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Long-term operational performance following spin-offs: Evidence from the medical technology industry

Master's thesis in Management and Economics of Innovation

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CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden 2023
www.chalmers.se
Report No. E2023:070

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Typeset in L^AT_EX
Printed by Chalmers Reproservice
Gothenburg, Sweden 2023

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Abstract

Spin-offs function as a strategic tool for firms aiming to adjust their portfolios in response to strategic changes and evolving business environments. From an operational perspective, a common motivation for spin-offs is tied to expectations of performance improvements where the mechanisms behind this stem from abilities to increase focus on core businesses as the parent and the spun-out entity can achieve greater organizational freedom, ability to change strategy, and focus the strategy more narrowly. There has been a high activity of spin-offs in the medical technology industry and an underpinning reason for this is that firms aim to mitigate industry-wide challenges through spin-offs with the motivation of achieving increased operational focus to capture long-term growth opportunities. Hence, the purpose of this study was to analyze spin-offs in the medical technology industry. To fulfill this purpose, a mixed-method approach was employed to investigate the operational performance of spin-offs in the medical technology industry through a combination of quantitative and qualitative analyses. The findings indicate that post-spin-off improvements in operating performance, as measured by ROA, are mainly associated with the parent firms rather than the spun-off entities. In the studied sample, the parents benefited from increased focus as it facilitated strategy execution, capital allocation, and access to capital. In addition, evidence suggests that the parent firms spun out underperforming firms and that the spun-out entities prioritized growth over profitability to a greater extent.

Keywords: Spin-off, Operational performance, Long-term performance, Medical-technology industry, Return on assets, Divestiture, Corporate restructuring

Acknowledgements

This master's thesis was conducted during the spring of 2023 at the Department of Technology Management and Economics, at Chalmers University of Technology. Our deepest appreciation goes to our supervisor, Gunnar Wramsby, who not only granted us this opportunity but also guided us through this project with deep knowledge and support.

We would like to express our sincere gratitude to all the interviewees who generously shared their time, knowledge, and insights throughout this study. Your valuable contributions and willingness to participate have been essential in shaping the outcomes of this research. We are deeply appreciative of your willingness to share your expertise and experiences, which have enriched this project and helped us gain a deeper understanding of the subject matter and industry. Thank you for your invaluable support and contribution to the realization of this study.

Finally, we would like to thank our opponents, Hampus Back and Albin Jönsson, for their valuable and helpful feedback during this period.

Haris Cehic and Linus Mellbring, Gothenburg, June 2023

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1

Introduction

1.1 Background

Strategic changes and evolving business environments give rise to the need for portfolio adjustments among firms where corporate divestitures function as important strategic tools (D. Lee & Madhavan, 2010). Restructuring-driven corporate equity spin-off (“spin-off”) is a type of divestiture where a firm’s subsidiary becomes an independent entity and a proportionate amount of equity in the subsidiary is distributed to the firm’s shareholders (Tübke, 2005). Spin-offs offer some advantages over other types of divestitures due to for instance tax benefits as the divestiture process is tax-free if certain conditions are met, but also the opportunity for the parent to retain up to 20% of the shares in the spun-off entity (“target”) allowing for reaping the benefits of potential success for the spin-off (Frank & Harden, 2001; Pearce & Patel, 2022).

In Figure 1.1 we have plotted the total deal volume and the number of spin-offs in Europe and the Americas between 1980-2023 using data from Refinitiv Eikon. Some of the largest spin-offs ever made include the spin-off of Phillip Morris International from Altria Group in 2008, worth \$108 billion, the spin-off of Nortel from BCE in 2000, worth \$60 billion, and the spin-off of PayPal from eBay in 2015, worth \$49 billion (Cook, 2020). The largest spin-off in 2022 was the spin-off of Haleon from GSK worth \$36 billion (Roland, 2022). The largest spin-off made in the healthcare sector occurred in 2013 when AbbVie was spun off from Abbott Laboratories, valued at \$55 billion (Armstrong, 2012).

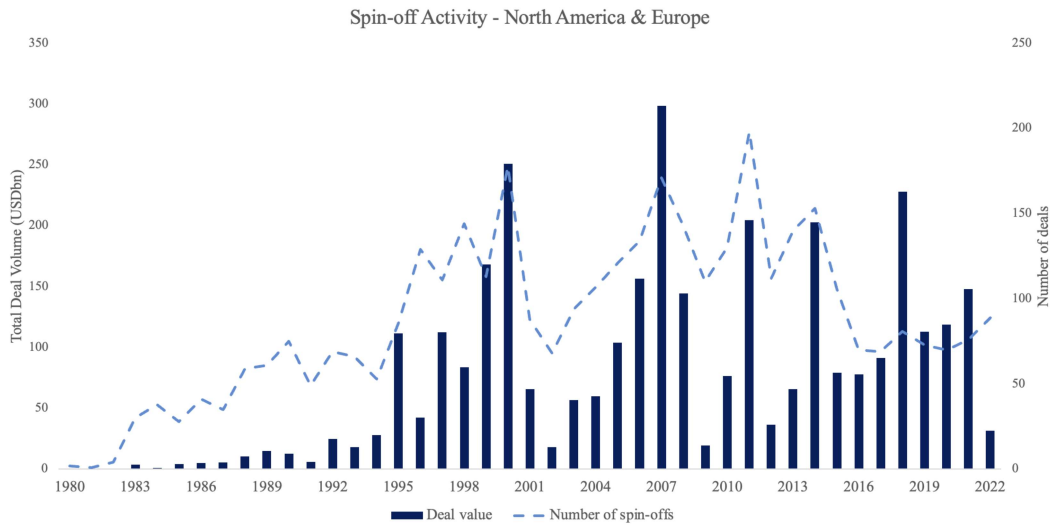


Figure 1.1: Annual volume and value of spin-offs in North America and Europe between 1980–2022. (Source: Refintiv Eikon)

From an operational perspective, a common motivation for spin-offs is tied to expectations of performance improvements where the mechanisms behind this stem from abilities to increase focus on core businesses as the parent and the target can achieve greater organizational freedom, ability to change strategy and focus the strategy more narrowly (Huyett & Koller, 2011; Pearce & Patel, 2022). Parents experiencing high growth can pursue spin-offs to achieve better product exploitation if the subsidiary targets a different market segment whereas the rationale behind highly profitable parents might be the inability to exploit the full market potential for the subsidiary (Tübke, 2005). Moreover, previous research on the rationale to spin-offs has been done from various theoretical perspectives. Researchers employing agency theory in the field of spin-offs and divestitures emphasize improved internal control, reduced cost of firm monitoring, and greater coherence in firm-specific objectives as motivations for pursuing spin-offs (Hoskisson & Turk, 1990; Seward & Walsh, 1996; Woo et al., 1992). Furthermore, transaction cost theory is another perspective commonly applied to spin-offs where operational benefits can be derived from a reduction in corporate scope and complexity facilitating greater efficiency in capital allocation (Brauer, 2006; Gertner et al., 2002; Schipper & Smith, 1983). Yet another perspective commonly used in spin-off literature is the resource-based view emphasizing the benefits which can be derived by complementary resources on the one hand or reduction in over-diversification or diseconomies of scale which allow for more efficient resource utilization on the other hand (Bergh, 1998; D. Lee & Madhavan, 2010; Parhankangas & Arenius, 2003).

1.2 Problem and Research Questions

During the last few years, there has been high spin-off activity within the medical technology industry. In 2021 and 2022, the conglomerates 3M and General Electric

both announced plans to spin out their healthcare businesses, establishing them as independent companies separated from their non-healthcare businesses. Furthermore, there has been activity among diversified, pure-play healthcare firms such as Johnson & Johnson and Medtronic, announcing spin-offs in 2022. Common motivations among these spin-offs include mitigation of industry-wide challenges through increased operational focus to capture long-term growth opportunities (Gorsky, 2021; Martha, 2022; Roman, 2022). The medical technology industry has consistently outperformed the S&P stock index over the last three decades (Copp et al., 2022). However, between 2017-2022 the industry is said to have underperformed as growth expectations for the industry have been lowered owing to factors such as low-growth legacy businesses or increasingly complex processes of launching new products transforming healthcare. Spin-offs have become increasingly common for firms in the medical technology industry functioning as potential strategic levers to mitigate these challenges. Previous research on operational performance following spin-offs is to a large extent focused on a diverse set of industries. The implications on operational performance following spin-offs in the medical technology industry are fairly limited. Hence, this industry will be the focus of this study.

We have derived a main research question that is intended to answer whether spin-offs could function as a strategic tool for companies in the medical technology industry to mitigate the above-mentioned challenges. Further, with respect to previous studies on abnormal operating performance such as Daley et al. (1997), Desai and Jain (1999), and Klein and Rosenfeld (2010), we want to examine if similar findings appear when only focusing on the medical technology industry. The research question is as follows:

Do spin-offs in the medical technology industry result in positive abnormal operating performance and if so, what are the sources of abnormal performance?

To facilitate our research process we have formulated two subquestions. The first subquestion is intended to analyze if there is value creation in terms of improved operational performance following spin-offs, whether the parent, the target, or both benefit from the spin-off as well as the underlying factors to potential performance improvements. The first subquestion is as follows:

Is there a difference in operational performance post-spin-off between the parent and the target and if so, why?

The second subquestion aims to explore the results from the first subquestions to shed further light on why some spin-offs allow for value creation or not, providing insights for executives in medical technology firms to assess whether there are certain firm-specific conditions that influence the success of spin-offs. The second subquestion is as follows;

Why do some medical technology spin-offs perform better than others?

1.2.1 Purpose

This study aims to analyze spin-offs in the medical technology industry.

1.2.2 Delimitations

There will be certain delimitations with respect to the timeline and resources devoted to this study. When evaluating the degree of value creation following spin-offs, the focus will be on changes in operational performance and not value creation for shareholders as indicated by stock price performance, although these two elements tend to correlate in the long run. However, firms might create long-term shareholder value although it is not reflected in shorter-term operational performance. Moreover, the focus is on the underlying operational performance of the parent and target firms and therefore we will not include tax and interest expenses when calculating the operational metrics.

2

Literature Review

The following section is intended to cover the relevant literature needed to provide a foundation and understanding of the problem which we intend to analyze. The first part of the literature review covers factors influencing firm profitability which is intended to shed light on changes in operating performance among firms. The second part begins with an introduction of corporate restructurings which is narrowed down to focus on spin-offs, the antecedent to pursuing spin-offs, and a review of the literature covering the long-term operating performance of firms pursuing spin-offs. This part can be attributed to the direct operational implications of spin-offs.

2.1 Return on Assets

Return on assets (“ROA”) is a financial ratio commonly used for measuring the profitability and operating performance of a firm as it measures the firm’s ability to leverage its assets in generating profits independently of financing structure (Jewell & Mankin, 2012; Selling & Stickney, 1989). The ratio is often calculated as the profit margin (net income or operating profit) divided by total assets and can be further broken down into profit/sales multiplied by sales/total assets (Jewell & Mankin, 2012). Fairfield and Yohn (2001) acknowledge that the firm’s strategy choice influences its asset turnover and operating margins as reflected by its asset utilization and operating efficiency respectively.

$$\frac{\text{Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}} = \frac{\text{Profit}}{\text{Total Assets}} = \text{Return On Assets ("ROA")}$$

2.1.1 Factors influencing ROA

Asset turnover depends on firms’ efficiency in asset utilization which can be determined by efficiency in the use of property, plant and equipment, capital expenditures, or working capital management (Selling & Stickney, 1989; Soliman, 2008). On the other hand, operating margins are rather reflected through operating efficiency and pricing power (Curtis et al., 2015; Fairfield & Yohn, 2001; Soliman, 2008). Reduction in operating expenses functions as a lever to increase operating margins (Burja, 2011). Pricing power can be achieved through efforts aimed at differentiating product or service offerings by focusing on innovation, brand, product positioning, or participation in a market niche, etc. (Selling & Stickney, 1989; Soliman, 2008).

Moreover, Selling and Stickney (1989) argue that ROA is influenced by the degree of operating leverage. It's explained that the proportion of variable and fixed costs influence ROA where a high proportion of fixed costs allow for scaling operating margins as firms experience sales growth. In addition, they explain that firms experiencing high operating leverage also demonstrate higher variability in ROA. It's also acknowledged that a high proportion of fixed costs results in capacity constraints which imply limitations in terms of potential asset turnover, and therefore operating margins become of greater importance.

Jenkins et al. (2004) touches upon the product life cycle phenomena and acknowledge that strategies emphasizing market share and scale expansion during growth phases are preferable over profitability maximization as it might allow for long-term competitive advantages at the expense of lowered profitability short term. The dynamics underpinning this reasoning include opportunities to achieve first-mover advantages or scale economies, but also the development of brand or capabilities related to innovation, distribution, and marketing which could be beneficial for long-term competitive strength. Selling and Stickney (1989) apply similar reasoning and argue that firm focus in initial product phases is characterized by gaining market share and market acceptance with emphasis on product, sales, and marketing development, but also capital expenditures for future expansion of which both aspects impact ROA negatively as demonstrated through low operating margins in relation to assets. The relevance of earnings becomes increasingly important as firms shift from earlier to later stages in their life cycles, where there is a shift from an emphasis on sales growth to profitability (Jenkins et al., 2004). As products reach maturity, previous investment bears fruit, and there is a shift towards reducing costs through strengthened capacity utilization and efficiency in operations and where economies of scale and learning contribute to strengthened ROA (Selling & Stickney, 1989). As firms reach stagnating or declining phases, ROA tends to decrease due to reduced operating income resulting in profitability being important for firm survival as the cash flows from the operations can be reinvested and finance new growth opportunities (Jenkins et al., 2004; Selling & Stickney, 1989).

