, 1996; Guillen, 2000; Khanna & Palepu, 2000a; Khanna & Palepu, 2000b). Looking at Samsung's historic development it is apparent that it is closely linked to shifts in South Korea's economic strategy (e.g. the shift towards the chemical and steel industry in the 1970s) and support from the domestic government. It is not a coincidence that South Korea is the most advanced country in terms of biosimilar funding and market approval. The focus on biosimilars is a government-backed policy aimed at controlling the rising healthcare expenditure and improving the quality of treatments in South Korea. As such, Samsung's investment into biosimilars is yet another example of a diversification strategy impacted by institutional constraints. A specificity related to the case of Samsung is discussed by Backman (1999), who argues that within many Asian firms, diversification is driven by factors not captured by the research on market inefficiencies. These factors include aspects such as the exploitation of privileged access to information, licenses, and markets. In the past, the close ties of the Lee family to government officials in South Korea have secured Samsung preferential treatment in the form of subsidies, tax concessions, or legal leeway, but as evidenced by the leadership crisis and arrest and conviction of Jay Y. Lee, the institutional landscape in South Korea is changing and privileges enjoyed in the past, may not exist much longer for the Lee family or Samsung.

In terms of the diversification-performance dichotomy the case of Samsung's venture into healthcare offers a number of examples that contradict the established theory stemming from the *external perspective*, which is primarily focused on firms from developed economies, while supporting most findings from the *institutional perspective* (emerging economies).

5.5.2 The internal perspective

This line of research is focused on the resource based view and the notion of competitive advantages. Collis and Montgomery (1995) found that firm specific inputs can be utilized when diversifying into related industries. They also argue that firms need to continuously upgrade existing and acquire new resources since market forces and competition may quickly render a certain competitive advantage useless. This approach ties into the concept of exploitation and

exploration (March, 1991), which describes the balancing act of exploiting existing, established business, while simultaneously exploring new options. Samsung's venture into healthcare exemplifies this concept, as not many companies would invest so heavily into new, unrelated business areas while performance of its current business portfolio was so strong. Samsung however, currently the global market leader in the areas of consumer electronics and semiconductors, chose precisely this point in time to think about possible diversification options in order to preempt future exposure to a declining industry and increased competition.

Building on these findings, Prahalad and Hamel (1990) argue that resources and capabilities that are utilized beyond the products they were developed for, create an opportunity for diversification. In the case of Samsung this is a valid argument and can be observed in both industries, however with counterintuitive results. While Samsung attempted to transfer and utilize its internal resources and capabilities it acquired in the manufacturing of semiconductors and consumer electronics to the medical device industry, it did not ease its market entry. On the other hand, Samsung's initial success in the bio-CMO market, although unrelated to consumer electronics and semiconductors, is to a large extent attributable to its manufacturing capabilities and the know-how it acquired in terms of entering and disrupting new industries by ramping up production capacities extremely quickly. According to Teece *et al.* (1994), firms will only then have sustainable competitive advantages when they diversify into products that are related to the resources and capabilities that they already possess. The example of Samsung's venture into healthcare and specifically biosimilars contradicts this notion to the extent that existing resources and capabilities can be exploited in unrelated product markets and help create new competitive advantages in these by, for example, enabling the incumbent firm to quickly establish itself and create market entry barriers.

Overall, the case of Samsung's diversification into healthcare contradicts the most prominent findings of the RBV or expands them by providing an example of a case where the transfer of resources and capabilities to an unrelated industry serve as the basis for the creation of competitive advantages (although they cannot directly be considered to be competitive advantages).

5.5.3 The financial perspective

The role of finance regarding the diversification-performance relationship covers three areas. The first area is focused on the aspect of risk reduction; the second area covers the economies of internal capital markets, and the third area is based on agency theory. Amit and Linvat (1988) argue that firms diversify into unrelated areas because the earnings from these businesses are negatively correlated and as such reduce the overall variance (risk) of the firm. Lewellem (1971) and Perry (1998) claim that a firm's goal is to ensure stable earnings and as such follow unrelated diversification strategies to reduce their overall business risk. This simply is another explanation for the logic described above in the exploitation/exploration approach. The Samsung Group, although already a diversified conglomerate, is seeking to establish new, unrelated lines of business to counter the increasing risk of dependence on consumer electronics and especially semiconductors, as the industry is currently undergoing a super cycle and attracting many low-cost entrants.

Another approach is presented by Williamson (1975), who argues that internal capital markets are an explanation for diversification as they enable diversified firms to reduce the transaction costs of raising and allocating capital. Caper (2003) extends this line of research, showing that undiversified firms are more dependent on external sources for raising capital, which are not only more expensive than internally generated funds but also result in a less efficient capital allocation within the firm (Stein, 1997). The concept of efficient internal capital markets, combined with cheap bank loans backed by the South Korean government, are a central aspect of Samsung's successful diversification strategy. More specifically, the access to cheap, internal capital allows Samsung to diversify the way that it does: by testing the waters through small investments and, once it feels that the time is right, investing heavily into the ramp-up of production capacities, as seen in the biosimilar industry, in order to achieve scale advantages, create entrance barriers, and position itself as the most competitive contract manufacturer/attractive partner for OEMs.

