Sequence to Success – Combining Acquisitions and Divestments as Incremental Real Options

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Abstract

Firms located in high-tech industries frequently make portfolio adjustments to remain competitive in the long run. As such, acquisitions and divestments are ubiquitous means utilized by firms to accomplish this goal. However, thus far research has not investigated the combined effect of acquisition and divestment activities on a firm's financial performance. Through the lens of real options theory, this research investigates this dimension by means of a sample of 5101 firms covering the time period between 2000 and 2020. To establish differing acquisition and divestment portfolio strategies, differing cluster sequence patterns, representing different patterns of acquisition and divestment activity, have been derived using a hierarchical clustering method. Those clusters subsequently serve as input for several robust ordinary least square regressions to investigate the hypothesized effects. The results show that divestment activities have a significant positive effect on a firm's financial performance. Furthermore, particular sequence patterns show significantly superior financial performance in comparison to other clusters. In addition, financial slack displays a significant, however, inconsistent moderating effect on the sequence cluster – financial performance relationship; The chosen strategy should be based on the level of available financial slack to improve the firm's financial performance. Lastly, extra-entrainment shows a negatively significant effect on financial performance. This research contributes to the existing real options reasoning literature by viewing acquisition and divestment activities as interlinked activities over several years. Hence, this research attempts first strides into a new realm of management research, leaving ample opportunities for subsequent research to investigate this phenomenon in more detail.

1 Introduction

Firms operating in the high technology (high-tech) industry underlie strong adaptive pressures that force organizations to frequently evaluate their organizational structure to remain profitable in the long run (Amiri et al., 2021; Eisenhardt and Martin, 2000; Posen et al., 2018). The frequent evaluation has to take place due to the high-paced and dynamic nature of the high-tech industry, further characterized by quick knowledge dissipation (Aalbers et al., 2021). This forces organizations to frequently reevaluate and adjust their strategic decisions to sustain their competitive advantages and remain profitable in the long run (D'Aveni et al., 2010; Eisenhardt and Martin, 2000). To accomplish this objective, organizations often engage in portfolio adjustments, more specifically acquisition and divestment activities to reposition themselves in the marketplace and protect their stance within the industry in the long term (Barkema and Schijven, 2008; Brauer, 2006; Dranikoff et al., 2002). Since those strategic decisions take place over time, it makes the temporal dimension a central element of the organization's strategy. Nonetheless, current research suggests that timing is not well investigated in the literature and, therefore, remains a "hidden and unrecognized dimension [...] that has the potential to create competitive advantage" (Shi et al., 2012, p. 165). In the high-tech industry, acquisitions and divestments are considered to be intertwined activities since, for instance, previously acquired but underperforming businesses will be divested to retain organizational profitability (Amiri et al., 2021). Alternatively, prior divestments can give organizations the financial means to engage in acquisitions, therefore, being a means to finance future acquisitions. This gives an indication that acquisitions and divestments take place simultaneously or in a sequential manner (Mellewigt et al., 2017; Shi and Prescott, 2011; Wang and Zajac, 2007). However, the academic literature thus far considers acquisitions and divestments only as loosely connected activities which are studied in their separate and respective fields (divestments as part of restructuring and acquisitions within the streams of MA) (Mellewigt et al., 2017; Shi and Prescott, 2011; Wang and Zajac, 2007). Despite the existence of separate and abundant acquisition research and some divestment research, the literature on divestment and acquisitions as intertwined activities is sparse (Amiri et al., 2021; Kuusela et al., 2017). Additionally, the literature on the sequential approach investigating the combined temporal sequences of divestments and acquisitions and the effects on financial performance is non-existent; only research investigating the concept of temporality is present (Kunisch et al., 2017; Shi et al., 2012). However, since acquisitions and divestments are activities that are performed simultaneously or sequen-

tially (Amiri et al., 2021; Kuusela et al., 2017), the phenomenon of those two strategic decisions in the context of organizational performance can only be fully understood by looking at both activities combined. Thus far, however, the body of research is working under the taken-for-granted assumption that strategic changes take place in a linear manner (Abbott, 1990; Kunisch et al., 2017; Shimizu and Hitt, 2005). Research by Klarner and Raish (2013), however, established that changes occur in focused, punctuated, temporarily switching, or regular sequential rhythm patterns, making the investigation of sequential acquisition and divestment patterns an important but understudied phenomenon. According to the limited research on this phenomenon, the following research question has been developed:

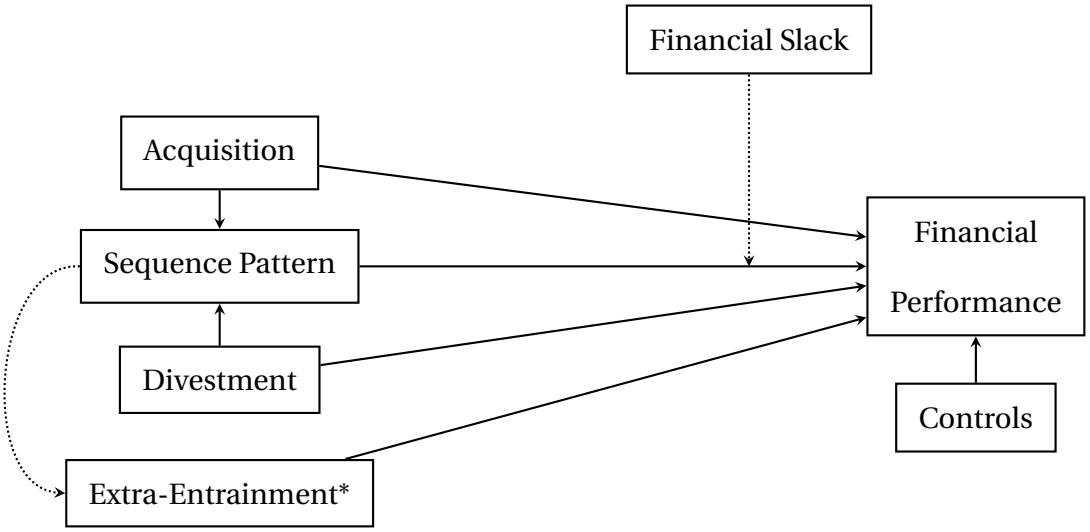
> *How do temporal sequences of acquisitions and divestments affect the financial performance of organizations positioned in high-tech industries?*

Extending on this phenomenon, two additional factors influence how organizations are deciding upon their portfolio decisions. Firstly, *financial slack* explains how firms approach and pursue portfolio adjustments with respect to their available funds (Kuusela et al., 2017; Devos et al., 2009; George, 2005; Combs and Ketchen, 1999). Financial slack, defined as a surplus of a financial resource in excess of the necessary amount needed to sustain the business (Carnes et al., 2019), constrains a firm's engagement in acquisitions and influences decisions on whether firms divest their existing business units or not. Ultimately, financial slack determines choices regarding acquisitions and divestments since the amount of financial slack necessitates acquisition or divestment decisions. Consequently, the financial slack a firm possesses gives insights into how firms make acquisition and divestment decisions. Secondly, the reason to engage in acquisitions will not only be internally derived but as well underlie the considerations and movements of the industry as a whole in which a firm operates. Therefore, they firms investigate the movement of their corresponding industry and align their decisions with those made by their industry competitors(Shi and Prescott, 2012). Hence, *extra-entrainment*, defined as "the synchronization of a focal firm's rhythm with a pacer in its external environment, e.g., competitors' actions" (Shi and Prescott, 2012, p. 1288), adds an additional concept that firms take into account when making portfolio adjustments. As a result, both financial slack and extra-entrainment pose dimensions that will influence the firm's choices with regard to portfolio adjustment activities. Consequently, the following sub-questions were developed, delving deeper into the relevance of temporal sequences under certain conditions:

> *How does financial slack moderate the relationship of temporal sequences on the financial performance of organizations positioned in high-tech industries?*

How does extra-entrainment affect the financial performance of organizations positioned in high-tech industries?