Related to the reasoning of innovation in the product life cycle phenomena is R&D and its corresponding impact on operating performance which has been widely studied across the literature where several studies have found improvements in operating performance following an increase in R&D intensity (Eberhart et al., 2004; Guo et al., 2018; Sougiannis, 1994). Guo et al. (2018) found that differentiation-focused manufacturing firms in China allocate more resources to R&D and that the spending is positively associated with future profitability as measured by ROA in contrast to cost-focused firms which experienced an inverse U-shape. Research has demonstrated the risks which come with R&D. Shi (2003) argues that the risk of failed R&D investments can be larger than the corresponding benefits. A study by Vithessonthi and Racela (2016) found that operating performance was negatively associated with R&D intensity in the short term due to the risk and uncertainty which stem from investments related to R&D activities. However, they also found that long-term firm value was positively associated with R&D intensity as it takes time for the

innovation process to generate operational benefits.

2.2 Corporate Restructuring

Strategic changes and evolving business environments give rise to the need for portfolio adjustments among firms where corporate restructuring functions as an important strategic tool (D. Lee & Madhavan, 2010). Business portfolio restructuring is a form of corporate restructuring in addition to organizational and financial restructuring (Bowman & Singh, 1993). It can be described as a process of creation of shareholder value by mitigating the structural and strategic contexts in which the firm operates by reducing firm scope or strategic refocusing through the divestiture of assets or business lines or through spin-offs, carve-outs, or sell-offs (Bergh & Lim, 2008; Brauer, 2009; Sanchez-Riofrio et al., 2014).

2.2.1 Spin-off

Spin-offs can be described as the separation of assets within a firm resulting in a new, independent entity which for instance can be able to capture opportunities that would have been difficult to realize within the structure of the parent (Bergh & Lim, 2008). Tübke (2005) explains that corporate spin-offs are spun out from firms, whereas institutional and university spin-offs stem from public or private institutions and universities respectively. Moreover, it is acknowledged that restructuring-driven spin-offs are conducted through a divestiture by the parent firm as means of refocusing or restructuring. In contrast, it is explained that restructuring-driven spin-offs differ from the so-called entrepreneurial spin-offs which are conducted by a number of individuals within the parent firm aiming to exploit commercial opportunities arising from intra-firm experiences. Furthermore, it is explained that restructuring-driven corporate equity spin-off (“spin-off”) is a type of divestiture where a firm’s subsidiary becomes an independent entity and a proportionate amount of equity in the subsidiary is distributed to the firm’s shareholders.

An advantage of pursuing a spin-off instead of selling the subsidiary stems from tax-free benefits as the divestiture process is tax-free if certain conditions are met (Frank & Harden, 2001), implying that profitable subsidiaries are more likely to be spun out whereas less profitable firms are sold (Huyett & Koller, 2011). Spin-offs in the US tend to be non-taxable whereas in Europe the tax dynamics vary between countries (Veld & Veld-Merkoulova, 2009). A study conducted by Maydew et al. (1999) found that tax benefits derived from spin-offs can allow for superior financial performance compared to selling the subsidiary when the tax savings outweigh the acquisition premia derived from a sell-off. Moreover, Bergh et al. (2008) argue that the restructuring choice is influenced by differentiation strategy and differences in information asymmetries. Spin-offs are said to better mitigate information asymmetries and generate higher financial performance than sell-offs when firms are highly specialized and demonstrate low levels of diversification whereas sell-off is more beneficial for firms with high diversification and low specialization (Bergh et al., 2008). In addition, the parent might retain up to 20% of the shares in the target following

the spin-off allowing for strategic and financial influence, but also opportunities of reaping the benefits of potential success for the spin-off (Pearce & Patel, 2022).

2.2.2 Carve-out

Carve-outs are commonly used as a mechanism of financing for firms with cash constraints where the subsidiary tends to experience high growth (Frank & Harden, 2001). Similar to spin-offs, the subsidiary generally becomes an independently listed entity. However, the parent can sell a portion of the shares in the subsidiary enabling additional shareholders but also increasing the cash position for the parent (Pearce & Patel, 2022).

For carve-outs, tax dynamics aren't as beneficial as for spin-offs and a larger share of the control can be retained by the parent (Frank & Harden, 2001). When benefits arise from controlling a subsidiary in related industries, a carve-out could be preferred over a spin-off. However, in carve-outs, the management and board tend to be shared whereas the board and management tend to be separate for spin-offs. Research has for instance demonstrated that continuing relationships between the parent and the subsidiary post-divestiture could constrain the subsidiary's ability to operate as an independent firm yielding implications on performance (Evald et al., 2009; Semadeni & Cannella, 2011).

2.2.3 Sell-off

Sell-offs involve the transfer of assets from the selling firm to an acquiring firm with the rationales for the acquiring firm to realize greater value for the acquired assets or the selling firm divesting assets negatively impacting the firm's strategy or operations (Berger & Ofek, 1995). A drawback with sell-offs is the tax liabilities that come with the transaction and the possible loss of strategic relationships (Pearce & Patel, 2022). However, the divestiture method is favorable when the need for cash increases for the parent or when the ability to influence the subsidiary from an operational perspective decreases (Frank & Harden, 2001).

2.3 Antecedents to Spin-offs

There is extensive research within the field of antecedent to divestitures and spin-offs and the theoretical point of view upon which the research is based greatly varies across the literature. However, literature based on agency theory, transaction cost theory, and the resource-based view are frequently recurring in literature reviews and will therefore be in focus (Brauer, 2006; Sanchez-Riofrio et al., 2014; Silva & Moreira, 2019).

2.3.1 Agency Theory

Agency theory is one of the most commonly used theories applied to divestitures. It contrasts differences in self-interests (e.g. goals and risk preferences) among prin-

cipals (e.g. owners) and agents (e.g. managers) and their corresponding ability to control the actions taken by the firm (Eisenhardt, 1989).

Hoskisson and Turk (1990) describe that owners strive for sufficient diversification to prevent the failure of the businesses while aiming for a diversification level facilitating value-creation through economies of scope. It's also explained that managers benefit from diversification as it allows for reduced employment risk and increased compensation, resulting in agency conflicts in terms of optimal diversification. These dynamics give rise to monitoring and bonding costs where the first is attributed to costs of monitoring managers whereas the latter relates to conflicting agendas imposing risks of the manager pursuing its own interests instead of the business unit's (Woo et al., 1992).

A spin-off can function as a strategic tool to mitigate the monitoring costs by reducing the firm's scope (Woo et al., 1992). Hence, the parent can appropriate benefits in terms of improved operational performance through increased efficiency in internal controls and reduction in the cost of monitoring managers following the reduction of corporate layers and where results are tied directly to firm performance to a greater extent (Hoskisson & Turk, 1990; Seward & Walsh, 1996; Woo et al., 1992). There are also challenges among firms to align incentive compensation to stock performance for managers in diversified firms which could result in insufficient motivation to maximize shareholder value (Feldman, 2016a). Spin-offs facilitate incentive alignment among managers in the target firm as the relation between outcome and effort becomes more evident. Hence spin-offs can also be associated with the reduction of bonding costs as it facilitates the establishment of objectives among agents which are coherent with the firm's market environment and priorities (Woo et al., 1992). However, managers of the target firm might become more risk averse due to fear of mistakes which could impose implications of innovative performance and activities taken on by the firm (Hitt et al., 1996).

Furthermore, Semadeni and Cannella (2011) explain that agency theory also revolves around incentive alignment and that agency issues are reduced by lowering information asymmetries. Krishnaswami and Subramaniam (1999) explain that spin-offs may facilitate a reduction in information asymmetries related to operating efficiency and cash flows and that when information asymmetries give rise to firms being undervalued, spin-offs could allow for improvements in valuation. They found that diversified firms with high levels of information asymmetries are more likely to pursue spin-offs. Furthermore, they found that firms with growth opportunities and those with a need for external capital are more prone to pursuing spin-offs and that spin-offs allow firms to enhance their market value by reducing information asymmetries prior to seeking capital from the market.

2.3.2 Transaction Cost Theory

The theory of transaction costs is another central theoretical field applied to divestitures and spin-offs and focuses on the scope of firms (Brauer, 2006; Semadeni

& Cannella, 2011). Jones and Hill (1988) acknowledge that transaction costs influence the strategic choices taken by firms where economic benefits can be derived from the internalization of transactions and that such benefits are explained to stem from economies of integration, economies of scope, or economies of internal capital markets. It's explained that economies of integration relate to benefits appropriated through vertical integration where internalization of activities can allow for greater coordination across activities. Moreover, economies of internal capital markets stem from unrelated diversification and allow for more optimal resource allocation compared to firms that would operate independently using external capital markets. In addition, economies of scope relate to related diversification where benefits arise from sharing resources which otherwise would be difficult owing to transactional factors. These benefits motivate the expansion of firm scope up to a certain point until the costs of administrative exchange exceed the corresponding market exchange costs, resulting in motivation for divestiture (Bergh & Lawless, 1998).

Semadeni and Cannella (2011) explains that the target firm's abilities to leverage the benefits of scope and integration might be reduced once it's established as an independent company where the degree of benefit loss depends on linkages to the parent post-spin-off. For instance, they found that continued ties were beneficial for the target firms which were vertically integrated or horizontally related to the parent. In addition, they argue that the target firms lose the economies of the internal capital market once separated from the parents' corporate structure. Although spin-offs might lose the benefits of internal markets, researchers have demonstrated that spin-offs can provide greater efficiency in capital allocation. Growing firm complexity due to diversification gives rise to dissynergies and increasing costs of managing the businesses where reduction of complexity may facilitate resource allocation (Brauer, 2006; Schipper & Smith, 1983). For instance, Berger and Ofek (1995) acknowledge that diversified firms are prone to overinvest to a greater extent compared to single-segment firms. Moreover, it's explained that value destruction can arise from the subsidization of business segments that perform poorly. Increased efficiency in capital allocation following spin-offs has been demonstrated by Gertner et al. (2002) where target firms may achieve greater efficiency in the allocation of capital as independent companies, isolated from distortions in internal capital markets. Moreover, it is shown that focus-increasing target firms in industries characterized by high investment opportunities increase investments post-spin-off whereas those in industries with lower opportunities decrease investments. In addition, Feldman (2016b) found results of improved capital allocation for the parent firm following the spin-off.

Semadeni and Cannella (2011) analyzed the degree of parent's ownership in the target post-spin-off by applying the logic of the scope of firms and transaction cost theory. They found that the degree of ownership impacts the performance of the target firms where significant ownership post-spin-off imposes constraints on the firm's ability to operate as an independent firm. Moreover, they found that when there is a representation of either a chairman or board member from the parent in the target firm, the latter experience positive effects on stock market performance. However, when there is both a chairman and board member represented, the target firm is

negatively impacted. Evald et al. (2009) found that direct relationships between the parent and target firm in terms of financial support or parent representation on the target firm's board of directors perform worse financially than those with no cooperation with the parent.

2.3.3 Resource-based View

The resource-based view is yet another theory commonly used in spin-off literature and can be argued to overlap with transaction cost economics as it relates to firm scope. Bergh (1995) highlights the essence of the resource-based view as the difference between firms' resources and that specific resources allow for economic benefits stemming from sharing of specialized resources or that resources can be more efficiently allocated internally compared to capital allocation through external markets.

Markides and Williamson (1996) argue that performance enhancements can arise through related diversification when it allows for a combination of resources that are valuable, rare, costly to imitate, and imperfectly tradable. Furthermore, it is explained that to sustain supernormal profits, firms need accumulated competencies to quickly and efficiently develop new strategic assets in relation to competitors. It's demonstrated that the relatedness of resources between business units within a firm allows for synergies that positively influence operating performance Bergh (1998). Moreover, low relatedness and complementarities to other firms in the portfolio influence divestiture decisions as it reduces economies of scope and imposes weaker coordination among the business segment, impacting operating performance negatively (Bergh, 1995, 1998; Duhaime & Grant, 1984; Snihur et al., 2022). Hence, firms with weak performance and high diversification are more likely to pursue divestments (Markides, 1992). Divestitures can allow for unlocking value in a corporate portfolio by removing dissynergies arising from factors such as diseconomies of scale or over-diversification (Brauer, 2006; D. Lee & Madhavan, 2010; Schipper & Smith, 1983). Spin-offs are thus prone to occur for business units less adjacent to their parent's core business owing to low potential for synergies or management ability (Chemmanur & Yan, 2004).

The relationship between the parent and the target firm both pre and post-spin-off has implications for the subsequent performance of the firms. Parhankangas and Arenius (2003) argue that extensive resource sharing with the parent might impose implications on learning and competence renewal. However, it's also explained that the target firm can benefit from increased flexibility while simultaneously leveraging the parent's resources. Sapienza et al. (2004) use the concept of a knowledge-based view and argue that too high or low degrees of overlapping knowledge bases between the parent and the target firm might impose implications on the abilities to develop new knowledge bases for the latter, affecting its post-spin-off growth negatively.

Moschieri and Mair (2011) explain that the target firm can achieve innovation-related benefits from a post-spin-off relationship with the parent through resource transfer and access to HR, sales, or other departments, while the parent can leverage

innovation produced in the target. In addition, Tübke (2005) argues that the success of the target firm is positively influenced by the parent's R&D budget. However, it's also acknowledged that target firms benefit from the transfer of market and managerial experiences whereas extensive technical focus could influence the spun-out entity negatively. This reasoning is strengthened by Chatterji (2009) arguing that success factors of new ventures in the medical technology industry relate to inherited market, marketing, and regulatory-related knowledge rather than previous technical knowledge.

2.3.4 Corporate Focus

Diversified firms are exposed to organizational and governance-related inefficiencies and divestitures can be used as levers to overcome these problems through strengthened strategic control and increased focus on core operations (Hoskisson & Turk, 1990). One of the most common motivations to pursue corporate restructuring through the divestiture of unrelated business units is to reduce excessive diversification to manage the firms more competitively and economically (Bergh et al., 2008), which arguably relates to the agency theory, transaction cost theory, and the resource-based view. In particular for spin-offs, a common motivation for divestiture ties to expectations of performance improvements where the mechanisms behind this stem from abilities to increase focus on core businesses as the parent and the target firm can achieve greater organizational freedom, ability to change strategy and focus the strategy more narrowly (Huyett & Koller, 2011; Pearce & Patel, 2022).