When research in the field of the financial perspective is conducted on emerging economies, it focuses on the areas of transaction cost economics and agency theory. The case of Samsung supports the established line of research on agency

theory. Chung (2004) argues that in emerging economies, conflicts between owner-managers and minority shareholders of affiliated firms are common. Samsung, with its tangled web of cross-shareholdings, holding vehicles, and the convoluted influence of the Lee family, is a prime example of this particular aspect of agency theory. In this context, it is common that managers of business groups transfer resources i.e. capital from one affiliate to another to strengthen its competitive position without compensating the shareholders of the affiliate firm that is providing the resources, as evidenced by the case of the restructuring of the Samsung Group. When Cheil industries, the Lee family's holding vehicle at the time, made an offer to take over Samsung C&T far below market value it was met by opposition from investors. In an attempt to further solidify family control over the Samsung Group, the Lee family had to use all of its influence in South Korea to get the deal passed. Additionally, Chang (2003) argues that when founding families manage business groups, abusing insider information and expropriating minority shareholders through intra-group business transactions are common practices. Although Samsung has enjoyed protection from (serious) prosecution for a long time, it is known that many members of the Lee family have been charged and sentenced in cases relating to business conducted for/within the Samsung Group. Most prominently, the arrest of Jay Y. Lee serves as an example of the questionable dealings between the Lee family and government officials.

The case of Samsung's venture into healthcare confirms the majority of findings from the financial perspective of the diversification-performance literature by presenting an example of how internal capital markets and close ties to high-ranking political figures are central resources and capabilities within the Samsung Group that have enabled its diversified growth and success.

6.0 Conclusion

Samsung's evolution from a small, local trading company to the global market leader in consumer electronics and one of the most profitable companies in history, is closely linked to the environment it developed in. As discussed in section 4.3, a central part of Samsung's diversification strategy is its deep internal market for capital, which it uses to enter target industries with force i.e. very rapidly ramping up production capacities and pricing competitors out of the market. While the easy and cheap access to capital from within the group as well

as from domestic banks will continue to be an asset in today's hypercompetitive and globalized markets, Samsung will find itself confronted with equally large competitors such as conglomerates or the large U.S. tech companies, which have similarly deep pockets, when it enters more sophisticated industries. Samsung, as Korea's leading chaebol, exemplifies the benefits of a business group structure within emerging markets and the power of conglomerates in such environments. While the internal markets for financial and human capital, as well as the transfer of knowledge and its close ties to the government have shaped Samsung into the company it is today, the current situation also underlines the need for change on several dimensions.

As the case of the medical device industry exemplifies, Samsung needs to fundamentally change its culture when approaching such complex and competitive markets. In the medical device industry, Samsung's diversification and market entry strategy has been in line with past exploits and founded on key acquisitions with a focus on internal development. In essence, Samsung viewed the medical device industry as an extension to the already successful consumer electronics business, which indicates a lacking assessment of the target industry that resulted in a situation, in which Samsung is not able to compete against the established, high-end producers, while simultaneously coming under pressure from Chinese competitors such as United Imaging (full spectrum of imaging devices) and Mind Ray (mainly ultrasound) in the low-cost segment. Samsung's primary hurdle has not been to master the technology in question (it produces competitive medical devices) but to fully grasp the industry specificities including all of the regulatory and legal parameters as well as, most importantly, the complexities in the distribution and sales process. Unlike consumer electronics, the medical device industry is characterized by highly educated healthcare professionals, complex hospital purchase and procurement processes, as well as globally diverse national healthcare systems, which require the build-up of substantial industry specific knowledge. Samsung's traditional diversification approach works very well as long as the complexity of the industry in questions is not too high and Samsung is facing incumbents that cannot compete with its financial power, as was the case for semiconductors, LCD panels, and televisions (among others). However, in the case of the medical device industry, Samsung finds itself confronted with the likes of GE, Siemens, and Philips as well as large

tech companies such as IBM and Google, who have been making inroads into healthcare and have comparable financial reserves and cannot simply be priced out of the market through the quick ramp-up of production capacities and the exploitation of economies of scale.

The Samsung Group, like only a handful of other firms, is equipped with the capabilities, resources, and political backing to herald in the new age of healthcare, which will combine medical devices, pharmaceuticals, consumer electronics, (health) applications with powerful software and data analytics. Already today, Samsung would be ideally positioned to address the demand for integrated device-software solutions within the healthcare sector, such as the optimization of the workflow infrastructure in diagnostic imaging. In connection with the Samsung Medical Center, one of the leading hospitals worldwide, Samsung possess all necessary prerequisites to develop and commercialize next generation solutions but is impeded by a lacking strategy and misaligned goals. Given the complex competitive situation in the medical device industry, Samsung may be well advised to shift its strategic focus towards more collaborative approaches and to consider creating an independent legal entity for the medical device business outside of Samsung Electronics, similar to Samsung BioLogics, in order to allow for the development of a healthcare specific identity.

The case of Samsung's venture into healthcare shows a clash of the old and the new. While the market entry into the medical device industry was based on the belief that Samsung would be able to reproduce the success it had in previous diversification moves using the same approach, Samsung acted more cautiously in regard to the biosimilar industry. This indicates a degree of unfamiliarity with the business and reflects the fact that the push into biosimilars is part of South Korea's overall economic policy. As such, Samsung's venture into biosimilars, to a certain extent, represents a break from the old approach towards a more open and collaborative strategy that focuses on sharing risks and costs as well as expertise and knowledge. Both in the contract manufacturing and R&D/commercialization businesses Samsung has sought out partnerships in order to bridge the knowledge gap it has in the field of biopharmaceuticals and to build absorptive capacity. While Samsung still has a lot to learn in regard to more

collaborative forms of business partnerships, the case of Samsung BioLogics indicates Samsung's ability and willingness to adapt.