To improve the understanding to the reader, the conceptual model shown in Figure 1.1 will aid to depict the main concepts and their corresponding relationships.



*Note. *derived from the comparison between firm sequence and corresponding industry sequence.*

Figure 1.1: Conceptual Model

This research will apply real options theory (ROT) as a theoretical lens. Real options theory is a tool used by managers to make incremental decisions in the context of long-range planning (Driouchi and Bennett, 2012) and, therefore, inherently incorporates portfolio restructuring decisions over time. Therefore, applying real options theory (ROT) as the theoretical lens allows to intertwine acquisitions and divestments in a sequential form. Real options, defined as "opportunities to purchase real assets on possibly favorable terms" (Myers, 1977, p. 163), allow firms to make small tangible investments and investigate their corresponding risks and opportunities. Particularly, real options reasoning (ROR), depicting the behavioral side of ROT, highlights the managerial decision-making process when flexibility for strategic changes in uncertain and complex situations is required (Trigeorgis and Reuer, 2017). ROR refers to the "formulation and testing of hypotheses based on verbal theorizing without the aid of analytical modeling" (Trigeorgis and Reuer, 2017, p. 47). ROR allows firms to decrease downside risk factors while at the same time leveraging the upside benefits of the presented options to the firm (Trigeorgis, 1996; Janney and Dess, 2004). This implies that firms who are exploring real options can control the risks involved (Tong and Reuer, 2007a)

such that the choice of an option that negatively influences the firm's position can be abandoned quickly to secure the firm's performance in the long run. The primary goal is hence, an improvement of the risk-return trade-off (Bowman and Singh, 1993; Markowitz, 1952, 1959). Moreover, ROR inherently includes a sequential approach with regard to decision making (Trigeorgis and Reuer, 2017), granting firms or organizational decision-makers, if required, to develop flexible and appropriate responses to changes in internal or external conditions over time. These responses, however, may depend on other contextual variables such as financial slack and extra-entrainment which will be explained in the following paragraphs.

Under ROT, firms with improved financial slack are able to stall or defer divestment decisions to establish the businesses' future importance, which is particularly useful in face of uncertainty (Damaraju et al., 2015). Regarding acquisitions and ROT, improved financial slack provides the firm with sufficient resources to engage in increased acquisition behavior since cash is one of the most dominant payment methods for acquisitions (Zhu et al., 2015). However, previous research suggests that improved financial slack makes organizations more likely to conduct value-destroying acquisitions (Jensen, 1986) and, consequently, make worse acquisition decisions (Devos et al., 2009; Yaghoubi et al., 2016) that result in decreased post-acquisition firm performance. As a result, financial slack inherently carries a temporal dimension that will be utilized in this research.

Concerning extra-entrainment, ROT explains that the firm will align its decisions with those made by its industry competitors. This entrainment effect has shown to be significant for alliances (Shi and Prescott, 2012), however, it has not been studied for acquisition and divestments. Therefore, this research will employ extra-entrainment as a second independent variable and investigate its effects on the firm's financial performance.

To investigate the identified phenomenon, this study utilizes a data set of 5101 firms in two selected high-tech industries between 2000 to 2020. For the analyses, 12 robust ordinary least square (OLS) regression models are employed to study the developed research gap. The results indicate that particular sequence clusters result in better financial performance than others. Furthermore, the importance of financial slack depends on the level of financial means available to an organization. This means that certain sequences perform better than others given the level of financial slack. Lastly, the analysis of extra-entrainment shows a negative influence on a firm's financial performance.

This research will manifest its contribution in a few major ways. Firstly, the research will contribute to the existing research body by investigating the importance of resource allocation activities via sequences of divestments and acquisitions, a branch of research that has not yet been studied in detail (Kunisch et al., 2017; Lovallo et al., 2022). Thus far, no research has investigated the phenomenon at hand. Hence, the present research dares first strides into a new field of management research, allowing subsequent research to further investigate this understudied subject. Secondly, this research contributes to the ROR literature by investigating acquisition and divestment activities jointly over time, providing explanations of why certain sequences are characterized by improved financial performance while others are not. Thirdly, it contributes by allowing executives in high-tech industries to understand the importance of divestment and acquisition patterns and allows them to estimate which sequence patterns bring superior performance outcomes. When certain sequences outperform other sequences, they inherently hold superior competitive advantages. Understanding which sequences maximize financial performance allows managers to accurately decide how to pursue divestment and acquisition decisions to enjoy superior financial performance outcomes. Lastly, managers will be able to determine which sequence of combined acquisition and divestment activities shows a detrimental or beneficial influence on a firm's financial performance. This allows them to better assess how to approach portfolio restructuring in the best way to mitigate losses and maximize financial gains.

The following sections will be organized as follows. First, the *Literature Review* examines the existing literature. Subsequently, the *Theoretical Framework* will be developed explaining the involved mechanisms and the hypotheses. The *Methodology* section elaborates on the methodological approach, including explanations for the sample construction and variable generation. The *Results* section presents the findings of the conducted analyses, followed by the *Discussion and Conclusion* which elaborates on the findings. The *Limitations* will present directions in which future research can steer its attention. Lastly, the *Research Ethics* section elaborates on the ethical conduct followed to finalize this research according to the established research principles.

2 Literature Review

Despite scholars acknowledging the relevance and importance of time in strategic management, research by Shi et al. (2012, p.165) elaborates that it thus far remains a "hidden and unrecognized dimension [...] that has the potential to create competitive advantage". Supporting this statement, Kunisch et al. (2017) conclude that there are still few empirical studies investigating the effects of efficient temporal sequences of strategic change that improve a firm's performance. The authors explain that the existing literature frequently follows the taken-for-granted assumption that strategic change takes place in linear sequences where a sequence refers to the "ordered set of initiatives carried out across time" (Shi and Prescott, 2011, p.1). While the existing research is working with this assumption, it has been argued that changes take place in a more sequential and rhythm-like manner. Klarner and Raish (2013) established that organizational changes occur in various sequential patterns, for instance, 'focused', 'punctuated', 'temporarily switching', or 'regular'. This implies that firms seem to show different ways of how to approach organizational changes. The shape of those changes is represented by differences in sequential patterns across firms. Identifying those differing sequential patterns and understanding their effect on a firm's financial performance is especially interesting in high-tech industries since they are characteristically high-paced where misalignments occur more frequently over a given period (Eisenhardt and Martin, 2000) and portfolio reevaluations have to take place more frequently to remain profitable (Aalbers et al. 2021). In the context of the topic of investigation, that implies that these industry-wide characteristics force firms to frequently evaluate their business portfolio and potentially engage in increased divestment or acquisition activities to remain profitable in the long run. Whilst the existing research established that strategic changes occur in sequential patterns (Klarner and Raish, 2013; Kunisch et al., 2017), there are differences between firms in how they conduct those activities and hence, show differences in how those temporal sequences are characterized.