Additionally, the external environment has been found to impact divestitures and result in implications for corporate focus. Bergh (1998) acknowledges that firms divesting unrelated businesses outperform those divesting related businesses when uncertainty increases. The dynamics behind this stem from abilities to lower information processing costs, increase focus on core business and reduce the risk of mistakes allowing for cooperative and strategic synergies. Furthermore, it's explained that when environmental uncertainty decreases, related divestiture becomes beneficial as it allows for reduced costs of information processing and benefits of financial synergies resulting in greater efficiency in resource allocation.

Peruffo et al. (2014) explain that spin-offs can be proactive means of facilitating innovation and coping with competition as it allows for renewed strategic focus. Similarly, K. Lee and Roh (2020) propose that proactive spin-offs facilitate innovation and increase the knowledge base within the firm supporting R&D intensity yielding greater R&D output and strengthened innovational performance. Moreover, Hoskisson and Johnson (1992) have found both R&D intensity and operating performance to increase as firms reduce their corporate scope.

2.4 Long-term Operating Performance

The main focus when assessing the long-term performance of spin-offs has been on the wealth effects associated with the announcement. In a meta-analysis of 26

studies by Veld and Veld-Merkoulova (2009), they find that there is a 3.02% abnormal return related to the spin-off announcements during the event windows. Further, they examined the literature on wealth effects that instead are associated with long-run performance. In this case, the empirical evidence is more disputed. The first-ever study on long-run stock price performance by Cusatis et al. (1993) found that significant long-run performance exists although later studies, that use a different methodology, such as Veld and Veld-Merkoulova (2004) and McConnell et al. (2001) could not reproduce these results and instead find non-significant returns.

The study by Daley et al. (1997) is the first to examine if value creation is explained by increased operating performance as a result of corporate focus. The metric they use is operating earnings-to-assets or return-on-assets (“ROA”). Further, they also employ changes in net capital expenditures to sales (“CAP”) as a metric to take the scale of the operations into account. Daley et al. (1997) conducts the analysis by combining both the parent and the spin-off with an interval of year -1 to +1, and year +1 to +2. The results show that the median performance-adjusted change in ROA for year -1 to +1 for cross-industry spin-offs is 3.1% while the results for own-industry spin-offs is 0.0%. They further find that CAP is not statistically significant for either cross-industry spinoffs or own-industry spin-offs. Daley et al. (1997) conclude that at a portfolio level (meaning combining the parent and the spin-off) only cross-industry spin-offs has a significant positive change in operating performance. Further, they could not show an increase in CAP and that the more likely explanation for the improvements in operating performance is due to cost controls. They also acknowledge that their findings of the own-industry spinoff’s lack of operating performances are aligned with others’ findings that there are no significant wealth effects at the spin-off announcement. Daley et al. (1997) show that an increase in operating performance most often arises from the parent firm rather than the target firm, where the most likely explanation is due to an increase of focus for managers because of the divestment of unrelated business.

Desai and Jain (1999) examine if stock market performance following a spin-off is related to an increase in focus and if it is correlated with operating performance similar to Daley et al. (1997). Desai and Jain (1999) also analyze the operating performance by both combining the parent and the target firm on a pro-forma basis and separately as well, with the window of year -3 to +3. The metric they choose is operating cash flow-to-total assets which differs from Daley et al. (1997) which uses operating earnings-to-assets. Their results show that the focus-increasing firm’s median operating post-spinoff performance for the period [+1, +3] is 3.11% for the pro-forma combined firms. Further, they could not see any significant improvement in operating performance for the non-focus-increasing combined firms. By conducting a cross-sectional regression they also link an increased focus with both stock market performance and operating performance. Desai and Jain (1999) also show evidence for the reasons why non-focus-increasing spin-offs are done and find that one main motivation is to remove the underperforming business unit from the parent.

In the study by Murray (2008), he examines how spin-offs perform in an environment of high bank debt such as in the UK. Contrary to previous research on the operational performance of spin-offs he finds that in the UK new spin-offs underperform compared to industry averages and that they perform in line with their parent firm. Murray (2008) argues that these contrary results are due to the UK being dominated by bank debt and hence debt providers have larger control and influence over the disposal of excess returns.

The study by Klein and Rosenfeld (2010) investigates the difference in performance and characteristics between sponsored and conventional spin-offs. Klein and Rosenfeld (2010) definition of a sponsored spin-off is when part of the equity in a new spin-off is acquired by an outside investor and the new company gets a cash infusion. They use a window of -1 year to + 3 years when examining the operation performance and the financial metrics that they use include ROA, capital expenditure (CapEx), and Tobin's Q. Similar to previous studies they use the matching firm methodology framework by Barber and Lyon (1996). They find that both the sponsored target and their parent performed at subpar prior to the spin-off. After the spin-off is effective, this is reversed for the parents and they show an average performance in ROA whilst the sponsored spin-offs continue to underperform. CapEx to sales is also significantly subpar compared to the matched firms for the sponsored spin-offs prior to the spin-off, as well as Tobin's Q. Klein and Rosenfeld (2010) argue that this could indicate that the reason for lower levels of capital expenditures by the spin-offs prior to becoming a separate entity is because of limited opportunities for growth. Further, this could explain why some spin-offs seek out sponsors to inject capital. In conclusion, the study by Klein and Rosenfeld (2010) shows that underperforming subsidiaries that are spun off continue to perform at subpar even after being provided with a cash injection by sponsors.

Contrary to previous studies on operating performance that include a sample with only U.S. firms Boreiko and Murgia (2013) finds that for a sample of European firms, the parent shows no improvement in operating performance post-spin-off. Moreover, they also find that the target firms perform better than their matched firms in the post-spin-off period. They also find that non-focus target firms perform the best out of the various subgroups which is in direct contrast to Daley et al. (1997) and Desai and Jain (1999).

2.5 Literature Review Summary

To summarize, spin-offs is a form of corporate restructuring used to mitigate the organizational and strategic context in which the firm operates by reducing firm scope or strategic refocusing (Bergh & Lim, 2008; Brauer, 2009; Sanchez-Riofrio et al., 2014). Previous research on spin-offs and their corresponding implications on both the parent and target firm has been done from various theoretical perspectives. These include agency theory, transaction cost theory, and the resource-based view capturing aspects such as internal control, capital allocation, and over-diversification respectively (Brauer, 2006; D. Lee & Madhavan, 2010; Schipper & Smith, 1983; Se-

madani & Cannella, 2011; Seward & Walsh, 1996). In addition, related to the three perspectives is the element of corporate focus capturing the aspect of performance improvements by managing the firms more focused (Huyett & Koller, 2011; Pearce & Patel, 2022). Moreover, previous research on long-term performance post-spin-offs demonstrates that the parent firms benefit most from spin-offs and that focus is an underpinning factor to this (Daley et al., 1997; Desai & Jain, 1999), although it varies when taking different geographical regions into perspective (Boreiko & Murguia, 2013).

3

Method

3.1 Research Strategy

For the purpose of this paper, we used a mixed-method design and more specifically an explanatory sequential design where we first conducted a quantitative study followed by a qualitative study used to elaborate on the quantitative findings. According to Bell et al. (2019), this approach can be useful when trying to select cases to study or people to interview. In our case, we wanted to analyze the operational implications on operating performance following spin-offs in the medical technology industry so there was a need to first determine the operational performance based on accounting data and later find possible explanations for these results through qualitative analysis. Some of the arguments against a mixed-method design according to Ivankova et al. (2006) are that it could become lengthy, prioritization, and the feasibility of collecting and analyzing both quantitative and qualitative data at the same time.

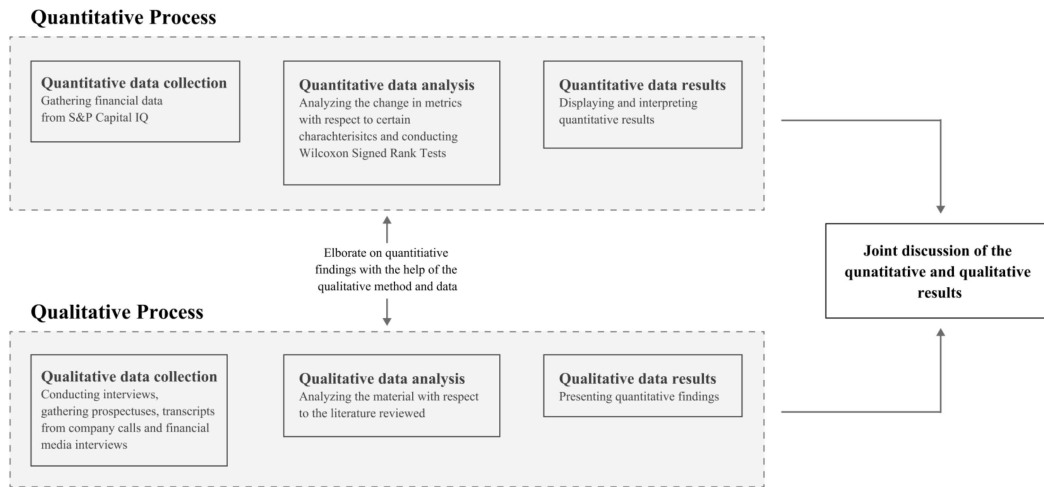


Figure 3.1: A graphical overview of the research strategy and process

3.1.1 Validity, Reliability, and Generalizability of a Mixed-Method Approach

In a mixed-method approach, validity and reliability need to be considered for the method as a whole and not just the sum of its parts (Wong & Cooper, 2016). On-

wuegbuzie and Johnson (2006) examines issues that arise when conducting mixed-method research. One of the problems is with integration and the question of how the weight should be dispersed between the quantitative and qualitative findings but also what to do if there is a conflict between the two. Further, Onwuegbuzie and Johnson (2006) states different legitimation types that need to be considered.

One of them is sample integration. Onwuegbuzie and Johnson (2006) states that if the sample between the two different methods doesn't contain the same groups or individuals then generalization of the two findings combined can be problematic. This entails that there needs to be a consideration of not overgeneralizing the qualitative results due to it not containing the full sample from the quantitative study. Another factor that is considered is weakness minimization. This entails that the method needs to be conducted to minimize the weaknesses of the two approaches so that the overall legitimacy can be maximized. For example, the weakness of low generalizability of the qualitative part can be mitigated with the quantitative part of the study. Further, shortcomings of the study could arise due to the sequential approach. If the findings are affected by the sequence of the method then that questions the legitimacy of the research. However, in the study, this is arguably mitigated by the structure and research questions which imply a need for first determining whether spin-offs demonstrate abnormal operating performance quantitatively and then employing both quantitative and qualitative analysis to find possible explanations for the operating performance.

Bell et al. (2019) acknowledge that generalizability is a challenge in qualitative research due to often small samples and lack of sufficient scope of the findings. However, it is also explained that generalizing the findings to the wider population is not the purpose and that it is rather the quality in theoretical reasoning which is of importance in contrast to meeting specific statistical criteria. Furthermore, it is explained that generalizability is of great importance in quantitative research as one of the main goals of that research type is to generalize the findings to the wider population from the sample. However, it is explained that biases in sampling methods impose challenges to representativeness and thus the generalizability of the findings where random sampling methods and large samples function as levers to mitigate these challenges. The aspect of generalizability potentially impacts the quality of this study. Since we only looked at the medical technology industry, the sample becomes limited which could influence the statistical significance and ability to generalize the findings from the quantitative part. Moreover, similar reasoning can be applied to the qualitative part where limited samples could influence the quality of the theoretical reasoning. However, the aim of this study is not to fully generalize the findings, but rather provide contrasting insights into how spin-offs could function as a tool among firms within the medical technology industry. Moreover, the structure of the study with a mixed-method approach arguably allows for contrasting the qualitative findings with the quantitative findings and vice versa giving support to theoretical reasoning as well as opportunities to evaluate the generalizability of the quantitative findings by considering the qualitative findings.

3.2 Methodological Approach

3.2.1 Quantitative Method

To analyze whether spin-offs in the medical technology industry allow for positive or negative abnormal operational performance and to identify potential sources of abnormal performance we pursued a deductive and quantitative approach (Bell et al., 2019), and analyzed the accounting data for the firms included in our sample. The main reason to pursue the quantitative study was to determine the implications which spin-offs have on operational performance for both the parent and target firms as well as sources to change in performance. Moreover, it also provided insights into whether there are differences in performance among focus-increasing and non-focus-increasing spin-offs. The results obtained from this were also used to distinguish overperforming from underperforming spin-offs which formed the basis for the qualitative study and allowed for further insights to the research questions.

3.2.2 Sample Selection

The sample used in the quantitative part of the study covers spin-offs in the medical technology industry between 2000 to 2019 and the sample was screened using Refinitiv Eikon and Mergermarket. When screening the sample in Mergermarket we used relevant criteria that relate to the medical technology sector to find relevant divestments in the industry. Moreover, the screening criteria for generating the sample in Refinitiv Eikon included relevant divestitures within the segment “Healthcare Equipment & Supplies”. Moreover, the sample was limited to firms having their headquarters in either Europe or the United States. Furthermore, only listed companies were analyzed as it allowed for greater accessibility of empirical data and if the operational data was not reported one year prior to or post spin-off completion the firm was removed from the sample. Firms were also removed from the sample if they had been acquired by another firm within one year after the completion of the spin-off. However, if either the parent or target was acquired within one year, the one which wasn’t acquired was still included in the sample. Firms included in the study were selected based on the primary two-digit industry SIC code (38) as reported by Capital IQ, which relates to the medical technology industry. Both the parent and target firm would be included in the analysis if at least one of them met the industry criteria. The screening in Refinitiv Eikon generated a total of 67 deals of which 24 relevant spin-off events were included in the sample. Moreover, the screening in Mergermarket included 194 deals of which 61 were relevant spin-off events. From that screening, five spin-off events were included in the sample which wasn’t already found in the previous screening. Three out of those five spin-off events did not have 38 as the primary two-digit SIC code as reported by Capital IQ but were included based on qualitative assessment. In total, firms from 29 spin-off events were included in the sample. 28 events included both the parent and target whereas one spin-off event only included the parent since its target was acquired within one year of the spin-off.