The environment that has caused Samsung to internalize many functions that firms from developed countries source from the open market, is changing. South Korea is rapidly transitioning from an emerging economy to a developed country (in some areas faster than in others e.g. healthcare). This shift has profound implications for the way Samsung does business. In the aftermath of the corruption scandal surrounding the former president of South Korea, Park Geun-hye, and Samsung's direct involvement, which led to the imprisonment of Jay Y. Lee, has not only left the Samsung Group paralyzed but has also changed the attitude of South Korean's towards its leading chaebol. The new, young democracy developing in the country is unlikely to continue to be as lenient with Samsung as the old one was, although change in this regard will be slow and Samsung will continue to enjoy preferential treatment as South Korea will not be willing to sacrifice its economic policy (of which Samsung is a central part) due to cries for more democratic rule. Although there are key people within Samsung, such as the now hospitalized former chairman Lee Kun Hee and his heir Jay Y. Lee, that see the need for change, rigid structures, power hungry managers, and conflicting interests are making change slow and difficult. Most fundamentally, Samsung needs to develop and open its culture to external influences. A company that operates globally and sells truly global products needs to adopt a more international approach to business and cannot remain as Korea-centric as it has been in the past. Samsung will not be able to grow and diversify using the same approach that was so successful in the past. However, as Samsung's history shows, it is able to adapt and reinvent itself like only a handful of other companies. Considering Samsung's venture into healthcare as a whole, the current situation presents a sharp contrast between potential and reality, between the old (medical devices) and the new (biosimilars) way of conducting business. It remains to be seen how quickly Samsung will manage to overcome its current leadership crisis as it merely is a matter of time and invested capital until Samsung manages to establish itself as a serious healthcare player given that there are people leading the company that will actively continue to pursue this future.

The findings of this case study need to be considered in light of the limitations this thesis faces. Most generally, as seen in previous research on the diversification-performance relationship, a single, clear, and agreed upon definition for industry relatedness and how to measure it as well as the best approaches to measuring firm performance do not exist. In an attempt to negate these limiting factors this thesis used a combination of industry relatedness and firm performance measures. A limitation related to the case of Samsung specifically is the access to primary information. Although several attempts were made at arranging interviews, both within Samsung BioLogics, Samsung HME, and the Samsung Medical Center, the current leadership crisis and the unclear strategy going forward regarding the venture into healthcare, combined with a closed and hierarchical corporate culture, access to primary data from Samsung was limited. In order to compensate this limiting factor, the thesis incorporates assessments from external industry experts as well as a wide array of secondary sources from unbiased third parties. The final limitation of this thesis stems from the specific industries analyzed in the case study. Since Samsung BioLogic's IPO in 2016 it is a publically listed company and as such financial data in the form of quarterly, half-year and annual reports as well as industry, market, and competitor assessments are readily available. Samsung's medical device business, namely Samsung Health and Medical Equipment Business as well as, among others, Samsung Medison, Samsung Nexus, and Samsung Ray are subsidiaries of Samsung Electronics. As such only consolidated financial data exists, which cannot be used to analyze the performance of the aforementioned businesses individually. As such, the analyses of the two businesses are based on (to a certain extent) different types of sources, which needs to be taken into account when comparing firm performance. However, as it was the goal of this thesis to depict the general business development and trends within medical devices and biosimilars, different types of sources can be used to reach a general assessment.

As mentioned above, further research in the area of diversification theory and specifically the concepts of relatedness and firm performance, is required in order to make studies (more) comparable. While the distinction between developed and emerging economies in this context offers a number of valuable insights, the case of Samsung presents an example of a firm from a country currently transitioning from the former to the latter. As such, the diversification-performance dichotomy

needs to be examined from a change perspective. Especially in the case of Asian conglomerates, which are closely linked to the overall economic development of their home countries, a longitudinal study of how corporate structures, firm culture, and especially diversification strategies need to shift in order to remain competitive in the rapidly changing global business environment, could offer valuable insights. Closely linked is also the question of how such firms need to adapt to hyper competition and globalized markets, should the backing of their respective governments waver. As Samsung's venture into healthcare only began seven years ago and is not close to being finished, in combination with the changing political and economic landscape in South Korea, this case could serve as a prime example to analyze key aspects of the questions mentioned above.

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8.0 Appendix

1) SIC Division Structure (United States Department of Labor, 2017).