However, the literature focusing on the *sequences of divestments and acquisitions* can be observed to be limited. Recently emerging research by Kuusela et al. (2017) turns its focus on the combined effect of divestment and acquisition activities. While their research investigates the combined effect of resource-consuming (acquisition) and resource-freeing (divestment) activities, the importance of temporal sequences of divestment and acquisitions and their effects on financial performance has not been considered. Additionally, Shepherd

et al. (2015) state that while the existing management research acknowledges that firms conduct both acquisition and divestments to improve their performance, the research indicates that there is a "recognized need to consider divestments as part of a firm's portfolio strategy" (Amiri et al., 2021, p. 2). Currently, some research focused on the order of acquisition and divestment activities, splitting the existing stream of literature into two categories. Firstly, the research focuses on acquisition activity preceding divestment activity, and secondly, divestment activity preceding acquisition activity. Generally, however, there is little consensus in the literature with regard to which activity (acquisition or divestment) precedes the other as well as the temporal ordering of those activities. Some older research from the strategy and finance realms shows that divesting activities follow preceding acquisition activities after a period of business expansion (Hayward and Shimizu, 2006; Kaul, 2012; Porter, 1987; Teece et al., 1994). This is supported by similar and recent research by Schilke and Jiang (2019) who investigated how premerger alliances influence subsequent divestments. The authors found that there is a significant relationship between the variables, suggesting that premerger alliances contribute to subsequent divestment activity. Furthermore, it is argued that preceding acquisitions provide firms with the means to reconsider their current resource structuring and, hence, subsequent divestments present a logical consequence as part of the reconfiguration process (Capron et al., 2001). Regarding the latter category, some research investigates the effect of divestments preceding acquisition activities. Recent research by Bennett and Feldmann (2017) investigates the effect of firms that engage first in spinoffs and subsequently in acquisitions. Their findings conclude that firms that firstly engage in spinoffs of businesses are subsequently more likely to be engaged in acquisition behavior. The findings are supported by Doan et al. (2018) who show that divestitures contribute to an improved acquisition completion likelihood.

While some more recent literature emerged, the temporal combination of acquisition and divestment activities over time remains an understudied but relevant field. As a result, this research will focus on filling this research gap based on the theoretical framework developed in the subsequent section.

3 Theoretical Framework

The mechanisms regarding the sequences of acquisitions and divestments and their effects on financial performance will be investigated through the lens of real options theory (ROT), specifically the real options reasoning (ROR) dimension as a subcategory of ROT (Trigeorgis and Reuer, 2017). ROT is a managerial tool used for long-term planning in an iterative way including a sequential approach (Trigeorgis and Reuer, 2017) which is important to investigate the identified research gap. Since ROT is commonly used when making strategic decisions (Trigeorgis and Reuer, 2017), using this lens is adequate to investigate the elaborated phenomenon.

In the remainder of this section, ROR will be used as the preferred terminology, however, ROT will be utilized as the main theoretical approach. Real options are defined as "opportunities to purchase real assets on possibly favorable terms" (Myers, 1977, p. 163) which allow firms to make small tangible investments and investigate their corresponding risks and opportunities. ROT is therefore used as a strategic decision-making tool to balance and align the firm's internal configuration with the external environmental demands (Smit and Trigeorgis, 2004; Kogut and Kulatilaka, 2001), making it a tool to tackle issues presented by the ever-changing world (Kogut and Kulatilaka, 1994, 2001). Moreover, this approach highlights behavioral perspectives, as strategic decisions are exercised by bounded rational individuals who carry cognitive frames and are subjected to biases and heuristics which eventually influence their decision-making processes. Due to the bounded rationality and the fact that fast-paced environments carry uncertainty and complexity, decision-makers inherently do not know the optimal decision. As a result, they revert to their established cognitive frames, biases, and heuristics when making real option choices in case of lacking or absent information (Coff and Laverty, 2007). Additionally, decision-makers care about the potential rewards or sanctions that follow made decisions, a concept referred to as accountability.

Accountability is defined as "an implicit or explicit expectation that one's decisions or actions will be subject to evaluation by some salient audience(s) with the belief that there is a potential for one to receive either rewards or sanctions based on this expected valuation" (Hall and Ferris, 2011, p. 134). ROR allows to incorporate uncertainty into the reasoning for a specific decision ex-ante. When considering the impact of accountability on the future career of managers, they will carefully consider their decisions before exercising them.

Managers will investigate a portfolio of options before making a definite decision since the right decision will improve a manager's legitimacy, eventually translating into enhanced accountability. The main underlying objective of those decisions is that the risk of performance shortfalls is mitigated and the likelihood to improve a firm's performance is improved. Since those decisions involve a degree of uncertainty, particularly in industries where competitive advantages dissipate quickly, ROR is commonly used when making management decisions to carefully derive and elaborate on options that mitigate the event of being sanctioned for not achieving expected outcomes. ROR allows managers to theoretically reason about the presented options of an organization and select those that are most applicable to achieving the organizational goal of improved financial performance. Simultaneously, managers are able to pursue the self-interested goals of remaining employed in the current position or being held accountable for positive instead of negative decisions. However, the choice of an option can be incorrect after all and have negative performance effects. This will lead to a reevaluation of portfolio choices, resulting in a repetitive cycle of acquisition and divestment choices. This indicates that ROR is commonly used in management when making strategic change decisions in uncertain and complex situations (Trigeorgis and Reuer, 2017) and carries numerous advantages.

As outlined by Trigeorgis and Reuer (2017), ROR holds several advantages for an organization to make appropriate strategic decisions when faced with the necessity to adapt to changing circumstances. Firstly, ROR can be used to realign a firm's combinative capabilities by divesting those areas that are misaligned with its organizational goals and acquiring in areas that strengthen the company's position and allow access to unique technological and organizational opportunities. Secondly, ROR builds on the importance of flexibility in competitive and quickly changing industries such as the high-tech industry (Klingebiel and Adner, 2015; Eisenhardt and Martin, 2000), allowing for quick adjustments to establish a business portfolio aligned with the organizational objectives. This is achieved by guiding the choices regarding future resource commitments as ROR allows a firm to make these in a proactive and flexible manner to allocate them appropriately. Under ROR, firms can flexibly defer or alter investment choices in case market conditions or other variables supporting the firms viability change. This allows firms to leverage the provided upside opportunities while also being able to decrease downside risk factors (Janney and Dess, 2004; Trigeorgis, 1996), allowing for improvements in performance or the containment of potential losses. As a result, ROR allows firms to evaluate all presented opportunities and select the option that best aligns the environmental demands and internal configuration to gain a competitive advantage and secure the long-run survivability and profitability. Where traditional evaluation methods fail, ROR allows for the flexibility to adapt decisions to the context-dependent demands of the organization (Trigeorgis, 1993). Moreover, this theory challenges the premises of value maximization and optimization goals based on forecasts and future objectives since