Spin-off Activity in the Medical Technology Sector from January 2000 to December 2019					
Year	Total Spin-offs	Focus Increasing Spin-offs	Non-Focus Increasing Spin-offs	North American Spin-offs	European Spin-offs
2019	3	2	1	1	2
2018	-	-	-	-	-
2017	2	-	2	1	1
2016	3	1	2	2	1
2015	2	1	1	2	-
2014	2	1	1	2	-
2013	2	2	-	2	-
2012	2	2	-	-	2
2011	-	-	-	-	-
2010	-	-	-	-	-
2009	1	1	-	1	-
2008	1	1	-	1	-
2007	1	1	-	-	1
2006	1	1	-	1	-
2005	-	-	-	-	-
2004	3	3	-	2	1
2003	-	-	-	-	-
2002	1	1	-	1	-
2001	3	1	2	2	1
2000	2	1	1	2	-
Total	29	19	10	20	9

Table 3.1: Distribution of total spin-offs in our sample by year of completion as well as the geography of the parent and if the spin-off is focus increasing or not.

The distribution of the spin-offs in our sample by year, geography, and focus is shown in Table 3.1. Out of a total of 29 spin-offs between January 2000 and December 2019, 19 spin-offs were focus-increasing and 10 were non-focus increasing where 80% of the non-focus-increasing spin-offs were completed after 2012. Further, 69% of the spin-offs were conducted by North American located parent companies and 31% by European.

3.2.3 Quantitative Research Design

To analyze the operating performance of the spin-offs, we used the method explained and evaluated by Barber and Lyon (1996) which demonstrates well-specified test statistics. To detect abnormal operational performance Barber and Lyon (1996) adjust sample firm-specific performance for industry-wide effects by matching firms with similar pre-event operating characteristics to the sample firms. In the method, the sample firms' performance was subtracted from the performance of the matching firms which allowed for performance-adjusted observations. The matching firms for each sample firm were selected by the best-fit relative to the sample firms in terms of industry and pre-spin-off performance as measured by the two-digit SIC code and ROA respectively. For the ROA criteria, we included the control firms that demonstrated ROA within a $\pm 10\%$ range of the sample firm one fiscal year prior to the spin-off completion date. However, when there was no financial data reported for the year prior to the spin-off we were unable to compute ROA for the fiscal year preceding the spin-off and hence in those cases, the control firms were matched to the spin-off year. This was the case for four out of the 29 target firms and one of the parent firms. If there were no matches within the ROA range, we reduced the industry filter to the single-digit SIC code. Barber and Lyon (1996) explain that selecting industry benchmarks based on performance provides better test statistics compared to solely selecting on industry or industry and size. The reason for this is

explained to stem from the tendency of mean reversion in accounting data, where non-performance-based benchmarking prior to the spin-off event could result in non-event-related factors influencing operational performance.

We analyzed the pre- and post-operating performance of the parent firm and the target. The financial data was gathered from Capital IQ and original filings were used for the sample firms. The matching firms were also screened through Capital IQ. Similar to Daley et al. (1997) we evaluated the operating performance as measured by ROA. The ROA for each sample and matching firm was calculated by dividing operating income (EBIT) by fiscal year-end total assets for each year. The operating ratio was calculated for the spun-off entities and their corresponding parents for the years -1, 0, +1, +2, and +3 where year 0 is the year on which the spin-off is completed. Similar to previous research by Desai and Jain (1999) and Klein and Rosenfeld (2010) we analyzed operating performance up to three years post-spin-off. Moreover, similar to Daley et al. (1997) we calculated the performance for the combined spin-off pair to take into account the performance on an aggregate level where the data used for the combined firms was the parents operating data for the year -1. For the years 0, +1, +2, and +3 we used the sum of the parent's and target firm's operating income and assets.

The operating performance was analyzed for the full target firm, parent, and combined firm samples. Barber and Lyon (1996) found that changes in operational performance in relation to industry benchmarks provide better test statistics than the level of performance difference between the firms and their corresponding industry benchmarks. Hence, change in performance-adjusted operating performance as measured by ROA was the primary focus. The change in ROA was analyzed for the following periods [-1 to 0], [-1 to +1], [0 to +1], [+1 to +2], [+2 to +3], [-1 to +3], [0 to +3] and [+1 to +3]. In the study by Barber and Lyon (1996) it's argued that due to extreme observations, a non-parametric Wilcoxon sign rank test is a better choice than parametric t-tests. Hence, median values were applied for the performance-adjusted samples in the analysis using the Wilcoxon sign rank test to evaluate the statistical significance of the results. The calculations used to detect abnormal performance as measured by changes in performance-adjusted ROA followed the equations used by Daley et al. (1997) which is based on the method outlined by Barber and Lyon (1996). The calculations are computed as follows:

For each year, the ROA of each sample firm was subtracted by the median ROA for the corresponding matching firms, which allowed for performance-adjusted numbers.

$$AROA_{j,t} = ROA_{j,t} - IROA_{j,t}$$

Change in performance-adjusted ROA was computed for the sample firms for each period within the [-1, +3] windows as described above.

$$\Delta AROA_j = AROA_{j,post} - AROA_{j,pre}$$

The median change among the sample firms in terms of performance-adjusted ROA was calculated which forms the basis of the quantitative results.

$$\overline{\Delta AROA} = Median(\Delta AROA_j)$$

Moreover, the literature states that an increase in focus is a common motivation to pursue spin-offs, and research within the field has demonstrated greater value creation among firms pursuing spin-offs which allows for increased focus (Daley et al., 1997; Desai & Jain, 1999; Veld & Veld-Merkoulova, 2004). Hence, we applied a similar approach and evaluated operating performance by distinguishing the samples between focus-increasing and non-focus-increasing spin-offs. This approach was similar to one of the approaches used by Desai and Jain (1999), where there was a focus-increasing spin-off when the spin-off's two-digit SIC code differed from the parent. We calculated changes in performance-adjusted ROA for the combined pairs, the parent, and target firms with respect to focus for the same periods as for the combined, parent and target samples as mentioned above. Moreover, similar to Daley et al. (1997) we analyzed the parent and target firms' changes in net capital expenditures (CapEx) to sales to take into account the changes in scale of operations due to new investments. This is done to analyze whether changes in investment could influence ROA as well as to determine the implications on capital allocation pre versus post-spin-off.

The parent and target firms were also ranked according to change in performance-adjusted ROA for the period [0, +3] which, in addition to the aspect of focus in the qualitative study, formed the basis for answering the research question on why some spin-offs perform better than others. In the ranking, we distinguished between the firms which demonstrated a positive and negative change in performance-adjusted ROA respectively. The ranking was mainly used for the qualitative parts and will be explained down below. In addition, the ranking was also used to find the sources of change in ROA and to determine whether it stemmed from operating margins or asset turnover. For this, we performed a Wilcoxon signed rank test on each of the unadjusted ROA components.

3.2.4 Qualitative Method

To extend the findings on sources of abnormal operating performance in the quantitative study, we used an inductive and qualitative approach with analysis of semi-structured interviews and firm documents. We reached out to 35 executives with positions at the sample firms during the spin-off periods. The scope of people to contact was reduced as we found difficulties in finding relevant people among the spin-offs which were executed earlier in the time frame of the sample. Moreover, our response rate increased after pivoting to contacting the executive management

of the firms rather than contacting managers at a lower level. However, we managed to achieve 5 interviews in total. The intention was initially to use interviews with people at the sample firms as the primary source of data used for achieving qualitative insights. However, we had to pivot and also put emphasis on organizational documents such as conference calls, annual reports, and listing prospectuses as complements to the semi-structured interviews.

The different sections and clear distinctions between different theories from the literature review allowed for a clear focus on the themes around which we gather data during the interviews. Bell et al. (2019) argue that if the researchers have a clear focus on the investigation, a semi-structured interview is to be preferred, and that is the method we used to further gather context and observations on what distinguishes different spin-offs and to complement the quantitative study. In addition, Bell et al. (2019) argue that other advantages of using interviews include the possibility to reconstruct events, a greater breadth of coverage, and the possibility to maintain a specific focus, which was beneficial in our case. However, Bell et al. (2019) also raise some disadvantages and limitations to qualitative interviewing such as that it tends to produce over-rationalistic accounts of the self and that it's not conducive to exposing deviant or hidden activities that we need to be aware of. Analysis of documents could therefore mitigate the over-rationalization of events since Bell et al. (2019) explain that an advantage of analyzing documents is that they are not created for the sole purpose of business research, reducing the risk of reactive effects in the data, strengthening the validity of the study.

Based on the quantitative findings we ranked the sample firms by the change in performance-adjusted ROA for the period $[0, +3]$ to detect factors causing differences in long-term operating performance among the parent and target firms. We then used a thematic analysis approach where qualitative data from the semi-structured interviews and organizational documents were gathered for the sample firms according to themes derived from the literature review. The themes upon which the qualitative study was based for both the semi-structured interviews and organizational documents include *Corporate Restructuring*, *Agency Theory*, *Transaction Cost Theory*, *Resource Based View*, and *Corporate Focus*. The data was then coded in Excel, forming the basis for the qualitative results.

Bell et al. (2019) acknowledge that coding comes with some drawbacks. For instance, they explain that selectively choosing parts to include in the analysis could result in losing the context of the underlying data. However, the thematic analysis approach which we used mainly included finding similarities and differences between the overperforming versus the underperforming firms in the sample based on already defined themes which arguably reduce the risk of decontextualization the data.

4

Results

The results are split into two chapters, quantitative and qualitative results. This is in line with the outlined research methodology where the qualitative results were used to elaborate on the quantitative results. Figure 4.1 illustrates how the process and this chapter are structured.

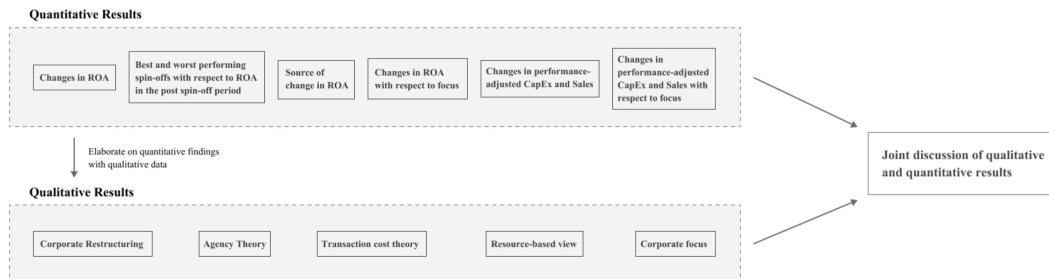


Figure 4.1: A graphical overview of the results and methodology to reach the conclusion

4.1 Quantitative results

4.1.1 Changes in ROA

In this section, we will examine the changes in performance-adjusted ROA for the combined firm, the parent, and the target. A positive change in performance-adjusted ROA implies that the sample firms demonstrated greater improvements percentage-wise in ROA in relation to the peer group of matched firms and is denoted as positive abnormal performance. Conversely, when the sample demonstrated negative change in performance-adjusted ROA, it is denoted as negative abnormal performance. In addition, if only denoted abnormal performance, the direction of change is determined by whether the percentage points change is positive or negative.

We examine the performance-adjusted change for the pre-spin-off period $[-1, 0]$, the post-spinoff periods $[0, +1]$, $[+1, +2]$, $[0, +3]$, $[+1, +3]$, $[+2, +3]$, and the relative change between the pre-and post-spin-off periods $[-1, +1]$, and $[-1, +3]$.

4. Results

Median change in ROA. *~ Significance at the 10% level. **~ Significance at the 5% level. ***~ Significance at the 1% level. Reported in percentage points.									
	[-1, +1]	[-1, 0]	[0, +1]	[+1, +2]	[From year, to year]		[+1, +3]	[0, +3]	[+1, +3]
					[+2, +3]				
Combined									
Number of obs.	28	28	28	27	25	25	27	27	27
Unadjusted	0.2%	-0.8%	0.6%	-0.2%	-0.4%	-0.1%	0.8%	0.0%	0.0%
Performance adjusted	0.9%*	-0.5%	1.5%***	0.5%	-0.2%	1.1%	1.3%*	-0.7%	-0.7%
Parent									
Number of obs.	29	29	29	29	28	28	28	28	28
Unadjusted	0.3%	-1.0%	0.9%	0.3%	0.4%	-0.4%	1.2%	0.2%	0.2%
Performance adjusted	1.4%	-0.9%	2%**	0.9%	0.4%	1.2%*	2.7%***	0.4%	0.4%
Target									
Number of obs.	26	27	28	27	26	25	26	26	26
Unadjusted	-2.4%	-2.5%	-1.4%	0.0%	-0.5%	-5.8%	-4.1%	-2.4%	-2.4%
Performance adjusted	-1.0%	-0.9%	0.4%	-0.6%	0.1%	-3.3%*	-2.5%	-0.4%	-0.4%

Table 4.1: Median change in adjusted ROA reported in percentage points for the combined firm, parent, and target.

4.1.1.1 Combined

Table 4.1. presents the results for the median unadjusted and performance-adjusted change in ROA for the respective time periods in the pre-and post-spin-off periods. We find that the combined spin-off pairs demonstrated positive abnormal performance for the period $[0, +1]$ of 1.5 percentage points (“p.p.”) which is significant at the 1% level. Moreover, they showed a positive abnormal performance of 1.3 p.p. for the period $[0, +3]$, statistically significant at the 10% level. However, a negative abnormal performance of -0.7 p.p. was demonstrated for the period $[+1, +3]$, which if broken down into the periods $[+1, +2]$ and $[+2, +3]$, indicates non statistically significant abnormal performance of 0.5 and -0.2 p.p. respectively.