A. Division A: Agriculture, Forestry, And Fishing
- Major Group 01: Agricultural Production Crops
- Major Group 02: Agriculture production livestock and animal specialties
- Major Group 07: Agricultural Services
- Major Group 08: Forestry
- Major Group 09: Fishing, hunting, and trapping

B. Division B: Mining
- Major Group 10: Metal Mining
- Major Group 12: Coal Mining
- Major Group 13: Oil And Gas Extraction
- Major Group 14: Mining And Quarrying Of Nonmetallic Minerals, Except Fuels

C. Division C: Construction
- Major Group 15: Building Construction General Contractors And Operative Builders
- Major Group 16: Heavy Construction Other Than Building Construction Contractors
- Major Group 17: Construction Special Trade Contractors

D. Division D: Manufacturing
- Major Group 20: Food And Kindred Products
- Major Group 21: Tobacco Products
- Major Group 22: Textile Mill Products
- Major Group 23: Apparel And Other Finished Products Made From Fabrics And Similar Materials
- Major Group 24: Lumber And Wood Products, Except Furniture
- Major Group 25: Furniture And Fixtures
- Major Group 26: Paper And Allied Products
- Major Group 27: Printing, Publishing, And Allied Industries
- Major Group 28: Chemicals And Allied Products
- Major Group 29: Petroleum Refining And Related Industries
- Major Group 30: Rubber And Miscellaneous Plastics Products
- Major Group 31: Leather And Leather Products
- Major Group 32: Stone, Clay, Glass, And Concrete Products
- Major Group 33: Primary Metal Industries
- Major Group 34: Fabricated Metal Products, Except Machinery And Transportation Equipment
- Major Group 35: Industrial And Commercial Machinery And Computer Equipment
- Major Group 36: Electronic And Other Electrical Equipment And Components, Except Computer Equipment
- Major Group 37: Transportation Equipment
- Major Group 38: Measuring, Analyzing, And Controlling Instruments; Photographic, Medical And Optical Goods; Watches And Clocks
- Major Group 39: Miscellaneous Manufacturing Industries

E. Division E: Transportation, Communications, Electric, Gas, And Sanitary Services
- Major Group 40: Railroad Transportation
- Major Group 41: Local And Suburban Transit And Interurban Highway Passenger Transportation
- Major Group 42: Motor Freight Transportation And Warehousing
- Major Group 43: United States Postal Service
- Major Group 44: Water Transportation
- Major Group 45: Transportation By Air
- Major Group 46: Pipelines, Except Natural Gas
- Major Group 47: Transportation Services
- Major Group 48: Communications
- Major Group 49: Electric, Gas, And Sanitary Services

F. Division F: Wholesale Trade
- Major Group 50: Wholesale Trade-durable Goods
- Major Group 51: Wholesale Trade-non-durable Goods

G. Division G: Retail Trade
- Major Group 52: Building Materials, Hardware, Garden Supply, And Mobile Home Dealers
- Major Group 53: General Merchandise Stores
- Major Group 54: Food Stores
- Major Group 55: Automotive Dealers And Gasoline Service Stations
- Major Group 56: Apparel And Accessory Stores
- Major Group 57: Home Furniture, Furnishings, And Equipment Stores
- Major Group 58: Eating And Drinking Places
- Major Group 59: Miscellaneous Retail

H. Division H: Finance, Insurance, And Real Estate
- Major Group 60: Depository Institutions
- Major Group 61: Non-depository Credit Institutions
- Major Group 62: Security And Commodity Brokers, Dealers, Exchanges, And Services
- Major Group 63: Insurance Carriers
- Major Group 64: Insurance Agents, Brokers, And Service
- Major Group 65: Real Estate
- Major Group 67: Holding And Other Investment Offices

I. Division I: Services
- Major Group 70: Hotels, Rooming Houses, Camps, And Other Lodging Places
- Major Group 72: Personal Services
- Major Group 73: Business Services
- Major Group 75: Automotive Repair, Services, And Parking
- Major Group 76: Miscellaneous Repair Services
- Major Group 78: Motion Pictures
- Major Group 79: Amusement And Recreation Services
- Major Group 80: Health Services
- Major Group 81: Legal Services
- Major Group 82: Educational Services
- Major Group 83: Social Services
- Major Group 84: Museums, Art Galleries, And Botanical And Zoological Gardens
- Major Group 86: Membership Organizations
- Major Group 87: Engineering, Accounting, Research, Management, And Related Services
- Major Group 88: Private Households
- Major Group 89: Miscellaneous Services

J. Division J: Public Administration
- Major Group 91: Executive, Legislative, And General Government, Except Finance
- Major Group 92: Justice, Public Order, And Safety
- Major Group 93: Public Finance, Taxation, And Monetary Policy
- Major Group 94: Administration Of Human Resource Programs
- Major Group 95: Administration Of Environmental Quality And Housing Programs
- Major Group 96: Administration Of Economic Programs
- Major Group 97: National Security And International Affairs
- Major Group 99: Nonclassifiable Establishments

2) Consolidated Financial Statements of Samsung Electronics Co., Ltd. and Subsidiaries as and for the Year Ended December 31, 2016 (Samsung Electronics Co., Ltd. and Subsidiaries, 2016).

Samsung Electronics Co., Ltd. and Subsidiaries

CONSOLIDATED STATEMENTS OF FINANCIAL POSITION

(In millions of Korean won, in thousands of US dollars (Note 2.28))