they carry a degree of uncertainty. Rather, this perspective focuses on resource configuration and value creation (Miller and Arikan, 2004), allowing firms to flexibly modify resource allocations with regard to technology, the environment, as well as to occurring market changes (Jahanshahi and Nawaser, 2018). The strategic flexibility of ROR in highly unpredictable and fast-paced environments provides firms with the opportunity to identify options presented under the changing conditions and allows them without substantial obligations to experiment with new undertakings (Miller and Folta, 2002; Nawaser, 2015) whilst controlling the downside risks inherent to those projects. Furthermore, ROR allows to identify which businesses are preferably retained and which should be discarded. While firms generally possess a vast array of businesses, they do not have to remain the 'best owner' for some of their businesses forever. This indicates, that the profitability of ownership of businesses is not static and, hence, subject to changes over time. When firms face changing contexts, they need to make adequate decisions about which businesses contribute to the organization's performance and should, hence, be retained and which businesses it should divest since the organization ceased to be the 'best owner' and is better off selling the business. In line with that reasoning, Campbell et al. (2014) argue that managers need to divest those companies where they cannot contribute as much as any other owner and acquire those where they could be the best owner. Alternatively, firms will engage in acquisitions when they perceive that their respective market is undergoing changes and their current state is misaligned with the environmental conditions to protect their profitability (Barkema and Schijven, 2006; Brauer, 2006; Dranikoff et al., 2002). Consistent with the 'parenting logic' outlined by Campbell et al. (2014), the incorporation of an asset that is aligned with the organization's configuration can lead to an outperformance of the market since the added asset can be capitalized upon and allows for the extraction of greater profits. These acquisition and divestment processes take place continuously over time since the best owner for businesses changes, requiring the firm to frequently revise and adjust its business portfolio to remain profitable in the long run. Research by Brandimarte et al. (2001) supports this reasoning and found that organizations who do not engage in portfolio restructuring through acquisitions and divestments underperform their more active counterparts that systematically divest unprofitable businesses and acquire those businesses where they may be the best owners. As a result, the investigation of sequences in divestment and acquisition behavior poses an important dimension to establish whether and how firms can modify their portfolio restructuring behaviors regarding divestment and acquisition decisions to achieve superior financial performance and remain profitable in the long run.

3.1 Acquisitions, Divestments, and Financial Performance

3.1.1 Acquisitions

When firms engage in acquisitions, they invest large amounts of financial and managerial resources with the objective to improve their overall performance (Kuusela et al., 2017). Investigating the scientific literature, however, it becomes evident that the outcome of acquisition activities on financial performance is not unanimous. Supporting this statement, Ismail et al. (2011) elaborate in their literature review that the mergers and acquisitions (MA) literature is inconclusive and explain that factors such as payment method, type of MA activity (unrelated or related), firm size, domestic versus cross-border MA influence the success of the undertaking. More recent literature by King et al. (2021) defines 16 constructs important to consider when assessing the performance of acquisitions. Often, however, acquisitions do not perform as expected and result in value destruction rather than value generation (Jensen, 1986). Research by King et al. (2004) explain in their meta-analysis that acquisitions generally do not lead to performance improvements. Similar results are presented by Cartwright and Schoenberg (2006), stating that failure rates range between 46 and 50% remained rather constant since Kitching's (1974) original work investigating European acquisitions. Using a similar methodology, a study by Schoenberg (2006) reports failure rates between 44 and 56%. Therefore, it can be said that "most mergers and acquisitions (MA) are financial failures and produce undesirable consequences for the people and companies involved" (Marks and Mirvis, 2012, p.2). Building upon this reasoning, the following hypothesis is developed:

> $H1_a$: *The acquisition of businesses will decrease the financial performance of a firm.*

3.1.2 Divestments

Where acquisitions are aimed to aid an organization to solve performance insufficiencies, divestitures are often used as a means to restore a firm's profitability (Brauer, 2006; Kuusela et al., 2017). As a result, a lack of performance has been repeatedly found to be the strongest predictor of divestment activities (Brauer, 2006; Chang, 1996; Dranikoff et al., 2002; Duhaime and Grant, 1984; Hoskisson et al., 1994; Pashley and Philippatos, 1990). While the literature on divestitures is generally not well-established and the effects of divestments on firm performance are not clear (Silva and Moreira, 2019), some compelling evidence suggests that divestitures lead to positive performance outcomes. For instance, Hillier et al. (2009) found that firms become more focused after asset divestments took place and, consequently, lead to improvements in operational performance. Additionally, Dranikoff et al. (2002) state that firms who actively engage in divestment activities to manage their businesses will create more shareholder value than those who do not. Haynes et al. (2002) support these find-

ings and concluded that divestment activities improve a firm's profitability. Lee and Madhavan (2010) found in their meta-analysis that divestments show a positive impact on firm performance. Additional evidence by some authors suggests similarly that divestment can potentially result in better performance (Barkema and Schijven, 2008; Dranikoff et al., 2002; Moliterno and Wiersema, 2007). Based on these findings, the following hypothesis is formulated:

> *$H1_b$: The divestment of businesses will improve the financial performance of a firm.*

3.2 ROR and Financial Performance

With regard to financial performance, prior research indicates that using ROR allows firms to decrease downside risk factors while at the same time leveraging the upside benefits of the presented options to the firm (Janney and Dess, 2004; Trigeorgis, 1996). This implies that firms who are exploring options can control the risks involved (Tong and Reuer, 2007a) such that the choice of an option that negatively influences the firm's position can be abandoned quickly to secure the firm's performance in the long run. Vice versa, exploring options that present high profitability can be further pursued by making subsequent investments in that business area. As a result, ROR can help firms to manage their options portfolio in a manner that does not compromise the firm's performance.

Driouchi and Bennett (2012) investigated in the most recent scientific review the existing literature on real options and financial performance implications. The existing evidence suggests that ROR offers a useful tool to manage a firm's performance in fields such as strategic decision making (Kogut and Kulatilaka, 2001; Sanchez, 2003), choice of governance modes (Brouthers et al., 2008; Chi, 2000), decisions regarding market entry and exploration (Miller and Folta, 2002; Petersen et al., 2001), collaborations (Reuer and Tong, 2010; Villalonga and McGahan, 2005), and strategic and operational flexibility (Driouchi and Bennett, 2012; Petersen et al., 2001; Reuer and Leiblein, 2000). Some evidence suggests that the possession of a real options portfolio or making investment decisions through the real options lens leads to improved firm value (Lee and Makhija, 2009a, 2009b; Yang and Carolis, 2014). However, the larger extent of existing research does not specifically focus on the direct effects of ROR on financial performance but rather uses ROR as an investigative lens through which strategic decisions are made that eventually impact a firm's performance. Therefore, this research extends this stream of literature by using ROR as an adequate theory to investigate the research question.

3.3 ROR and the Sequencing of Acquisitions and Divestments

As previously stated, decision-makers have to ensure that their business portfolio is synchronized with the performance objectives set by the organization. To ensure improved financial performance, decision-makers have to frequently evaluate the current portfolio to assess whether portfolio alterations have to take place. Consequently, decision-makers have to evaluate those decisions with the passing of time which results in a sequential approach to portfolio decision making. The referred-to sequences are defined as an "ordered set of initiatives carried out across time" (Shi and Prescott, 2011, p.1), in this case, referring to the ordering of divestment and acquisition activities performed by a firm.