4.1.1.2 Parent & Target

When breaking down the results for the parent and the target we find that the positive abnormal performance for the period $[0, +1]$ is attributed to the parent firms which demonstrated positive abnormal performance of 2.0 p.p., significant at the 5% level. The target firms achieved a positive abnormal performance of 0.4 p.p., although not statistically significant. Contrary to those results, the parent firms demonstrated a positive abnormal performance of 2.7 p.p. at the 1% significance level for the period $[0, +3]$ in contrast to the target firms with a non-statistically significant negative abnormal performance of -2.5 p.p. For the period $[+1, +3]$ the parent and target firms demonstrated abnormal performance of 0.4 and -0.4 p.p. respectively of which both are non-statistically significant. For the period $[+1, +2]$ the parent firms demonstrated a positive abnormal performance of 0.9 p.p. whilst the target demonstrated a negative abnormal performance of -0.6 p.p., although none of them are significant. Moreover, both the parent and target firms demonstrated positive abnormal performance of 0.4 and 0.1 p.p. respectively for the period $[+2, +3]$ of which none is statistically significant. In addition, for the period $[-1, 0]$ both the parent and the target firms demonstrated negative abnormal performance of -0.9 p.p., although not statistically significant.

4.1.2 Changes in ROA with respect to Focus

Median change in ROA. * = Significance at the 10% level, ** = Significance at the 5% level. Reported in percentage points.								
	[From year, to year]							
	[-1, +1]	[-1, 0]	[0, +1]	[+1, +2]	[+2, +3]	[-1, +3]	[0, +3]	[+1, +3]
Combined								
Focus increasing								
<i>Number of obs.</i>	19	19	19	18	17	17	18	18
Unadjusted	0,2%	-0,6%	0,7%	-0,4%	0,2%	0,3%	0,2%	-0,5%
Performance adjusted	1,3%*	-0,4%	1,5%**	-0,9%	-0,2%	1,3%	1,7%**	0,4%
Non-focus increasing								
<i>Number of obs.</i>	9	9	9	9	8	8	9	9
Unadjusted	-0,7%	-1,2%	0,6%	0,1%	-1,3%	-1,9%	0,8%	0,0%
Performance adjusted	0,1%	-0,5%	1,6%	0,5%*	-0,5%	-0,8%	0,7%	-0,8%
Parent								
Focus increasing								
<i>Number of obs.</i>	19	19	19	19	18	18	18	18
Unadjusted	0,4%	-0,5%	0,8%	0,3%	0,4%	-0,3%	1,3%	0,3%
Performance adjusted	1,5%	-0,8%	2,0%	0,0%	0,4%	1,8%	3,4%**	0,4%
Non-focus increasing								
<i>Number of obs.</i>	10	10	10	10	10	10	10	10
Unadjusted	-0,2%	-1,0%	1,0%	0,8%	0,1%	-0,8%	0,4%	-0,3%
Performance adjusted	0,6%	-1,4%	2,3%*	1,3%	0,4%	0,6%	1,9%	0,6%
Target								
Focus increasing								
<i>Number of obs.</i>	17	18	19	18	18	17	18	18
Unadjusted	-2,2%	-3,0%	-0,9%	-1,2%	-0,8%	-5,8%	-4,4%	-2,4%
Performance adjusted	-1,6%	-2%*	2,4%*	-2,2%	-0,4%	-3,3%*	-2,0%	-1,2%
Non-focus increasing								
<i>Number of obs.</i>	9	9	9	9	8	8	8	8
Unadjusted	-2,5%	-1,5%	-2,3%	0,1%	-0,3%	-6,6%	-3,0%	-1,5%
Performance adjusted	-1,0%	-0,7%	-3,0%	0,4%	0,6%	-2,2%	-3,4%	0,1%

Table 4.2: Median change in adjusted ROA reported in percentage points for the combined firm, parent, and target.

4.1.2.1 Combined

Table 4.2. presents the results for the median unadjusted and performance-adjusted change in ROA for the respective time periods with the sample being sectioned into focus-increasing and non-focus-increasing spin-offs. For the period $[0, +1]$ we find that the non-focus-increasing combined pairs demonstrated non-statistically significant positive abnormal performance of 1.6 p.p. in contrast to the focus-increasing pairs at 1.5 p.p., where the latter is statistically significant at the 5% level. For the period $[0, +3]$ the focus-increasing and non-focus-increasing combined pairs demonstrated positive abnormal performance of 1.7 and 0.7 p.p. respectively of which the former is statistically significant at the 5% level. For the period $[+1, +3]$ the focus-increasing combined pairs demonstrated a positive abnormal performance of 0.4 p.p. in contrast to the non-focus-increasing pairs at -0.8 p.p., of which none of them are statistically significant. The focus-increasing combined pairs demonstrated a performance-adjusted change of 1.3 p.p. for the $[-1, +1]$ period which is significant at the 10% level. For the non-focus increasing pairs during the same period, the abnormal performance was 0.1 p.p., although not statistically significant.

4.1.2.2 Parent & Target

For the period $[0, +1]$ we find that the focusing increasing parents demonstrated a positive abnormal performance of 2.0 p.p. which is not statistically significant. Although not statistically significant, this was reversed in the following period $[+1,$

+2] as they demonstrated neither positive nor negative abnormal performance in that period. The non-focus increasing parents demonstrated positive abnormal performance of 2.3 and 1.3 p.p. for the periods [+0, +1] and [+1, +2] respectively, of which only the former is statistically significant at the 10% level. The focus-increasing targets demonstrated a positive abnormal performance of 2.4 p.p. for the period [0, +1], statistically significant at the 10% level. This was reversed in the period [+1, +2] where they demonstrated a negative abnormal performance of -2.2 p.p. The non-focus-increasing targets demonstrated abnormal performance of -3.0 and 0.4 p.p. during the periods [0, +1] and [+1, +2] respectively.

We find that the focus-increasing parents demonstrated positive abnormal performance of 1.8 p.p. and 3.4 p.p. for the periods [-1, +3] and [0, +3] respectively, of which the latter is statistically significant at the 5% level. The non-focus-increasing parents demonstrated positive abnormal performance of 0.6 p.p. and 1.9 p.p. during the same periods of which none are statistically significant. These results give indications that the focus-increasing parents demonstrated better long-term performance than the non-focus-increasing parents. The focus-increasing targets demonstrated a negative abnormal performance of -3.3 p.p. for the [-1, +3] period and a negative abnormal performance of -2.0 for the [0, +3] period, of which the performance in the former period is statistically significant at the 10% level. The non-focus increasing targets demonstrated non-statistically significant negative abnormal performance of -2.2 p.p. and -3.4 p.p. during the same periods.

4.1.3 Changes in performance-adjusted CapEx/Sales

Median change in performance adjusted CAPEX/Sales. * = Significance at the 10% level, ** = Significance at the 5% level. Reported in percentage points.								
	[From year, to year]							
Parent	[-1, +1]	[-1, 0]	[0, +1]	[+1, +2]	[+2, +3]	[-1, +3]	[0, +3]	[+1, +3]
<i>Number of obs.</i>	27	28	28	28	27	27	28	27
Unadjusted	0,0%	0,2%	0,0%	0,0%	0,1%	-0,3%	-0,4%	-0,1%
Performance adjusted	0,0%	0,1%	0,0%	0,1%	0,0%	-0,3%	-0,1%*	0,1%
Target								
<i>Number of obs.</i>	24	23	25	26	25	22	23	26
Unadjusted	0,5%	0,8%	-0,2%	-0,3%	0,4%	0,4%	-0,1%	0,0%
Performance adjusted	0,9%**	1%**	0,1%	0,0%	-0,1%	1,7%**	0,5%	0,6%

Table 4.3: Median change in adjusted CAPEX to sales reported in percentage points for the parent and target.

Table 4.3 presents the results for the median change in CapEx to sales for the parent and target firms. We find little statistical significance in the results for the change in CapEx to sales ratios. However, for the period [0, +3] we find that the parent firms demonstrated a change in performance-adjusted CapEx to sales of -0.1 p.p. which is significant at the 10% level. In addition, for the target firms during the periods [-1, +1], [-1, 0], and [-1, +3] we find performance-adjusted change in CapEx to sales of 0.9 p.p., 1.0 p.p., and 1.7 p.p. respectively, of which all of them are statistically significant at the 5% level.

4.1.4 Changes in performance-adjusted CapEx/Sales with respect to Focus

Median change in performance adjusted CAPEX/Sales. **= Significance at the 10% level, ***= Significance at the 5% level. ****= Significance at the 1% level. Reported in percentage points.								
	[From year, to year]							
	[-1, +1]	[-1, 0]	[0, +1]	[+1, +2]	[+2, +3]	[-1, +3]	[0, +3]	[+1, +3]
Parent								
Focus increasing								
<i>Number of obs.</i>	17	18	18	18	17	17	18	17
Unadjusted	0,0%	0,2%	0,1%	0,1%	0,1%	-0,3%	-0,5%	-0,1%
Performance adjusted	0,0%	0,2%*	0,0%	0,2%	0,0%	-0,4%	-0,3%	0,1%
Non-focus increasing								
<i>Number of obs.</i>	10	10	10	10	10	10	10	10
Unadjusted	-0,5%	0,0%	-0,3%	-0,2%	0,1%	-0,4%	-0,2%	0,1%
Performance adjusted	-0,1%	-0,1%	0,0%	-0,6%	0,2%	-0,5%	-0,2%	-0,1%
Target								
Focus increasing								
<i>Number of obs.</i>	15	15	17	17	17	14	16	18
Unadjusted	0,5%	0,8%	-0,2%	-0,1%	0,0%	0,3%	0,0%	0,0%
Performance adjusted	1%***	0,7%*	0,2%	-0,2%	-0,2%	1,5%	0,2%	0,2%
Non-focus increasing								
<i>Number of obs.</i>	9	8	8	9	8	8	7	8
Unadjusted	0,6%	0,7%	-0,5%	-0,3%	0,7%	0,5%	-0,4%	0,0%
Performance adjusted	0,8%	1,1%	-0,9%	0,0%	0,6%	1,9%	0,5%	0,7%

Table 4.4: Median change in adjusted CAPEX to sales reported in percentage points for the parent and target.

Table 4.4 presents the results for the median change in CapEx to sales with respect to whether the spin-off was focus-increasing or not. For the majority of the periods, the results show no statistical significance. However, for the focus-increasing target firms, we find that the performance-adjusted change in CapEx to sales for the periods [-1, +1] and [-1, 0] were 1.0 p.p. and 0.7 p.p. respectively, of which the former is statistically significant at the 1% level and the latter at the 10% level. For the non-focus increasing targets the change in performance-adjusted CapEx to sales was 0.8 p.p and 1.1 p.p. during the periods [-1, +1] and [-1, 0] respectively, of which none is statistically significant.

4.1.5 Best and worst performing spin-offs with respect to change in ROA in the post-spinoff period

4.1.5.1 Parent

Parent firms rank by median change in ROA. Reported in percentage points.				
Firm	Spin-off year	Focus increasing	Spin-off pair	Performance adjusted change in ROA [0, +3]
OraSolv AB	2012	x	17	11,7%
Thermo Electron Corp	2001		30	11,7%
Getinge AB	2017		4	10,4%
Harvard Bioscience Inc.	2013	x	14	10,1%
Vitrolife AB	2012	x	16	9,5%
Baxter	2015	x	10	8,9%
Hill-Rom	2008	x	20	8,8%
Gurit Holding AG	2006	x	21	6,4%
Danaher	2019		1	5,8%
Snia SpA	2004	x	25	5,8%
Tyco International Ltd	2007	x	22	4,1%
Kimberly-Clark Corp	2014	x	12	3,9%
Allergan Inc.	2002	x	26	3,5%
Abbot Labs	2013	x	15	3,3%
Addtech AB	2016	x	8	2,1%
Integer Holdings	2016		7	2,0%
Danaher	2016		6	1,9%
Cardinal Health Inc.	2009	x	19	1,4%
Varian Medical Systems Inc.	2017		5	1,0%
Abbott Labs	2004	x	24	-0,1%
Bristol-Myers Squibb Co	2001	x	29	-0,1%
Baxter International Inc.	2000		32	-0,1%
Integra LifeSciences Holdings	2015		9	-0,2%
Novartis AG	2019	x	3	-1,2%
Reckitt Benckiser	2014		13	-2,6%
Navamedic ASA	2019	x	2	-3,2%
Sulzer Ltd	2001	x	28	-3,7%
Sybron International Corp	2000		31	-4,4%
<i>E-Z-EM Inc.</i>	2004	x	23	<i>n.a.</i>

Table 4.5: Ranked median change in adjusted ROA for the parent firms during the period [0, +3]. Reported in percentage points.

Table 4.5 presents the ranked performance-adjusted change in ROA for the parent firms during the period [0, +3]. The results can be seen as an extension of the results displayed in Table 4.1 indicating that the majority of parent firms experienced abnormal long-term performance post-spin-off.

4.1.5.2 Target

Target firms rank by median change in ROA. Reported in percentage points.				
Firm	Spin-off year	Focus increasing	Spin-off pair	Performance adjusted change in ROA [0, +3]
Biostage Inc.	2013	x	14	34310,3%
Observe Medical ASA	2019	x	2	9,2%
Arjo AB	2017		4	7,1%
Edwards Lifesciences Corporation	2000	x	32	5,8%
Sybron Dental Specialties Inc.	2000		31	4,8%
Medisize Holding AG	2006	x	21	3,7%
Covidien plc	2007	x	22	1,3%
Xvivo Perfusion AB	2012	x	16	1,2%
Alcon Inc	2019	x	3	0,6%
CareFusion Corporation	2009	x	19	0,1%
Envista Holdings Corporation	2019		1	0,1%
AbbVie Inc.	2013	x	15	-2,0%
AddLife AB	2016	x	8	-2,0%
Varex Imaging Corporation	2017		5	-3,0%
Sorin SpA	2004	x	25	-3,1%
Viasys Healthcare Inc.	2001		30	-3,7%
AngioDynamics Inc.	2004	x	23	-3,8%
SeaSpine Holdings Corporation	2015		9	-4,9%
Avanos Medical Inc.	2014	x	12	-5,0%
Hospira Inc.	2004	x	24	-5,1%
Advanced Medical Optics Inc.	2002	x	26	-7,0%
Fortive Corporation	2016		6	-8,7%
Zimmer Biomet Holdings Inc.	2001	x	29	-9,6%
Hillbrand Inc.	2008	x	20	-11,7%
RLS Global AB	2012	x	17	-69,1%
Indivior	2014		13	-582,3%
Centerpulse	2001	x	28	n.a.
Nuvectra Corporation	2016		7	n.a.