	Notes	December 31, 2016	December 31, 2015	December 31, 2016	December 31, 2015
		KRW	KRW	USD	USD
Assets					
Current assets					
Cash and cash equivalents	4, 6, 7, 31	32,111,442	22,636,744	27,686,236	19,517,225
Short-term financial instruments	5, 6, 7, 31	52,432,411	44,228,800	45,206,818	38,133,728
Short-term available-for-sale financial assets	6, 9, 31	3,638,460	4,627,530	3,137,052	3,989,820
Trade receivables	6, 7, 10, 31	24,279,211	25,168,026	20,933,347	21,699,677
Non-trade receivables	10	3,521,197	3,352,663	3,035,949	2,890,640
Advances		1,439,938	1,706,003	1,241,503	1,470,903
Prepaid expenses		3,502,083	3,170,632	3,019,469	2,733,694
Inventories	11	18,353,503	18,811,794	15,824,248	16,219,383
Other current assets		1,315,653	1,035,460	1,134,346	892,765
Assets held-for-sale	36	835,806	77,073	720,625	66,452
Total current assets		141,429,704	124,814,725	121,939,593	107,614,287
Non-current assets					
Long-term available-for-sale financial assets	6, 9, 31	6,804,276	8,332,480	5,866,594	7,184,200
Investment in associates and joint ventures	12	5,837,884	5,276,348	5,033,378	4,549,226
Property, plant and equipment	13	91,473,041	86,477,110	78,867,346	74,559,893
Intangible assets	14	5,344,020	5,396,311	4,607,573	4,652,657
Long-term prepaid expenses		3,834,831	4,294,401	3,306,362	3,702,599
Net defined benefit assets	17	557,091	-	480,320	-
Deferred income tax assets	28	5,321,450	5,589,108	4,588,113	4,818,886
Other non-current assets		1,572,027	1,999,038	1,355,388	1,723,555
Total assets		262,174,324	242,179,521	226,044,667	208,805,303

(In millions of Korean won, in thousands of US dollars (Note 2.28))

	Notes	December 31, 2016	December 31, 2015	December 31, 2016	December 31, 2015
		KRW	KRW	USD	USD
Liabilities and Equity					
Current liabilities					
Trade payables	6, 31	6,485,039	6,187,291	5,591,350	5,334,634
Short-term borrowings	6, 8, 15, 31	12,746,789	11,155,425	10,990,183	9,618,121
Other payables	6, 31	11,525,910	8,864,378	9,937,550	7,642,798
Advances received		1,358,878	1,343,432	1,171,614	1,158,297
Withholdings		685,028	992,733	590,626	855,927
Accrued expenses		12,527,300	11,628,739	10,800,941	10,026,208
Income tax payable		2,837,353	3,401,625	2,446,344	2,932,855
Current portion of long-term liabilities	6, 15, 16, 31	1,232,817	221,548	1,062,925	191,017
Provisions	18	4,597,417	6,420,603	3,963,857	5,535,794
Other current liabilities		351,176	287,135	302,781	247,565
Liabilities held-for-sale	36	356,388	-	307,275	-
Total current liabilities		54,704,095	50,502,909	47,165,446	43,543,216
Non-current liabilities					
Debentures	6, 16, 31	58,542	1,230,448	50,474	1,060,883
Long-term borrowings	6, 15, 31	1,244,238	266,542	1,072,772	229,810
Long-term other payables	6, 31	3,317,054	3,041,687	2,859,938	2,622,519
Net defined benefit liabilities	17	173,656	358,820	149,725	309,372
Deferred income tax liabilities	28	7,293,514	5,154,792	6,288,411	4,444,422
Provisions	18	358,126	522,378	308,773	450,390
Other non-current liabilities		2,062,066	2,042,140	1,777,899	1,760,717
Total liabilities		69,211,291	63,119,716	59,673,438	54,421,329

(In millions of Korean won, in thousands of US dollars (Note 2.28))

	Notes	December 31, 2016	December 31, 2015	December 31, 2016	December 31, 2015
		KRW	KRW	USD	USD
Equity attributable to owners of the parent					
Preferred stock	20	119,467	119,467	103,004	103,004
Common stock	20	778,047	778,047	670,826	670,826
Share premium		4,403,893	4,403,893	3,797,002	3,797,002
Retained earnings	21	193,086,317	185,132,014	166,477,524	159,619,385
Other components of equity	23	(11,934,586)	(17,580,451)	(10,289,907)	(15,157,728)
Accumulated other comprehensive income attributable to assets held-for-sale	36	(28,810)	23,797	(24,841)	20,517
		186,424,328	172,876,767	160,733,608	149,053,006
Non-controlling interests		6,538,705	6,183,038	5,637,621	5,330,968
Total equity		192,963,033	179,059,805	166,371,229	154,383,974
Total liabilities and equity		262,174,324	242,179,521	226,044,667	208,805,303

Samsung Electronics Co., Ltd. and Subsidiaries

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

(In millions of Korean won, in thousands of US dollars (Note 2.28))

		For the year ended December 31,			
	Notes	2016	2015	2016	2015
		KRW	KRW	USD	USD
Profit for the year		22,726,092	19,060,144	19,594,260	16,433,508
Other comprehensive income					
Items not to be reclassified to profit or loss subsequently:					
Remeasurement of net defined benefit liabilities, net of tax	17, 23	963,602	263,978	830,810	227,600
Shares of other comprehensive income of associates and joint ventures, net of tax	12, 23	50,438	24,069	43,487	20,752
Items to be reclassified to profit or loss subsequently:					
Changes in value of available-for-sale financial assets, net of tax	9, 23	(23,839)	(414,961)	(20,554)	(357,776)
Share of other comprehensive loss of associates and joint ventures, net of tax	12, 23	(130,337)	(65,330)	(112,376)	(56,327)
Foreign currency translation, net of tax	23	1,131,536	268,315	975,603	231,339
Other comprehensive income for the year, net of tax		1,991,400	76,071	1,716,970	65,588
Total comprehensive income for the year		24,717,492	19,136,215	21,311,230	16,499,096
Comprehensive income attributable to :					
Owners of the parent		24,310,814	18,804,189	20,960,595	16,212,826
Non-controlling interests		406,678	332,026	350,635	286,270