ROR inherently includes a sequential approach with regard to decision making (Trigeorgis and Reuer, 2017), granting firms or organizational decision-makers, if required, to develop timely and appropriate responses to changes in internal or external conditions over time. Prior research by Klingebiel and Adner (2015) confirms ROR's sequential dimension and states that firms who adopt ROR for decision-making invest sequentially and, hence, make use of a multistep approach to resource allocation. ROR, which includes an initially low investment and commitment to new ventures (McGrath and Nerkar, 2004), leaves room for the organization to investigate the profitability of the project without substantially compromising the organizational performance by investing in businesses that eventually turn out to underperform. When a project is considered profitable (unprofitable), additional organizational resources may be invested (divested), resulting in a sequential pattern of acquisition and divestments over time. This logic indicates that under ROR, investment or divestment decisions are made in the context of long-range strategic planning (Driouchi and Bennett, 2012) and hence, can explain divestment and acquisition behavior of firms as linked steps in a sequential process. Based on the ROR logic, firms have three options to choose from. Firstly, they can decide to *defer* and neither invest nor divest. Secondly, firms can *acquire* those options that will provide the greatest returns. Lastly, firms can *divest* those that show underperformance at any given time. Hence, management decisions regarding portfolio choices will be selected based on the greatest potential return, eventually leading to improved financial performance. Those decisions can be captured in firm-specific sequences that represent a firm's divestment and acquisition activities which are temporally ordered over time. In line with ROR, seven different acquisition and divestment sequence patterns are hypothesized to take place which will be described in the following paragraphs.

3.3.1 Sequence Pattern 1:

Firstly, firms can heavily acquire at the beginning which is followingly accompanied by fewer periodical divestments. Under ROR, firms would choose to firstly acquire companies that

suit their scope and later divest those businesses that prove not to be profitable. Based on this reasoning, the following hypothesis is derived:

$H2_a$: Sequence pattern 1 has a positive effect on a firm's financial performance.

3.3.2 Sequence Pattern 2:

Alternatively, firms can choose to divest in smaller amounts shortly before any acquisition. Under ROR, it can be argued that firms following this strategy are freeing up capital by selling the worst-performing businesses to acquire new businesses to replenish their portfolio. As a result, the following hypothesis is derived:

$H2_b$: Sequence pattern 2 has a positive effect on a firm's financial performance.

3.3.3 Sequence Pattern 3:

Moreover, firms can conduct an acquisitions-only strategy in a peak-like manner. According to ROR, firms deliberately observe the market for the best buying opportunities and strike when they find one that largely overlaps with the firm's current configuration, allowing to minimize performance shortfalls. As a result, the following hypothesis is derived:

$H2_c$: Sequence pattern 3 has a positive effect on a firm's financial performance.

3.3.4 Sequence Pattern 4:

Under ROR, firms that heavily acquire may be subjected to low-performing businesses which have to be divested due to organizational misfits. With the decrease in acquisition confidence and ongoing divestments, it could be argued that those firms have problems acquiring businesses that perform well in the long run. As a result, this pattern shows an early acquisition in the beginning which slowly fades out while divestments take place periodically in between. As a result, the following hypothesis is derived:

$H2_d$: Sequence pattern 4 has a negative effect on a firm's financial performance.

3.3.5 Sequence Pattern 5:

Furthermore, under ROR it can be argued that those firms acquire fitting businesses first and follow up once their decision has proven to be correct. After several acquisitions have been conducted, few businesses are divested as they prove to be unsustainable in the long run. Therefore, firms have the possibility to have strong acquisition activity in the beginning, followed by smaller acquisition peaks that eventually fade out and few divestments between acquisitions. As a result, the following hypothesis is derived:

$H2_e$: Sequence pattern 5 has a positive effect on a firm's financial performance.

3.3.6 Sequence Pattern 6:

Under ROR, those firms may strategize to heavily invest to gain a competitive edge by absorbing many potential businesses. Eventually, some businesses turn out to be underperformers which put pressure on the organization and are, therefore, eventually divested. In this sequence pattern, firms follow a slowly fading wave-like pattern of acquisitions followed by late divestment activities. As a result, the following hypothesis is derived:

$H2_f$: Sequence pattern 6 has a negative effect on a firm's financial performance.

3.3.7 Sequence Pattern 7:

Lastly, firms can initiate heavy divestments early on accompanied by heavy acquisitions which decrease over time. ROR would argue to discard the worst-performing businesses first which then generate financial capacities that can be used to acquire businesses suiting the organization's scope until their full capacity is reached. Resulting, the following hypothesis is derived:

$H2_g$: Sequence pattern 7 has a positive effect on a firm's financial performance.

3.4 ROR and Financial Slack

Financial slack, defined as a surplus of a financial resource in excess of the necessary amount needed to sustain the business (Carnes et al., 2019), manifests itself as a relevant variable since it influences the freedom an organization has with regard to divestment and acquisition decisions. The existing literature established that the amount of financial slack is determinative of the strategic decisions of an organization (Combs and Ketchen, 1999). Originally, Bourgeois (1981) established in his paper several ways to measure organizational slack. While the author makes no distinction between organizational and financial slack, the operationalizations, however, are predominantly based on financial measures. This work is considered the seminal work on how to operationalize financial slack and is since used to operationalize financial slack in more recent work (Bentley and Kehoe, 2020; Duque-Grisales and Aguilera-Caracuel, 2021; Guo et al., 2020; Xiao et al., 2021; Xu and Hitt, 2020; Yang et al., 2021; Zhang et al., 2021). Generally, research argues that financial slack possibly acts as a buffer, allowing firms to respond to portfolio restructuring either through resource-consuming or resource-freeing activities (Kuusela et al., 2017).

3.4.1 Financial Slack, Acquisitions, and Divestments

Improved financial slack can provide the firm with sufficient resources to engage in increased acquisition behavior since one of the most dominant payment methods for acquisitions

is cash (Zhu et al., 2015). However, following the ROR argument, an increase in financial slack can lead firms to make worse investment and divestment decisions. For instance, improved financial slack can, due to bounded rational decision making (Posen et al., 2018), lead to wrong decisions. Particularly in the case of high levels of financial slack, less thought-out acquisition decisions could be made, eventually leading to decreased performance outcomes.

Investigating the literature regarding financial slack and acquisitions, previous research shows that firms with more financial slack engage in more aggressive acquisition behavior (Alessandri et al., 2014; Harford, 1999; Iyer and Miller, 2008; Marchica and Mura, 2010; Yang et al., 2019). Daly et al. (2004) show that financial slack may directly influence the acquirer's performance since it reduces the need for debt financing which is inherently more costly. Hitt et al. (1993) explain that an increased amount of financial slack makes it easier to access debt financing as well as making it less costly, resulting in decreased acquisition expenditures through debt which translates into a healthier balance sheet. However, regarding post-acquisition performance, the research is more ambiguous. Jensen (1986) states that firms with increased financial slack occasionally invest in unprofitable projects. This translates into, as the author suggests, that firms with increased financial slack are more likely to engage in value-destroying or low-benefit acquisitions. Consistent with this argument, research argues that firms with greater financial slack make worse acquisition decisions (Devos et al., 2009; Yaghoubi et al., 2016). Vice versa, decreased financial slack thus shows a reduction in the likelihood to invest in unprofitable acquisitions since the management is monitored more closely and has less available cash to spend on new ventures (Lang et al., 1991; Maloney et al., 1990). Additionally, research established that an increased number of financial resources allows firms to maintain several coexisting, even if not perfectly maximizing, projects and allows for the maintenance of low-performing projects (Bourgeois, 1981; Cheng and Kesner, 1997; Cyert and March, 1963). On the other hand, Gao and Mohamed (2018) show that cash-rich firms show better acquisition and performance outcomes than cash-poor organizations. Overall, the research seems to generally point in the direction that increased financial slack is associated with decreased acquisition performance, however, some evidence suggests the contrary. Adhering to the majority of research our reasoning builds upon the indication that greater financial slack decreases acquisition performance. More specifically, previous authors investigate the effect linearly, suggesting that increases in financial slack linearly influence the number of acquisitions that are undertaken (Devos et al., 2009; Gao and Mohamed, 2018; Harford, 1999; Lang et al., 1991).