Table 4.6: Ranked median change in adjusted ROA for the target firms during the period [0, +3]. Reported in percentage points.

Table 4.6 presents the ranked performance-adjusted change in ROA for the target firms during the period [0, +3]. The results can be seen as an extension of the results displayed in Table 4.1 indicating that a large number of target firms experienced negative abnormal performance post-spin-off.

4.1.6 Source of ROA change

Sources of change in ROA. *= Significance at the 10% level, **= Significance at the 5% level. ***= Significance at the 1% level. Reported in percentage points.		
	Median unadjusted change in ROA for period	
	[0, +3]	
	EBIT-margin	Asset turnover
Parent		
All	1,6%***	-2,8%
Overperformers	2,8%***	4,5%
Underperformers	0,2%	-8,1%**
Target		
All	1,7%	-5,2%**
Overperformers	5,5%***	2,5%
Underperformers	-0,2%	-34,0%***

Table 4.7: Median change in EBIT-margin and asset turnover for the parent and target firms during the period [0, +3]. Reported in percentage points.

Table 4.7 presents the median unadjusted sources of change in ROA as measured by EBIT margin and asset turnover respectively for the period [0, +3]. The table displays the median for all the parent and target firms used in the samples as well as the over- and underperformers respectively. The distinction between over- and underperformer is determined by positive or negative abnormal performance respectively for the period [0, +3] which is illustrated in tables 4.6 and 4.7.

The results indicate that the sources of ROA improvements among the overperforming parent and target firms stemmed from improvements in both EBIT margin and asset turnover. The overperforming parent firms experienced a median unadjusted change in EBIT margin of 2.8 p.p. during the period [0, +3] which is statistically significant at the 1% level. The corresponding change among the overperforming targets was 5.5 p.p. which is statistically significant at the 1% level.

Among the underperforming parents, the decline in ROA largely stemmed from a reduction in asset turnover of -8.1 p.p., significant at the 5% level. The underperforming targets experienced a decline in both EBIT margin and asset turnover of -0.2 and -34.0 p.p. respectively of which the latter is statistically significant at the 1% level.

Sources of change in ROA. Reported in percentage points.

	Median unadjusted change for period [0, +3]		
	EBIT	Revenue	Total assets
Parent			
All	15,0%	12,3%	29,3%
Overperformers	18,9%	6,1%	6,6%
Underperformers	13,3%	21,3%	57,8%
Target			
All	22,0%	18,4%	15,9%
Overperformers	37,5%	16,1%	7,7%
Underperformers	8,7%	29,9%	101,8%

Table 4.8: Median change in ROA components for the parent and target firms during the period [0, +3]. Reported in percentages.

Table 4.8 presents the median unadjusted sources of change in ROA broken further down into EBIT, revenue, and total assets for the period [0, +3].

The results show that overperforming parents and targets demonstrated higher growth in EBIT in relation to both revenue and total assets whereas among the underperformers there was relatively higher growth in revenue and assets in relation to EBIT.

4.2 Qualitative Results

As described in the methodology, this chapter elaborates on the quantitative findings with the help of interviews with executives that have knowledge or experience with a spin-off in the sample. These results also include material such as prospectus documents, earnings reports, and conference call transcripts to further help answer the research questions. The chapter is organized with the literature study as a basis and in Figure 4.1 an outline of the results and methodology is illustrated.

Overview and characteristics of interviewees

Company	Target/Parent	Role	Chg. in performance adjusted ROA [0, +3]
Envista	Target	Senior Vice President ("SVP")	+0,1%
HealthCo	Target	Former Corporate Finance Executive	Negative abnormal performance
MedCo	Target	Former CEO	Negative abnormal performance
Arjo/Getinge	Target/Parent	Former Executive Vice President ("EVP")	Arjo +7,1% / Getinge +10,4%
XVIVO/Vitrolife	Target/Parent	Executive	XVIVO +1,2% / Vitrolife +9,5%

Figure 4.2: Overview of the firms, the respondents, and firm performance

4.2.1 Corporate Restructuring

We find critical mass, both in terms of size and sales as potential factors which influence the target to operate as an independent firm. According to the management of Abbott, both the target Abbvie and the parent Abbott were said to be of critical mass which provided a foundation for establishing them as two independent firms

(White, 2011). Both firms were of significant size at the time of the spin-off and demonstrated positive abnormal performance during the period $[0, +3]$. Moreover, an executive of XVIVO explained that critical mass in terms of sales is important among smaller firms in the medical technology industry.

“You need to achieve a certain [critical] mass within medtech. It is only during the last twelve months we have reached this critical mass and started to see [the profits] accruing at the bottom line. If there are small spin-offs, as in the case of XVIVO, it is difficult to achieve critical mass in the short term and to experience the desired profit and value development due to [lack of] economies of scale” - Executive at XVIVO

XVIVO was spun out from Vitrolife and demonstrated positive abnormal performance during the period $[0, +3]$. XVIVO managed to mitigate the increasing costs of becoming an independent entity through cost control.

“[Establishing a proprietary organizational infrastructure] affects the profitability. We were a small company [at the time of the spin-off] and [establishing a proprietary organizational structure] influences the profitability . . . we were profitable and built a very lean organization initially to keep the costs down and to demonstrate . . . positive EBITDA” - Executive at XVIVO

In contrast to the above, the medical technology spin-off MedCo demonstrated negative abnormal performance during the $[0, +3]$ period, was not profitable, and thus dependent on external capital. The former CEO of MedCo argued that the firm was too young to be listed where there were difficulties for investors to assess the risk in the company and dependency on external capital as well as insufficient cash within the company resulted in a lack of continuity in its operations.

“The company couldn’t afford to establish the structure below me which was needed to fully execute, which resulted in me having to take on a lot of roles” - Former CEO at MedCo

In addition, we find valuation and separate investment identities to be of importance when deciding to pursue spin-offs. In the case of the Abbott and Abbvie spin-off, one of the rationales was to extract a higher valuation from both firms with the motivation of each of them to be valued at the top of their peer group, which wasn’t possible to the same extent as a group (White, 2011). Abbvie had grown and become a large entity within Abbott and both firms had different investment identities and operating models since Abbott was a diversified medical technology firm and Abbvie a more research-intensive pharmaceutical firm (White, 2011).

A similar rationale could be found for the parent of HealthCo which was later acquired, where it was argued that the parent would be more attractive to potential buyers when HealthCo was spun out.

“They [the parent] did make the moves to execute on this new portfolio strategy of acquiring other like businesses. So they executed that plan. And then the company was acquired. In that sense, they have made themselves more attractive to a potential buyer, I guess you could say in some ways that might have been a secondary reason for the spinoff itself, right, is to have a more of a pure play asset that is going to appeal to some potential buyers more than having one that has, well, we’ve got this one and then this one which doesn’t fit in. So we can’t acquire that company because we don’t want to separate that. If you separate it beforehand, then you have, you know, potentially two attractive assets that could be acquired if that’s your goal. And I don’t know if that was really the goal for the parent company. But when someone puts a certain amount of money on the table, you say yes, and they got a very nice price for the business. It was a huge success for the parent company”
- Former Corporate Finance Executive at HealthCo

Moreover, in terms of abnormal performance, HealthCo underperformed during the period $[0, +3]$, while the parent overperformed, indicating that the latter benefited more from the spin-off.

“I mean, the other options that the company looked at besides spinning off the business. The parent company did consider selling the company instead of spinning it off as a public entity. . . but as I said, not a lot of great buyers for the business besides private equity. And the private equity firms are not known, at least at that time, maybe things have changed in a few years, for paying the best price for a business. So at that time, the public market was deemed the best route. But yeah, I mean, the spin-off logic certainly paid off for the parent company, but not as much for the target at this point in time. But I suppose if it works for one of the parties, that’s still a win, even if it’s not a win-win. If it had failed for both, that would have been bad. But at least one part benefited.” - Former Corporate Finance Executive at HealthCo

Similarly, part of the rationale for spinning out XVIVO from Vitrolife was to demonstrate the values that resided within each of the firms, allowing investors to better understand the investment rationale for each business.

“If it is a period of harvesting profits for Vitrolife...and an investment phase for XVIVO, the sum of the two equalizes each other. . . making it difficult for investors to understand the underlying performance of each business. [The spin-off] allowed for illuminating the values within both Vitrolife and XVIVO.” - Executive at XVIVO

In addition, similar to above where it was explained that HealthCo was spun-out due to misfits in terms of assets, we find that firms are spun-out to remove assets or units which perform badly, as in the case of MedCo which also underperformed during the $[0, +3]$ period.

“They wanted to get rid of the problem because it was a cost [the target company] and they needed to remove the cost and try to create some value so that the par-

ent company would perform better. And it was expressed from the very beginning, I would say. It was kind of - get rid of that.” - Former CEO at MedCo

Alcon was spun-out from Novartis with the goal of extracting greater shareholder value when each firm was standalone, and Alcon demonstrated positive abnormal performance during the period $[0, +3]$ (Narasimhan, 2018). Novartis acquired Alcon in 2011 and following the acquisition Alcon experienced lagging sales and investors labeled the entity as a potential target to sell (Liu, 2019). However, in 2017 the firm returned to growth and it was explained that Novartis’ CEO saw the opportunity to spin out Alcon (Liu, 2019).

Moreover, we find that the vast majority of the targets highlighted that the spin-off would allow for better targeting growth opportunities. In addition, some of them also highlighted that a spin-off would enable them to better pursue M&A opportunities.

4.2.2 Agency Theory

A majority of the target firms in the sample that demonstrated negative abnormal performance during the period $[0, +3]$ had at least one director on the board from the parent firm. The pattern is not seen to the same extent for the target firms which demonstrate positive abnormal performance, indicating that board involvement could hinder the companies to pursue their own strategic options. Contrary to this, all of the respondents mentioned that they felt full freedom and autonomy in their decision-making post-spin-off.

“Joakim Lindorff, who was appointed CEO and is still CEO, got to make his own mark on how he wanted the structure and organization to be and what they would achieve.” - Former EVP at Getinge

In the case of MedCo, which demonstrated negative abnormal performance, the respondent pointed to the fact that there were misaligned views in terms of the timeframe for how the company and projects should be operated, indicating a possible information asymmetry that could be an explanation for the subpar operational performance.

“I would say that it was a rather selfish operation in a way because individuals wanted to extract value and they had not received that value in the parent company. And I return to the fact that this entire construction has been managed with a too short of an outlook.” - Former CEO at MedCo

Moreover, another aspect regarding information asymmetries is if the decision to pursue a spin-off originated from the management, board of directors, or owner. In the case of Getinge and Arjo, it was primarily the board of directors who took the decision.

“And during the first year [after the integration], a decision was made and it was primarily the board of directors together with the management group, but primarily the board that decided that Arjo should be spun-off in order to get the focus that was needed on that business.” - Former EVP at Getinge

Similar to Getinge and Arjo, the board of directors initiated a strategic review of Reckitt Benckiser’s pharmaceutical business in 2013 which one year later led to the spin-off of Indivior. Performance-wise, Arjo had a positive abnormal performance during the period [0, +3] whilst Indivior was the worst performer of the targets in the sample. The decision to initiate a strategic review of Indivior came against a backdrop of generic competition and falling sales and profitability. An analyst even raised the question if it was too early to initiate a strategic review because Indivior faced several challenges and could have a hard time mitigating these on their own (Zuanic, 2013). On the same earnings call, Rakesh Kapoor, the former CEO of Reckitt Benckiser, praises Indivior and its employees and alludes to the point that Indivior in fact is a healthy business.

“We have created a capability which is frankly beyond just the physical infrastructure and the relationships that we have with patients and with prescribers. I think this is a company where the people are incredibly, I would say, fantastic. This is – is it sometimes underestimate in companies. We underestimated – I said it before, people underestimate companies that are not run, just by strategy. They’re run by people. And I think in my case, I would very strongly endorse the RB team – RBP team. It’s a fantastic team. So I’m – we are talking about a business which is in a very good shape.” (Kapoor, 2013)

What later ensued was a picture far from that one painted on the earnings call for the third quarter of 2013. Indivior was indicted and pleaded guilty to a felony charge regarding improper marketing of its lead drug, Suboxone. Further, the former CEO who led the company from 2005 to 2020, was sentenced to 6 months in federal prison. Reckitt Benckiser also agreed to pay \$1.4 billion to settle their case with the U.S. Department of Justice (“DOJ”). Later, Reckitt Benckiser sued Indivior for the same amount but settled at a lower number. Moreover, the DOJ stated that the illegal scheme started before the company was spun out of Reckitt Benckiser (Rovnick et al., 2019). This naturally raises the question of high information asymmetries between the management and investor in the case of the spin-off of Indivior from Reckitt Benckiser.

4.2.3 Transaction Cost Theory

4.2.3.1 Capital Allocation

Several of the companies reported that they had achieved increased freedom and autonomy in capital allocation post-spin-off. Two respondents, from firms that demonstrated positive abnormal performance, pointed to the fact that the dismantling of internal capital markets was beneficial for deploying capital to maximize their returns. The respondent from Envista pointed out that the competition from

internal capital markets made it somewhat difficult to grow the company in the way that they saw fit due to other divisions being prioritized.