Samsung Electronics Co., Ltd. and Subsidiaries

CONSOLIDATED STATEMENTS OF PROFIT OR LOSS

(In millions of Korean won, in thousands of US dollars (Note 2.28))

		For the year ended December 31,			
	Notes	**2016**	**2015**	**2016**	**2015**
		KRW	KRW	USD	USD
Revenue	32	201,866,745	200,653,482	174,047,940	173,001,874
Cost of sales	24	120,277,715	123,482,118	103,702,512	106,465,323
Gross profit		81,589,030	77,171,364	70,345,428	66,536,551
Selling and administrative expenses	24, 25	52,348,358	50,757,922	45,134,348	43,763,086
Operating profit		29,240,672	26,413,442	25,211,080	22,773,465
Other non-operating income	26	3,238,261	1,685,947	2,792,003	1,453,610
Other non-operating expense	26	2,463,814	3,723,434	2,124,281	3,210,316
Share of profit of associates and joint ventures	12	19,501	1,101,932	16,814	950,077
Financial income	27	11,385,645	10,514,879	9,816,615	9,065,847
Financial expense	27	10,706,613	10,031,771	9,231,159	8,649,315
Profit before income tax		30,713,652	25,960,995	26,481,072	22,383,368
Income tax expense	28	7,987,560	6,900,851	6,886,812	5,949,860
Profit for the year		22,726,092	19,060,144	19,594,260	16,433,508
Profit attributable to owners of the parent		22,415,655	18,694,628	19,326,604	16,118,363
Profit attributable to non-controlling interests		310,437	365,516	267,656	315,145
Earnings per share for profit attributable to owners of the parent (in Korean Won, in US dollars)	29				
- Basic		157,967	126,305	136.2	108.9
- Diluted		157,967	126,303	136.2	108.9

Samsung Electronics Co., Ltd. and Subsidiaries

CONSOLIDATED STATEMENTS OF CASH FLOWS

(In millions of Korean Won, in thousands of U.S dollars (Note 2.28))

		For the year ended December 31,			
	Notes	2016	2015	2016	2015
Cash flows from operating activities		KRW	KRW	USD	USD
Profit for the period		22,726,092	19,060,144	19,594,260	16,433,508
Adjustments	30	30,754,471	29,610,971	26,516,267	25,530,350
Changes in assets and liabilities arising from operating activities	30	(1,180,953)	(4,682,032)	(1,018,209)	(4,036,812)
Cash generated from operations		52,299,610	43,989,083	45,092,318	37,927,046
Interest received		1,405,085	2,151,741	1,211,453	1,855,215
Interest paid		(443,838)	(748,256)	(382,674)	(645,141)
Dividend received		256,851	266,369	221,455	229,661
Income tax paid		(6,132,064)	(5,597,176)	(5,287,018)	(4,825,842)
Net cash generated from operating activities		**47,385,644**	**40,061,761**	**40,855,534**	**34,540,939**
Cash flows from investing activities					
Net increase in short-term financial instruments		(6,780,610)	(5,762,783)	(5,846,189)	(4,968,627)
Proceeds from disposal of short-term available-for-sale financial assets		3,010,003	2,143,384	2,595,201	1,848,009
Acquisition of short-term available-for-sale financial assets		(2,129,551)	(509,349)	(1,836,082)	(439,157)
Proceeds from disposal of long-term financial instruments		789,862	3,999,710	681,013	3,448,519
Acquisition of long-term financial instruments		(1,741,547)	(132,733)	(1,501,548)	(114,441)
Proceeds from disposal of long-term available-for-sale financial assets		2,010,356	200,502	1,733,313	172,871
Acquisition of long-term available-for-sale financial assets		(1,498,148)	(232,530)	(1,291,692)	(200,486)
Proceeds from disposal of investment in associates and joint ventures		2,280,203	278,009	1,965,973	239,697
Acquisition of investment in associates and joint ventures		(84,306)	(137,917)	(72,688)	(118,911)
Disposal of property, plant and equipment		270,874	357,154	233,545	307,935
Purchases of property, plant and equipment		(24,142,973)	(25,880,222)	(20,815,884)	(22,313,726)
Disposal of intangible assets		6,944	1,083	5,987	934
Purchases of intangible assets		(1,047,668)	(1,501,881)	(903,291)	(1,294,910)
Cash outflows from business combinations		(622,050)	(411,445)	(536,327)	(354,745)
Others		19,936	421,231	17,190	363,183
Net cash used in investing activities		**(29,658,675)**	**(27,167,787)**	**(25,571,479)**	**(23,423,855)**

		For the year ended December 31,			
	Notes	2016	2015	2016	2015
		KRW	KRW	USD	USD
Cash flows from financing activities					
Net increase in short-term borrowings		1,351,037	3,202,416	1,164,854	2,761,098
Acquisition of treasury stock		(7,707,938)	(5,015,112)	(6,645,724)	(4,323,991)
Disposal of treasury stock		-	3,034	-	2,616
Proceeds from long-term borrowings and debentures		1,041,743	192,474	898,183	165,950
Repayment of long-term borrowings and debentures		(252,846)	(1,801,465)	(218,002)	(1,553,209)
Payment of dividends		(3,114,742)	(3,129,544)	(2,685,506)	(2,698,269)
Net increase in non-controlling interests		13,232	(25,312)	11,407	(21,823)
Net cash used in financing activities		**(8,669,514)**	**(6,573,509)**	**(7,474,788)**	**(5,667,628)**
Effect of exchange rate changes on cash and cash equivalents		417,243	(524,487)	359,744	(452,209)
Net increase in cash and cash equivalents		**9,474,698**	**5,795,978**	**8,169,011**	**4,997,247**
Cash and cash equivalents					
Beginning of the period		**22,636,744**	**16,840,766**	**19,517,225**	**14,519,978**
End of the period		**32,111,442**	**22,636,744**	**27,686,236**	**19,517,225**

3) Samsung BioLogics Co., Ltd. Separate Financial Statements as of and for the Year Ended December 31, 2016 (Samsung BioLogics, 2016).