Concerning divestment decisions, the literature states that improved financial slack acts as a buffer and allows firms to defer or temporarily stall divestment decisions (Damaraju et al., 2015; Kuusela et al., 2017). Evidence suggests that the early divestment of business units with uncertain future value can result in the loss of access to tangible and intangible assets

which may have been valuable to the firm (Dixit and Pindyck, 1995) and may be impossible to recoup after the sale (Dierickx and Cool, 1989). Furthermore, access to critically valuable information may be lost while competitors may seize access to this very information (Kester, 1984; Smith and Ankum, 1993). Therefore, ROR argues that under uncertainty, flexibility concerning the divestment of owned options is required to identify their future value and importance (Belderbos and Zou, 2009; Damaraju et al., 2015; Kogut, 1991).

While the evidence on divestments is not well-established (Silva and Moreira, 2019), the limited research on financial slack and divestments supports the theoretical argumentation of ROR and establishes that increased financial slack diminishes the need to react to performance shortfalls. Consequentially, a firm is not forced to immediately respond by divesting and freeing up resources that are employed in more profitable areas (Belderbos and Zou, 2009; Cheng and Kesner, 1997; Kuusela et al., 2017). Furthermore, the effect of stalling divestment decisions and holding on to unprofitable businesses is strengthened since managers often find themselves reluctant to sell business units due to overcommitment or potential reputational loss accompanying the sell-off (Hayward and Shimizu, 2006; Kuusela et al., 2017; Ross and Staw, 1986; Shimizu, 2007). Prior research suggests that decision-makers have difficulties deciding upon the most beneficial decision from a given set of identified options due to their bounded rationality (Cyert and March, 1963; March and Simon, 1958; Posen et al., 2018). In other words, divestment considerations are commonly subjected to incomplete information as decision-makers can neither gather nor compute all existing information (Conlisk, 1996; March, 1978). Therefore, managers can experience pressures of making false decisions and, hence, succumb to the 'status quo' bias, explaining that individuals are more inclined to stick to the current state of certainty rather than changing the current situation with the possibility of further negative repercussions (Samuelson and Zeckhauser, 1988). Since financial slack gives increased leeway to postpone crucial divestment decisions (Belderbos and Zou, 2009; Cheng and Kesner, 1997; Kuusela et al.,2017), the negative effect on financial performance is hypothesized to worsen when the financial slack of an organization increases. Based on the elaborations in the previous paragraphs, the following hypothesis is derived:

> *H3: A high amount of financial slack will have a negatively moderating effect on sequence patterns.*

3.5 ROR and Extra-Entrainment

When an organization is making strategic adjustments to its current portfolio, it is reasonable to expect that the organization will not perform those considerations in a vacuum. Rather, the organization will orient and compare its decisions with those made by its industry competitors (Shi and Prescott, 2012). According to Fine (1998), this alignment is particularly im-

portant for those companies operating in industries with temporary short-term competitive advantages, such as the high-tech industry. In the field of biological sciences, this concept is referred to as "entrainment", explaining that a large share of cycles is aligned to 24-hour periods (Ancona and Chong, 1992). For example, humans follow the circadian rhythm which explains the alignment of the individual's sleep-wake cycle to the night-day cycle of the earth. With the alignment of both processes, the human body is able to operate more effectively and achieve higher performance as the coordination and synchronization activities allow bodily processes to occur at the intended times (Ashoff, 1979). Transferring the logic of entrainment into the organizational field, it can be argued that synchronizing a firm's nested activities with the activities of the corresponding industry will result in improved organizational performance outcomes. In the organizational context, Pérez-Nordtvedt et al. (2008, p. 5) define entrainment as "a form of organizational adaptation, which involves repetitive adjustments to ongoing, endogenous environmental cycles over a period of time". This is supported by a study from Khavul et al. (2010) who show that the synchronization of activities of international ventures and their most relevant customer, performance metrics improved significantly. Similarly, Jansen and Kristof-Brown (2005) explain that the entrainment with competitors' behavior fosters the feeling of organizational self-assurance since they conform to established 'social norms' that are established within an industry. Based on this theoretical underpinning, Shi and Prescott (2012) developed the entrainment model which presents a theoretical explanation for why firms should aim to temporally align their actions internally as well as externally. Resulting, entrainment can be distinguished into two components, namely, intra-entrainment and extra-entrainment.

Intra-entrainment refers to the internal coordination of two cyclical firm activities while extra-entrainment focuses on the external synchronization of activities (Shi and Prescott, 2012). In this research, intra-entrainment is captured through the sequence patterns as these depict different forms of aligning portfolio scoping activities of acquisitions and divestments. Therefore, a firm already internally coordinates its decisions regarding acquisitions and divestments and is, hence, aligned with the organization's internal needs and circumstances at any given time. As a result, the effect of intra-entrainment is already captured by the firm-specific temporal sequences established for each firm to answer previously established hypotheses.

Extra-entrainment, on the other hand, displays itself as a variable of interest for this research which has not been subject of investigation thus far. Extra-entrainment is defined as "the synchronization of a focal firm's rhythm with a pacer in its external environment, e.g., competitors' actions" (Shi and Prescott, 2012, p. 1288). More specifically, in this research context, the referred to 'competitors' actions' are the decisions made by competing organizations with regard to acquisitions and divestments over time. The reason to include

this variable as an additional independent measure is that Pettus et al. (2018) elaborate that the literature uses the competitive environment mainly as a control variable and shows little concern for it to be a critical determinant for firm performance. Secondly, this external rhythm compatibility could potentially result in firms being able to better control their environment and improve the accuracy of predicting future industry movements (Shi and Prescott, 2012).