“For us, it has been an advantage because we have very profitable companies that have a good cash flow and a good ability to lever the company and it gives us a purchasing power that we didn’t really have access to before, and that was right. It was right for the shareholders in Danaher not to buy companies in the dental part and therefore they could buy even more attractive companies in other segments and other sectors. It was a completely correct strategy and tactic. Now we are focused on one area and that is where you make these reinvestments and deployment of capital. That means you can grow this business both organically and inorganically, which was a little more difficult before when you were part of this larger part.” - SVP at Envista

The former EVP of Getinge emphasized the same aspect of pooling cash centrally and highlighted that capital allocated to Arjo was not prioritized to the same extent since Getinge could get better returns on investments elsewhere.

“When we became one company, it became one pool of cash, if you think in terms of cash, and then it would be distributed among all the different activities when it comes to making acquisitions, investing in R&D and maybe in infrastructure and so on. And the result is that Arjo and their products always came much lower in priority because you didn’t have the same return on investment.” - Former EVP at Getinge

One aspect which seems to impact capital allocation is how the capital structure is set in the newly formed company after the spin-off. In the qualitative analysis, the results point to the fact that there is a discrepancy in how much debt is allocated to the target. For example, the respondent from HealthCo explained that the target company needed to raise a substantial amount of debt to transfer cash back to the parent company which affected the target company’s ability to allocate sufficient capital to its projects.

“So it had to borrow debt to pay the parent company and then it had to take on debt to acquire this business. So it became a very levered company with debt right at the time of the spin-off. And as you may know about companies that are highly levered, they become very susceptible to changes in performance or in the market. It’s an inexpensive way of financing a business, but it also puts you at more risk if things start to go sideways” - Former Corporate Finance Executive at HealthCo

The respondent from HealthCo further explained that shortly after the spin-off, their only option to access more capital would’ve been through equity funding rather than debt.

“So basically the company used up most of its available capital capacity, at least in terms of debt. . . So when it wanted to do other things on top of that, it was more constrained than having an open checkbook. . . Any larger transactions would have had to be done with equity-type funding rather than debt because there was no more

capacity for debt. The company was already maxed out.” - Former Corporate Finance Executive at HealthCo

The respondent from MedCo highlighted the fact that problems in allocating sufficient capital could arise when non-mature firms are spun-out. He argued that although becoming an independent and publicly listed company enabled the firm to attract capital, the types of investors and pressure of being a publicly listed company affected the company negatively in how capital was allocated. The respondent further argued that a listing on the market was suboptimal in relation to where the company was in its life cycle and that another structure would’ve been better for the company at the time.

“Sometimes it is possible to create such a result for the short time horizon, but many times it is almost impossible. Especially if you have an FDA process. It can take 5-10 years, it can take any number of years and we had the problem that we had so little money so the time that I knew we were funded in relation to the shortest time I could get our research projects down, was never matched. This enabled that continuous stress that forced me to take huge risks in my decisions because if I was going to make decisions based on my funding, then we would have achieved nothing. Zero. So that’s why I wanted, as I said, not to be listed and I wanted to have an even bigger bag of cash and work on being able to build a proper organization, structure, and long-term vision. Then I argue that I could’ve delivered greater value, even in the short term.” - Former CEO at MedCo

4.2.3.2 Access to Capital

Several of the respondents emphasized that being an independent company increased their access to capital since they didn’t have to rely on the parent company to deploy capital to their business unit. A former Corporate Finance Executive at HealthCo explained that this for example enabled them to pursue M&A in a different way.

“But right as the company was being spun off, the company decided to buy another business. So it was entering into an acquisition at the same time as the spinoff, which was a positive because it also wanted to, you know, raise capital to do its own deals, its own M&A transactions, and expand its capabilities in different ways. So that was a positive.” - Former Corporate Finance Executive at HealthCo

Further, the executive at XVIVO explained that one reason for this was that it is easier for investors to understand what they are investing in, hence lowering information asymmetries between investors and managers when trying to raise capital.

“The more pure-play [the business is], the easier it is for investors to understand what they invest in... my perception is that it is easier to raise capital if we communicate the need to raise X million SEK to invest in an FDA-approval for our product... It’s more difficult [for investors] to know where the capital will be allocated in a larger context” - Executive at XVIVO

The respondent from MedCo shared the view that being listed as a separate firm enabled it to raise capital more easily but it came with a different set of challenges than before.

“But as I said, out with it [the company] from the [parent] company, in with it on the stock market in order to thereby also make it easier to raise capital for the continued growth. We did so many new share issues, and that was very difficult and exactly what I wanted to avoid by having a different ownership structure. You get no continuity. It’s just like, okay now it’s burndown and then a new share issue. And you don’t want to make it too big [the share issue], because then you deplete the value. You want to grow the value and so on.” - Former CEO at MedCo

4.2.4 Resource-based View

4.2.4.1 Resource Transfer

Respondents from firms that demonstrated positive abnormal performance highlighted that the transfer of knowledge and culture was beneficial in strengthening the new organization whilst simultaneously evolving it to fit the new company. An example of this was highlighted in the interview with the SVP at Envista where the respondent mentioned that Envista replicated Danaher’s Business System (“DBS”), which was considered a competitive advantage, and Envista evolved it into its own business system to fit the new organization.

“Everyone who is a senior executive in this company started at Danaher and is drilled in DBS and when we spun out, we took a copy of it with us, so to speak. Both culturally and literally. And we chose to build a larger, relatively larger organization around what we call EBS and the Envista Business System. Day one they were identical, but we’ve built it just like Danaher which has a DBS Office that is an organization within the company that continues to build, improve, and change these tools that you use and the culture that comes with it. And there we have chosen and over-invest in it” - SVP at Envista

Fortive, another Danaher spin-off in the sample, also built its own business system based on DBS. The firm performed worse than Envista and demonstrated negative abnormal performance during the period [0, +3], where the relatively weaker performance instead seemed to stem from changes in its portfolio companies and an increase in assets due to acquisitions that also had negatives effects on their EBIT margin which impacted ROA negatively (Fortive, 2011). Similar to Envista, Fortive argued that its business system was a source of competitive advantage.

In line with the argumentation from the Danaher spin-offs, another respondent argued that the transfer of resources had been beneficial for the new organization and enabled it to further build on the transferred culture and knowledge.

“There were many of these good things that both Getinge got from Arjo and Arjo got from Getinge. After all, there are positive effects that then remain and you build

on.” - Former Executive VP at Getinge

Further, retaining knowledge in the newly formed company seems to be an important factor in ensuring that core competencies are kept and mitigating a flight of human capital when the company is restructured.

“It was decided that everyone who had been at Arjo Huntleigh before we entered into One Getinge would then remain at Arjo Huntleigh to ensure that Arjo became a strong company as well. Getinge was not allowed to take all the competences, but rather that it would be two strong companies that would emerge from this spin-off”

Former Executive VP at Getinge

4.2.4.2 Synergies and Dissynergies

We find little evidence suggesting that loss of operational synergies contributes to weakened performance post-spin-off. However, Alcon mentioned that it lost some capabilities within pharma development and that these capabilities were reacquired through M&A a few years post-spin-off (Endicott, 2023). This provides evidence there were dissynergies from the spin-off but did not influence Alcon’s operational performance to a large extent during the period $[0, +3]$ as it demonstrated positive abnormal performance post-spin-off.

In contrast to the above, the former Corporate Finance Executive at HealthCo explained that the target firm could approach a larger number of customers as it previously had been an exclusive supplier to the parent firm within specific market segments targeted by the parent. These barriers were removed once separated resulting in potential positive synergies for the target firm post-spin-off.

“In fact, there was actually a synergy opportunity for the company. So the company was the components business and was not allowed to supply the other large competitor. So when the company became its own public company it was no longer associated with the parent company and was able to actually pursue more business than it had been restricted from before... The parent company did enter into a supply agreement with the company, so it would continue receiving the products it always had received historically for some period of time. The pricing on that agreement was not market-based pricing. So the company didn’t necessarily gain immediately from that. Maybe it was even a little hurt by that in the short term.” - Former Corporate Finance Executive at HealthCo

When Arjo was spun-out from Getinge it was explained that the benefits of focus for each firm outweighed the potential synergy effects, which could have been exploited by Arjo.

“I actually don’t think there was a difference for Arjo or Getinge, but it’s more about being able to focus on what benefits the business to be successful. If Arjo had stayed, there could have been certain synergies that could have been taken advantage of and done well. But as a whole, I think that both parties benefited from being

focused and not being so scattered” - Former Executive VP at Getinge

However, for the Abbott and Abbvie spin-off, we find evidence that the removal of dis-synergies could be beneficial. The different operating characteristics of Abbott and Abbvie resulted in Abbott being out of balance which was a contributor to the spin-off decision (White, 2016). The segments which remained in Abbott were explained to be in balance relative to each other in terms of sales, profitability, and size, but they also had some common operating characteristics among them such as shared similar channel dynamics (White, 2015).

4.2.5 Corporate Focus

A vast majority of the spin-off rationales include some kind of increased corporate focus as a reason for the restructuring. The quantitative results indicate that focus can be a source of positive abnormal performance when considering the sample of medical technology companies, especially in the case of the parent. Moreover, we find strong support in the qualitative interviews that increased corporate focus helps executives manage their business in a more optimal way.

“I believe that in order to be successful, you have to have focus and that is what Arjo has gotten and they have built a completely different base to stand on.” - Former Executive VP at Getinge/Arjo

Another respondent explained that prior to the spin-off, the target and the parent had a different set of customers and by becoming an independent company they could more freely pursue those opportunities.

“And within the parent company, it didn’t make sense to put a lot of emphasis on non-medical end markets. So as long as the components business was also, you know, mostly focused on health care, that was okay. But the components business really wanted to spend more capital and time going after non-medical markets. So that was another thing. It was always the case that the two businesses did not have the same customers. They were selling to two completely different customer bases. It happened to be that the parent company was a customer of the components business. But other than that the components business was always looking to sell to other businesses that might need the technology, but the health care or oncology side of the business was selling to hospitals and centers and things like that, which again, no commonality there. So that was kind of at the very highest level the rationale - different end markets, different customer types. And as always, limited capital that could be deployed. So if you separate the two, you can attract more capital to go after those specific opportunities.” - Former Corporate Finance Executive at HealthCo

Similar to the other respondents, the executive at XVIVO also stated that by becoming an independent firm, increased focus could be achieved which resulted in foundations for the two companies to better pursue their respective opportunities and allocate capital in a more focused and efficient manner.

“There were no synergies in terms of go-to-market and the two companies had different business models. Vitrolife had made large investments...and its investment needs going forward revolved more around go-to-market and sales in established business, but also to develop product offering through M&A. XVIVO was in a completely different phase and needed large investments in R&D, regulatory approvals, and its own initiatives around M&A.” - Executive at XVIVO

Moreover, in the case of the Abbott and Abbvie spin-off, the former demonstrated abnormal performance during the period $[0, +3]$, and a major contributor to this was arguably increased focus. Abbvie demonstrated slightly negative abnormal performance during the same period. However, the company achieved strengthened operational efficiency and operational leverage which contributed to an increase in operating margins, despite increased focus on portfolio investments and increases in R&D as a percentage of sales (Chase, 2015; Yoor, 2016). In the case of Abbott, several initiatives contributed to strengthened performance including operational efficiency as the separation of Abbvie allowed the management of Abbott to reshape the business through the alignment of resources and infrastructure to the business needs which for instance resulted in reduced administrative and general costs (Freyman, 2014; White, 2015). In addition, Abbott pointed out that during this transformation they also reshaped their portfolio by strengthening certain business areas through internal investments while selling off certain assets, but also strengthened one of their business areas which had previously been labeled as relatively weaker among investors and analysts (White, 2017).

When Alcon was spun-out from Novartis, a key rationale behind the decision was to enhance focus for both firms and pursue distinct opportunities as the target operated in the medical technology industry and the parent in the pharmaceutical industry (Alcon, 2019). For Novartis, the spin-off enabled a strengthened focus on deploying capital to initiatives generating the highest return but also to leverage capabilities within R&D, manufacturing, and sales of pharmaceutical products (Narasimhan, 2018). Similarly, for Alcon, the spin-off allowed for an intensified focus on manufacturing and R&D to drive sales growth which in turn allowed for strengthened operating margins through operational leverage (Endicott, 2022, 2023). In addition, improvements in operating efficiency contributed to the further strengthening of operating margins (Endicott, 2021, 2022).

5

Analysis & Discussion

5.1 Corporate Restructuring

The purpose of this study is to analyze spin-offs in the medical technology industry. We find that on a combined level the spin-offs in the sample had a positive abnormal performance for the periods $[0, +3]$ and $[-1, +3]$ of 1.3 and 1.1 p.p. where the former period is statistically significant at the 10% level. We find that they also demonstrated positive abnormal performance during the period $[-1, 1]$ and $[0, +1]$ of 0.9 and 1.5 p.p., significant at the 10% and 1% levels respectively. Further, the quantitative results show that the parent firms in the sample experienced abnormal operating performance as measured by performance-adjusted ROA during the period $[0, +3]$ which was statistically significant at the 1% level. In contrast, the targets experienced negative abnormal operating performance during the same period, although not statistically significant. These findings are consistent with the findings of Daley et al. (1997) and Desai and Jain (1999) where it was demonstrated that improvements in operating performance applied to the parent firms rather than the target firms post-spin-off. However, these results are in contrast to Boreiko and Murgia (2013) which found no improvement in operating performance for the parent. Some caution is needed when comparing these results because Daley et al. (1997) and Desai and Jain (1999) looked at a U.S.-listed sample of firms whilst Boreiko and Murgia (2013) looked at a sample of European firms. The sample in this study includes both North American firms as well as European firms and is limited to the medical technology industry, providing new and unique findings and an extension of previous research.

The sources of ROA change, analyzed through the median unadjusted change in EBIT-margin, asset turnover, EBIT, revenue, and assets in the quantitative results section during the period $[0, +3]$ allow for insights and evidence of differences among the overperforming and underperforming firms. Expansion of operating margins and increase in asset turnover is found among both the overperforming parent and target firms. Moreover, they also demonstrated a greater increase in EBIT in relation to revenue and total assets during the same period. These results provide evidence that the performance improvements to a great extent are attributed to cost efficiency. This is partly consistent with the findings by Daley et al. (1997) where it was argued that improvements in ROA within the parent firms stemmed from cost control.