SAMSUNG BIOLOGICS CO., LTD.

STATEMENTS OF FINANCIAL POSITION

AS OF DECEMBER 31, 2016 AND 2015

	Note	December 31, 2016	December 31, 2015
		(In thousands of Korean won)	
ASSETS			
CURRENT ASSETS:			
Cash and cash equivalents	5,6,30	₩ 230,337,601	₩ 34,510,062
Short-term financial instruments	5,30	970,000,000	-
Trade and other receivables	5,8,28,30	75,630,820	37,009,243
Inventories	9	164,219,980	119,177,340
Other financial assets	5,10,30	16,289,300	-
Other current assets	10	4,947,475	2,157,249
Total current assets		1,461,425,176	192,853,894
NON-CURRENT ASSETS:			
Other financial assets	5,7,30	8,000	8,000
Investments in associates and joint Ventures	1,11,27,28	4,944,356,290	4,837,539,391
Property, plant and equipment	12,28	1,090,959,766	890,256,137
Intangible assets	13,28	14,044,654	14,285,740
Other non-current assets	5,10,30	22,222,220	25,550,553
Total non-current assets		6,071,590,930	5,767,639,821
TOTAL ASSETS		₩ 7,533,016,106	₩ 5,960,493,715
LIABILITIES AND SHAREHOLDERS' EQUITY			
CURRENT LIABILITIES:			
Trade and other payables	5,15,28,30	₩ 138,056,375	₩ 56,193,891
Financial liabilities at fair value through profit or loss	5,27,30	1,874,470,943	1,820,439,050
Short-term borrowings	5,14,27,30	-	10,109,490
Current portion of long-term borrowings	5,14,30	403,694,084	-
Other current liabilities	16,30	60,323,791	24,926,773
Total current liabilities		2,476,545,193	1,911,669,204
NON-CURRENT LIABILITIES:			
Trade and other payables	5,15,30	2,300,380	1,909,574
Long-term borrowings	5,14,27,30	439,363,194	681,792,000
Defined benefit obligations	17	5,757,265	8,714,355
Deferred tax liabilities	25	526,670,614	581,574,424
Total non-current liabilities		974,091,453	1,273,990,353
TOTAL LIABILITIES		₩ 3,450,636,646	₩ 3,185,659,557

	Note	December 31, 2016	December 31, 2015
		(In thousands of Korean won)	
LIABILITIES AND SHAREHOLDERS' EQUITY			
SHAREHOLDERS' EQUITY:			
Share capital	18	₩ 165,412,500	₩ 137,843,605
Share premium	18	2,487,313,082	1,030,620,604
Accumulated other comprehensive income	18	4,947,005	4,839,666
Retained earnings		1,424,706,873	1,601,530,283
Total shareholders' equity		4,082,379,460	₩ 2,774,834,158
TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY		₩ 7,533,016,106	₩ 5,960,493,715

SAMSUNG BIOLOGICS CO., LTD.

STATEMENTS OF COMPREHENSIVE INCOME

FOR THE YEARS ENDED DECEMBER 31, 2016 AND 2015

	Note	2016	2015
		(In thousands of Korean won)	
REVENUE	4,19,28	₩ 294,622,021	₩ 91,278,029
COST OF SALES	4,9,20,22,28	268,088,358	114,784,617
GROSS PROFIT (LOSS)		26,533,663	(23,506,588)
Selling, general and administrative expenses	4,21,22,28	56,956,302	180,135,856
OPERATING LOSS		(30,422,639)	(203,642,444)
Other income	23,28	1,217,830	2,663,581
Other expenses	23	(39,010)	(821,253)
Financial income	24	14,348,567	6,844,724
Financial expenses	12,24	(86,783,081)	(1,841,196,798)
Gain on disposal of investment in subsidiary		-	4,543,610,535
Share of loss of equity-accounted investees	11	(129,222,650)	(19,395,735)
PROFIT (LOSS) BEFORE INCOME TAX		(230,900,983)	2,488,062,610
INCOME TAX EXPENSE	25	(54,077,573)	583,116,693
NET PROFIT (LOSS) FOR THE PERIOD ATTRIBUTABLE TO:		₩ (176,823,410)	₩ 1,904,945,917
Owners of the Company		(176,823,410)	1,920,178,774
Non-controlling interests		-	(15,232,857)
OTHER COMPREHENSIVE PROFIT (LOSS)		₩ 107,338	₩ (8,535,493)
ITEMS THAT WILL NEVER BE RECLASSIFIED TO PROFIT (LOSS):			
Remeasurement of defined benefit plans	17,25	(1,595,928)	(2,971,127)
Net change in other comprehensive income of equity-accounted investees	11,25	(1,001,039)	-
ITEMS THAT ARE OR MAY BE RECLASSIFIED TO PROFIT (LOSS):			
Net change in other comprehensive income of equity-accounted investees	11	2,704,305	(5,565,214)
Foreign currency translation differences for foreign operations		-	848
TOTAL COMPREHENSIVE PROFIT (LOSS) FOR THE PERIOD		₩ (176,716,072)	₩ 1,896,410,424