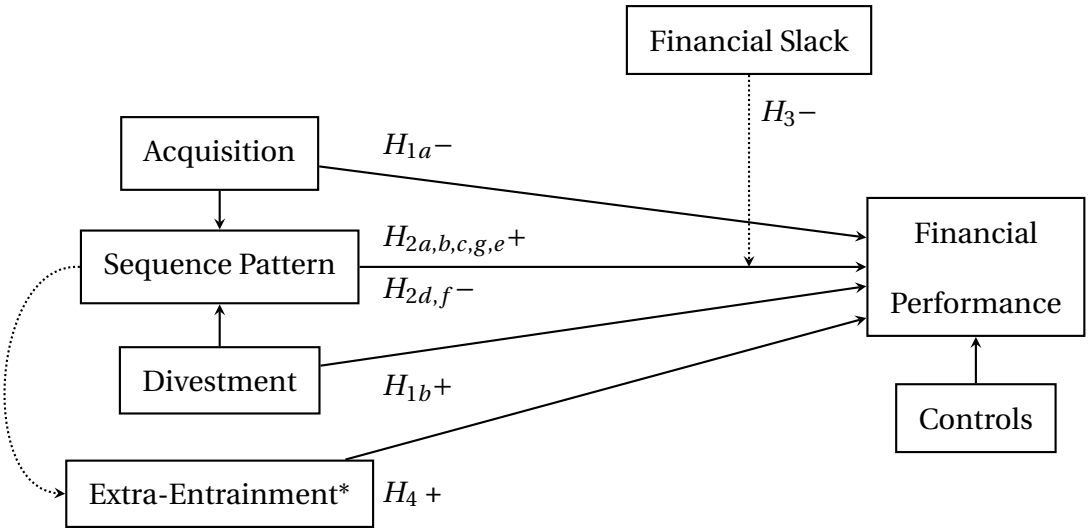
Investigating the existing body of literature, it becomes evident that this phenomenon is not studied in much detail. Pérez-Nordtvedt (2008) established that firms that do not synchronize their actions with the environment will experience decreased performance compared to those that act in a synchronized manner. Subsequently, a study by Shi and Prescott (2012) took a look at alliance and acquisition rhythms and found that when a firm's alliance rhythm is aligned with that of its industry competitors the firms show improved financial performance. More peripherally, Moore (1963) shows that the synchronization of activities leads to a 'satisfying' effect for organizations since the coordinated pattern reduces the feeling of uncertainty. This reduction in uncertainty can be explained by prior evidence suggesting that individual firms follow those firms that are believed to hold superior information (Lieberman and Asaba, 2006). Moreover, the entrainment effect specifically considering the divestment and acquisition decisions is thus far not part of scientific investigations. Resulting, the current literature is limited and further investigation of this phenomenon is required.

As the literature that investigates the entrainment perspective through the incorporation of acquisition and divestment activities has yet to be established, this research will follow up on Shi and Prescott's (2012) investigation and lead the direction of this unstudied field. The inclusion of divestments and acquisitions into the entrainment perspective is of particular interest since the advantages of a cyclical alignment with the industry's movement instead of following a static evenly paced cycle are manyfold. According to Shi and Prescott (2012), evenly paced cycles lead to a ritualization of acquisition behavior where decision-makers frame those activities in a symbolic rather than a functional way which may compromise the actual purpose of acquisitions and the improvement of current operations. Moreover, Geibler (2002) shows that the linear allocation of resources may suppress resource allocation in creative ways which require flexibility and freedom (March, 1991). Lastly, Prescott and Miller (2001) establish that an evenly paced cycle of acquisitions deprives the organization of surprise activities that may stir up competitors' behaviors. As a result, the elaborated literature and the above-mentioned disadvantages show that the firm's adjustment toward a cyclic acquisition and divestment pattern aligned with the acquisition and divestment pattern of the firm's corresponding industrial context provides a tool to remain competitive in the firm's corresponding industry and, hence, may result in improved financial performance.

Under ROR the theoretical argument describes that decision-makers not only internally derive the acquisition and divestment sequences but additionally investigate the external context to make adequate decisions. As a result, firms are on the lookout for their competitors' actions and respond accordingly. In the context of this research, this concerns the actions of competitors regarding acquisition and divestment activities. As a result, a firm will investigate others' 'formulas of success' and imitate those organizations that show superior performance. As previously elaborated, some research indicates that adhering to the movements of the environmental context results in improved performance compared to solely following your own initiatives (Pérez-Nordtvedt et al., 2008; Shi and Prescott, 2012). Concerning the verbal theorizing of managers regarding which actions work and which may not, it can be argued that generally speaking, the industry average acts 'rationally' with the underlying objective to decrease the likelihood of performance shortfalls and increase the possibility of increased performance. This means that the industry, on average, moves in the direction to eliminate insufficiencies and underperformances while leveraging successful methods of achieving superior performance. Under ROR, we would thus expect that adhering to the industry average sequence pattern of acquisitions and divestments will result in improved financial performance. Therefore, extra-entrainment will be utilized as a second independent variable. Naturally, this variable is linked to the temporal sequences, as shown in the conceptual model below, as the average industry sequence, and its pattern is derived from the temporal sequences of all individual firms in the dataset. Hence, the dotted arrow represents that the temporal sequences of acquisitions and divestments of the respective industries are the foundation to compute the extra-entrainment variable. As a result, the following hypothesis has been derived:

> *H4: Firms that adhere to their industry acquisition and divestment sequence will enjoy superior performance compared to those firms that do not adhere to the average industry acquisition and divestment sequence.*

In Figure 3.1, the extended conceptual model is represented, including the expected directional effects of the elaborated hypotheses.



*Note. *derived from the comparison between firm sequence and corresponding industry sequence.*

Figure 3.1: Conceptual Model

4 Methodology

To test the hypotheses, a sample of firms located in the high-tech industry will be utilized. The reason to utilize those firms is that they carry a high propensity to undergo changes and are well-known to pursue changes through acquisitions (Aalbers et al., 2021; McCarthy and Aalbers, 2016) and divestments (Brauer, 2006; Dranikoff et al., 2002) to improve financial performance outcomes. As a result, the fast-paced, dynamic, and uncertain characteristics of those industries result in voluminous acquisition and divestment data which allows for the adequate construction of temporal sequence patterns and results in a satisfactory sample to study this phenomenon.

4.1 Sampling and Data Collection

The data for the sample is created according to the following process.

Firstly, the data on acquisition and divestment activities are collected from the Thomson Reuters SDC Platinum database. The SDC Mergers Acquisitions data set will be filtered by the time span between January 2000 and December 2020, including a deal value of $1 million. Taking previous research from Ikenberry et al. (1995) as guidance, further selection criteria include the exclusion of self-tenders, recapitalizations, minority stakes (acquisitions with shares less than 50.1%), as well as acquisitions with the objective to increase an existing majority stake (for example, from 90% - 100%). Following previous research by Cloodt et al. (2006) and McCarthy and Aalbers (2016), the high-tech industries are defined as the electronics and communications (Standard Industrial Classifications (SIC) code 36) as well as the aerospace + defense (SIC-codes 372+376) industries. To collect a firm ISIN as a common identifier for subsequent data merging, the ultimate parent was selected in both cases to obtain relevant financial data[1]. This results in a data set of 3938 acquisitions. With regards to the divestment data, the same criteria as for acquisitions have been applied. Additionally, a divestiture flag has been added to identify acquisitions from the divestment side. This results in a data set of 551 divestments.

[1]For both acquisition and divestment data sets, the observed overlap between the immediate parent and the ultimate parent is 99,972881% for the acquisitions and 99,084097% for the divestment data. As previous research provides no further specification to which should be preferred (Kuusela et al., 2017), the ultimate parent is chosen to collect further data as more data is accessible.

Additionally, data from COMPUSTAT was gathered to create the baseline data set including those firms that did not conduct any acquisition or divestment activities over the time span of interest. This data will, after the successful merging with the acquisition and divestment data set, aid to establish the baseline sequence pattern. Those firms included in the baseline sequence pattern are those firms that have not engaged in any acquisition or divestment activities over the time span of interest. Hence, the sequence will be an 'empty' sequence with no visible activity in either domain. This approach is chosen based on research by Shi and Prescott (2011) to ensure that, after performing the regression analysis, all other established sequence patterns can later be compared against a 'meaningful' zero point. Resulting, the COMPUSTAT dataset entails 3916 unique observations that do not show any acquisition or divestment activities.