In contrast, a reduction in asset turnover was evident among the underperforming parent and target firms. Moreover, they also demonstrated a greater increase in both revenue and total assets in relation to EBIT. As explained by Jenkins et al. (2004), firms can pursue different strategies depending on whether they focus on growth or profitability which in turn influence ROA differently. An analysis of the rationale behind the spin-offs shows that 24 out of the 28 target firms mentioned that a spin-off would enable them to better capture growth opportunities and 12 out of the 28 target firms mentioned opportunities to pursue M&A. The fact that the underperforming target firms demonstrated relatively higher growth in revenue and total assets in relation to EBIT, but also in relation to the overperforming firms might indicate that growth is prioritized over profitability for some of the underperforming targets which in some cases can be a potential explanation to negative abnormal performance on a ROA level.

The above reasoning can be exemplified through some examples of target firms from the qualitative results. For instance, Fortive demonstrated negative abnormal performance and was therefore ranked as an underperformer. However, the reduction in operating margins and asset turnover largely stemmed from factors related to M&A. The spin-off of Abbvie from Abbot is another example where the former is ranked as an underperformer. Although Abbvie managed to expand its operating margins due to operating leverage and cost control, it pursued M&A which contributed to an increase in assets and therefore a reduction in ROA.

However, a factor that is not related to strategy choice and might influence the success of the target firm post-spin-off is size and critical mass which seems to be of importance, especially for firms lacking scale economies. Although not related to the subsequent performance of Abbvie, it was a key aspect behind the decision to spin out Abbvie from Abbott to ensure that they were able to operate as standalone entities. MedCo on the other hand lacked profitability, was relatively small, and couldn't afford to establish an optimal organizational structure. The spin-off can be argued to have worked more in favor of MedCo's parent as a weakly performing business unit was spun out.

5.2 Agency Theory

In our overview of the target firms that have negative abnormal performance for the period $[0, +3]$ we find that a vast majority of them had representatives from the parent firm on the board of directors. The same pattern is not seen for the target firms that had a positive abnormal performance during the same time period. These findings are in line with previous research by Evald et al. (2009). However, in our qualitative interviews, only one respondent pointed to the fact that ties with the parent and misaligned views had an impact on the management and performance of the firm. Besides that, the other respondents felt full freedom in their decision-making. Previous research on agency theory and transaction cost theory by Semadeni and Cannella (2011) found that the picture is more nuanced when it comes to the parent's involvement as either chairman or a director of the board.

Whilst this study finds some indications that board involvement in the target firm can affect performance for spin-offs in the medical technology sector, applying their methodology to the sample in this study would give even greater clarification and generalizability of these results.

Spinning out unrelated businesses with different investment identities seems to be an important rationale for spin-off decisions. According to previous research, spinning out a business unit can enable a firm to achieve a higher valuation when information asymmetries give rise to the firm being undervalued (Krishnaswami & Subramaniam, 1999). This is arguably evident from the qualitative results where both Abbvie and XVIVO were spun-out to extract a higher valuation for each firm as well as for their respective parents. Similarly, the decision to spin out HealthCo was underpinned by a similar rationale, but where only the parent benefited to a greater extent. Further, in the case of Reckitt Benckiser and Indivior where Indivior is the worst performer in the sample, we find strong information asymmetries between management, the market, and subsequent performance. When Indivior was a part of Reckitt Benckiser the previous CEO praised the management of Indivior, later on, it would show that Indivior engaged in illegal marketing of their product and the former CEO of Indivior was sentenced to prison and where the company had to pay a large fine to the DOJ. The illegal scheme started before Indivior was spun out and analysts were questioning the intent to spin off the firm. Reckitt Benckiser at the time had no significant owner. This naturally raises the question of information asymmetries and the real intent of spinning out a subsidiary. Moreover, managers have incentives tied to their compensation and the performance of the firm that they lead which could create misalignments with shareholders. This suggests that a misalignment in incentives in creating shareholder value for both the parent and the target firms could create information asymmetries that lead to discrepancies in performance for the parent and the target.

5.3 Transaction Cost Theory

5.3.1 Capital Allocation

From the quantitative results, there is little evidence suggesting that the parent firms demonstrate a change in CapEx post-spin-off. However, the target firms on the other hand demonstrated an increase in CapEx during the $[-1, 0]$ and $[-1, +3]$ periods, statistically significant at the 5% level. This supports the reasoning that some target firms in the sample focused on growth and hence invested accordingly. Moreover, focus-increasing target firms demonstrated a statistically significant increase in CapEx at the 1% level during the period $[-1, +1]$. This seems to be consistent with the findings by Gertner et al. (2002) which argued that focus-increasing targets in industries with high investment opportunities tend to increase investments post-spin-off.

Moreover, Gertner et al. (2002) argued that spin-offs may facilitate capital allocation. Evidence of this is found in the qualitative results for Envista and Arjo,

where the competition for resources within internal markets was a disadvantage due to being less prioritized, and that the spin-off allowed them to focus their investments on their respective investment opportunities to a greater extent. However, contrasting findings to this is the case of HealthCo which became highly levered post-spin-off as it had to pay large amounts of cash to its parent, which impacted its abilities to use debt when pursuing larger transactions or projects.

5.3.2 Access to Capital

Spin-offs seem to enable target firms in need of external capital to better execute their strategic plans. This was emphasized by HealthCo, MedCo, and XVIVO where being listed as an independent firm facilitated access to capital to execute on distinct opportunities through equity issuing. This is consistent with the findings of Krishnaswami and Subramaniam (1999) who argued that firms with growth opportunities and those in need of external capital are more prone to pursuing spin-offs. Furthermore, this supports the growth rationale that some target firms demonstrate negative abnormal performance as they focus on growth.

5.4 Resource-based View

5.4.1 Resource Transfer

Although difficult to attribute directly to positive abnormal performance, there is evidence that transfer of non-technical aspects is beneficial for the targets as evident from the Envista and Danaher spin-off where the former benefited from knowledge and culture transfer by replicating the successful business system “DBS” from Danaher. Similarly, the transfer of resources and human capital was described to be beneficial for Arjo after being spun out from Getinge. This is consistent with previous literature stating that intangible resources are more important determinants of the success of the target firms in relation to inherited technical knowledge (Chatterji, 2009; Tübke, 2005).

5.4.2 Synergies and Dissynergies

According to previous literature, divestitures can allow for unlocking value in a corporate portfolio by removing dissynergies arising from factors such as diseconomies of scale or over-diversification (Brauer, 2006; D. Lee & Madhavan, 2010; Schipper & Smith, 1983). We find varying results with regard to this aspect. For instance, Abbott benefited from spinning out Abbvie as it allowed for greater fit among the business which remained following the removal of dissynergies that stemmed from different operating characteristics between the two firms. HealthCo achieved positive synergies by being spun out from its parent as it could target a wider range of customers post-spin-off within the market segment which its former parent targeted. However, that doesn't seem to be a major contributor to its operating performance as it demonstrated negative abnormal performance during the $[0, +3]$ period. In contrast, when Alcon was spun-out from Novartis it was mentioned that it lost

capabilities within pharma development. However, these capabilities were later acquired through M&A. Furthermore, potential synergies that were lost when Arjo was spun-out from Getinge were outweighed by the benefits of focus. There seem to be varying results in terms of synergies and dissynergies post-spin-off. What is common among these spin-offs is arguably low relatedness between each parent and target, which is consistent with Chemmanur and Yan (2004) who argued that spin-offs are more prone to occur for business units less adjacent to their parent's core business owing to low potential for synergies. In addition, it also relates to aspects of corporate focus and the view that managers employ divestitures of unrelated business units with the aim of reducing excessive diversification to manage firms more competitively and economically (Bergh et al., 2008).

However, the quantitative analysis shows that both the parent and target firms demonstrated negative, although not statistically significant, abnormal performance during the period $[-1, 0]$, which might be related to the costs of restructuring and set-up of new organizational infrastructure. This does not seem to result in long-term implications for the parent firms as they demonstrated positive long-term abnormal performance. It could however be of significance for smaller target firms that are not of critical mass as indicated by the MedCo spin-off which was described in the *Corporate Restructuring* segment.

5.5 Corporate Focus

When considering the change in ROA with respect to focus we find that the focusing increasing parent firms demonstrated a positive abnormal performance of 3.4 p.p. for the period $[0, +3]$, significant at the 5% level. These results are in line with previous research by Daley et al. (1997) and Desai and Jain (1999) indicating that increased focus is a source of positive abnormal performance of ROA. For the focus-increasing target firms, we find that for the period $[0, +1]$ they demonstrated positive abnormal performance of 2.4 p.p., significant at the 10% level. This is contrary to Daley et al. (1997) which found no change in operating performance during the same period for the target firms. However, for the period $[0, +3]$ we find that focus-increasing target firms demonstrated a negative abnormal performance of -2.0 p.p., although not statistically significant. For the full period $[-1, +3]$ we find that focus-increasing targets demonstrated a negative abnormal performance of -3.4 p.p., significant at the 10% level. This indicates that although the focus-increasing target firms overperformed during the period $[0, +1]$, the improvements are reversed in the subsequent period following the spin-off. For the non-focus increasing target firms, we find no statistically significant result. They demonstrated a negative abnormal performance of -3.4 p.p. for the period $[0, +3]$ indicating that they performed even worse than the focus-increasing target firms. Worth noting is that these results should be interpreted cautiously because of the limited sample size. Our qualitative results confirm that focus is an important factor for firms as it allows for focus on strategy execution, operational efficiency, and capital allocation.

6

Conclusions

The purpose of this study was to analyze spin-offs in the medical technology sector. Regarding our first sub-question: *Is there a difference in operational performance post-spin-off between the parent and the target and if so, why?* We find that the improvements in operating performance are tied to the parent firms and not the target firms for the three years post-spin-off. First, the parent seems to benefit from an increased focus post-spin-off while this was not found to be the case for the target. Second, our qualitative results indicate that parents might be spinning out poor-performing firms. Third, although the target firms underperformed on a ROA level, our analysis suggests that the underperforming targets and parents instead increased their revenue and total assets more than their EBIT, which negatively affects their ROA.

Regarding our second sub-question: *Why do some medical technology spin-offs perform better than others?* First, our results suggest that underperforming firms focus more on revenue growth than increasing their ROA. This is further supported by the fact that the target firms increased their CapEx in the post-spin-off period, suggesting that they focus more on growth rather than profitability. Second, our qualitative results indicate that post-spin-off ties to the parent may have a negative effect on the operating performance of the target firms. Third, our qualitative interviews indicate that a successful resource transfer from the parent to the target in terms of valuable knowledge and culture may lead to greater operating performance for the target firms. Fourth, we find that parent firms that get an increased focus post-spin-off perform better in the post-spin-off period. Explanations for this are that internal capital markets are dismantled and that they can pursue a more focused capital allocation as well as a more focused strategy execution. Moreover, our results also indicate that decreased information asymmetries following the spin-offs increase access to capital for the target firms.

Lastly, regarding our main research question: *Do spin-offs in the medical technology industry result in positive abnormal operating performance and if so, what are the sources of abnormal performance?* On a combined basis, meaning looking at the total effects for both the parent and the target firms, we find that spin-offs in the medical technology industry result in a positive abnormal operating performance during the three years post-spin-off.

6.1 Further Research

This study has focused on operational long-term performance following spin-offs in the medical technology sector with a sample of North American and European firms. To further generalize the results for the respective regions and to be more aligned with previous research, a study with a regional focus could further give insights into intra-regional effects on spin-offs in the medical technology sector. Since we find indications the underperforming firms focus more on revenue growth, testing the sample with the method proposed by Barber and Lyon (1996) but with a different financial ratio would further strengthen the generalizability, validity and reliability of this finding.

Although we find some evidence pointing to the fact connections to the parent company could have a negative effect on the target firm, replicating the method used by Semadeni and Cannella (2011) would give greater insights and generalizability to these findings. Related to this topic is the aspect of continued ownership in the target firm post spin-off where it could be interesting to analyze the operational performance with respect to the degree of concentration of major shareholders. Further, we find some evidence that the principal-agent problem and unaligned incentives might be evident in some cases of the underperforming spin-offs and a more robust test of this theory would increase the reliability of these results.

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A

Appendix 1. Interview Questions.

Company specific

What was the rationale behind the spin-off for the parent and the target respectively?
How long did it take for the thesis/rationale behind the spin-off to play out, if it did? If so, was the outcome better than expected or not?

Operating performance

What were the operational benefits and drawbacks stemming from the spin-off for the target and the parent respectively?

Were there any of the two companies which benefited more/less from the spin-off and if so, why?

What were the managerial implications following the spin-off in terms of Managerial control and ability to focus strategy? Incentives among employees?

What were the implications for capital allocation in terms of Access to funding Resource allocation to R&D, CapEx, or high growth prospects etc.

Were there any positive/negative synergies that were eased following the spin-off? (Improved R&D processes?) Any indirect synergies/dissynergies?

In hindsight, what are your conclusions about the spin-off? What factors were beneficial for the respective companies and what weren't?

Industry-specific

Do you think the rationale for spin-offs in the med-tech sector has changed in recent years and if so, in what sense?

Generally, why do you think that some spin-offs would perform better than others?

B

Appendix 1. Interview Information.

Overview and characteristics of interviewees					
Company	Target/Parent	Role	Length (Minutes)	Type	Chg. in performance adjusted ROA [0, +3]
Envista	Target	Senior Vice President ("SVP")	30	Digital	+0,1%
HealthCo	Target	Former Corporate Finance Executive	45	Digital	Negative abnormal performance
MedCo	Target	Former CEO	75	Physical	Negative abnormal performance
Arjo/Getinge	Target/Parent	Former Executive Vice President ("EVP")	30	Digital	Arjo +7,1% / Getinge +10,4%
XVIVO/Vitrolife	Target/Parent	Executive	30	Digital	XVIVO +1,2% / Vitrolife +9,5%

Table B.1: Overview of interviews

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