	Note	2016	2015
		(In thousands of Korean won)	
TOTAL COMPREHENSIVE PROFIT (LOSS) ATTRIBUTABLE TO:			
Owners of the Company		(176,716,072)	1,911,863,952
Non-controlling interests		-	(15,453,529)
TOTAL COMPREHENSIVE PROFIT (LOSS) FOR THE PERIOD		(176,716,072)	1,896,410,424
EARNINGS (LOSS) PER SHARE			
Basic earnings (loss) per share (in Korean won)	26	₩ (3,115)	₩ 38,828

SAMSUNG BIOLOGICS CO., LTD.

STATEMENTS OF CASH FLOWS

FOR THE YEARS ENDED DECEMBER 31, 2016 AND 2015

	2016	2015
	(In thousands of Korean won)	
CASH FLOWS FROM OPERATING ACTIVITIES:		
Net profit (loss) for the period	₩ (176,823,410)	₩ 1,904,945,917
Adjustments for:		
Retirement benefits	6,377,009	5,894,646
Depreciation	55,784,426	32,694,637
Amortization	4,365,463	8,933,636
Reversal of loss on valuation of inventories	(1,275,392)	(5,391,777)
Loss on inventories abandoned	321,930	141,983
Loss on disposal of property, plant and equipment	1,033	583,987
Gain on disposal of intangible assets	-	(682,926)
Gain on foreign currency translation	(2,825,232)	(554,928)
Loss on foreign currency translation	3,962,749	9,188,935
Loss on valuation of derivatives	54,031,894	1,820,439,050
Gain on disposal of investment in subsidiary	-	(4,543,610,535)
Gain from assets contributed	(12,018)	-
Interest income	(3,639,650)	(1,182,311)
Interest expenses	19,254,373	2,650,470
Share of loss of equity-accounted investees	129,222,650	19,395,735
Income tax expense	(54,077,573)	583,116,693
	211,491,662	(2,068,382,705)
Change in:		
Decrease (increase) in trade receivables	(28,693,573)	(20,369,472)
Decrease (increase) in other receivables	(4,435,409)	5,804,379
Decrease (increase) in other current assets	(2,502,245)	3,129,492
Increase in inventories	(44,089,178)	(117,238,900)
Increase in long-term other receivables	(12,784,300)	-
Increase in other non-current assets	(359,173)	(18,108,442)
Increase in trade payables	1,161,707	699,431
Increase (decrease) in other payables	(7,659,178)	48,803,685
Increase (decrease) in other current liabilities	35,397,017	6,806,052
Increase in long-term other payables	1,373,929	(577,068)
Decrease in non-current other payables	(526,389)	(1,067,689)
Changes in benefit payment	-	681,446
Payment of plan assets	(10,735,713)	(4,518,212)
	(73,852,505)	(95,955,298)
Interest received	821,632	1,437,110
Interest paid	(24,361,814)	(4,503,598)
Income taxes refund (paid)	63,137	(3,055,177)
	(62,661,298)	(265,513,751)

(Continued)

	December 31, 2016	December 31, 2015
	(In thousands of Korean won)	
CASH FLOWS FROM INVESTING ACTIVITIES:		
Cash inflows from investing activities:		
Decrease in long-term financial instruments	₩ -	₩ 1,000
Disposal of property, plant and equipment	-	19,760
Disposal of intangible assets	-	3,500,000
Decrease in deposits provided	-	270,000
Cash outflows for investing activities:		
Increase in short-term financial instruments	970,000,000	-
Acquisition of property, plant and equipment	162,992,350	240,326,345
Acquisition of intangible assets	5,179,126	152,644,276
Acquisition of investment in joint ventures	234,653,000	-
Increase in deposits provided	-	4,832,853
Decrease in loss of control over a subsidiary	-	35,468,801
	(1,372,824,476)	(429,481,515)
CASH FLOWS FROM FINANCING ACTIVITIES		
Cash inflows from financing activities:		
Proceeds from issue of bonds payable	169,743,600	-
Proceeds from short-term borrowings	-	204,786,766
Proceeds from long-term borrowings	28,396,168	248,532,065
Paid in capital increase	1,484,261,372	267,027,041
Cash inflows from changing in capital of subsidiary	-	6,228,425
Cash outflows for financing activities:		
Repayment in short-term borrowings	10,109,490	93,355,664
Repayment in long-term borrowings	41,000,000	-
	1,631,291,650	633,218,633
NET INCREASE(DECREASE) IN CASH AND CASH EQUIVALENTS	195,805,877	(61,776,633)
CASH AND CASH EQUIVALENTS AT THE BEGINNING OF PERIOD	34,510,062	96,286,617
EFFECT OF EXCHANGE RATE CHANGE ON CASH AND CASH EQUIVALENTS	21,662	78
CASH AND CASH EQUIVALENTS AT THE END OF PERIOD	₩ 230,337,601	₩ 34,510,062

(Concluded)