Lastly, the financial data is collected via Thomson Reuter's Datastream. The data is collected for the time between 1997 and 2021 and is used to construct the dependent, moderator, and control variables for each observation, respectively. All data has been converted into US$ to ensure that a unified currency is used to adequately represent the estimation coefficients. For this research, the following DATASTREAM variables have been used: Total assets (WC02999), return on assets (WC08326), RD Expenditures (WC01201), employees (WC07011), total debt (WC03255), and total shareholder's equity (WC03995).

In the final step, all the above-described data sets are merged into the final panel data set which is used for further variable construction and for the quantitative analyses.

4.2 Measurements

4.2.1 Dependent Variable

For the dependent variable, the one-year lag of return on assets (ROA) will be used. This variable is chosen for two reasons. Firstly, ROA displays the maximum available data points for each firm, making it the measure that includes most firms in the final analyses. Secondly, ROA is considered the most commonly used variable to measure financial performance in management research. King et al. (2004) suggest in their meta-analysis that ROA has been used frequently to evaluate post-acquisition performance. Their consensus of the investigated research suggests that time lags of one to three years should be built-in to capture the effects of the decision and to establish causal inference. Hence, the variables used for robustness test will be time-lagged by two years. The operationalization of ROA is as follows:

$$\text{ROA}_{i,t-1} = \frac{\text{Net Income}_{i,t-1}}{\text{Total Assets}_{i,t-1}}$$

The variable is directly drawn from the COMPUSTAT database and subsequently standardized to account for factors outside of the analysis such as, for instance, the financial crisis. Furthermore, outliers with values ≤ 20 have been discarded to ensure a normal distribution of the variable. This procedure subtracted four observations from the data set used for the final analysis.

4.2.1.1 Acquisitions.

Acquisitions are defined as activities where a company conducts the "purchase of stock in an already existing company in an amount sufficient to confer control" (Kogut and Singh, 1988, p. 412). Accordingly, this variable is constructed by creating a dummy variable represented by a 1 indicating that a firm has conducted one or several acquisitions in a given year and 0 otherwise.

4.2.1.2 Divestments.

Divestments, on the other hand, are defined as "a firm's adjustments of its ownership and business portfolio structure via spin-off, equity carve-out, split-up, or unit sell-off" (Brauer, 2006, p. 751). Similar to the acquisitions, a dummy variable has been constructed. The number 1 indicates that a firm has engaged in one or more divestments while a 0 represents that a firm has not performed any divestment activities.

4.2.1.3 Cluster Sequences.

The first independent variable comprises the clustered temporal sequences of acquisitions and divestments. Following the approach by Shi and Prescott (2011), those firm-specific sequences are derived and established from the data and subsequently inductively aggregated into sequence patterns, which represent clusters of firm-specific sequences that share equal or similar divestment and acquisition patterns over time. The variable is constructed by the method described in the following section.

4.2.1.3.1 Clustering Method. The independent variable will be constructed akin to a procedure previously used by Shi and Prescott (2011). Firstly, firm-specific sequence patterns including all divestment and acquisition activity of that particular organization will be generated according to the outline represented in Table 4.1 below.

Example Sequence Data

Activity - Year Combination	A00	D00	A01	D01	...	A19	D19	A20	D20
Firm A	1	0	0	2	...	0	1	0	3
Firm B	0	0	0	0	...	2	0	1	1

Note. Example of how to read the table:
Firm A conducted 1 acquisition in the year 2000, 2 divestments in the year 2001, 1 divestment in the year 2019, and 3 divestments in the year 2020.
Firm B conducted 2 acquisitions in the year 2019, and 1 acquisition and 1 divestment in the year 2020.

Table 4.1: Example Sequence Data for Acquisitions and Divestments

While Shi and Precott (2011) originally differentiate the clusters by activities, hence, establishing separate sequences for acquisition and divestment activities, it can be argued that in the context of this research it is more appropriate to combine both activities into one cluster. The justification for this decision is based on the research's fundamental argument that acquisition and divestment activities are intertwined activities (Mellewigt et al., 2017; Shi and Prescott, 2011; Wang and Zajac, 2007) which are to be considered jointly instead of separately. Secondly, the differentiation of those activities for each individual firm may lead to biased sequence patterns since one firm may be represented in, for instance, cluster 1 for their acquisition and divestment activities while simultaneously being placed in cluster 2 for their divestment activities. Hence, the firm may be part of two distinct clusters for each corresponding activity which would mismatch the methodological approach and the theoretical considerations of this research. As a result, this research combines both acquisitions and divestments in a single sequence to investigate the combined effect of both activities. Based on the input of the sequence data, a distance matrix is calculated employing the "euclidean" distance method[2], aiming to measure the dissimilarity between pairs of sequences. Following, this distance matrix serves as an input to compute the clusters via the agglomerative clustering method "ward"[3]. This clustering method initially regards each firm-specific sequence as a stand-alone cluster which is merged in subsequent steps into larger clusters in a bottom-up manner. This means, that each sequence is further aggregated into higher-order clusters until the desired number of clusters is reached. The clustering procedure is done

[2]While this method is being used for the final calculations, all other available options to calculate the distance matrix ("Maximum", "Manhattan", "Canberra", "Binary" and "Minkowski") have been investigated to ensure that the most accurate procedure is used given the nature and characteristics of the data set and the aim of the following analyses.

[3]The clustering method shows an agglomerative coefficient of 0.9802357. According to Kaufman and Rousseeuw (2009), this coefficient ranges between 0 and 1 and shows the strength of a clustering structure. The closer the value to 1, the stronger the clustering structure is and, hence, displays a favorable structure to perform a cluster analysis. As part of further investigations, all other available algorithmic methods to calculate the clusters have been explored. The model with the highest agglomerative coefficient has been chosen to establish the final distance matrix. Similar to Shi and Prescott (2011), the same procedure is used to obtain the final sequences.

by minimizing the within-cluster variance by which in each step those clusters showing the smallest between-cluster distance are merged. The result represented in Figure 4.1 shows 7 predetermined clusters[4] which serve as the input for the regression analysis as the independent variable. *Cluster 0* represents the reference cluster with no acquisition and divestment activity. Clusters 1 to 7 show different patterns of both acquisitions and divestments based on the outcomes of the clustering method. The blue line represents the acquisition activities while the red line shows all divestment activities. Taking, for instance, *Cluster 1*, it can be seen that initially, the acquisitions make up the largest share of all activity, slowly tapering down and aligning with the divestment activities. *Cluster 2*, in comparison, shows constant ongoing acquisition and divestment activities while acquisitions are more numerous than divestments. Eventually, both activities slow down significantly. *Cluster 3* shows little to no divestment activity and little acquisition activity which eventually builds up to a single acquisition peak, quickly tapering off to previous levels of activity. *Cluster 4* represents again little divestment activity spread in intervals over the time period. The acquisition activity, on the other hand, starts out high and slowly approaches the level of divestment activities. Similar to cluster 1, *Cluster 5* shows initially high acquisition activity followed by a decrease in activity over time. Distinct from cluster 1 are however the more pronounced smaller jumps in reoccurring acquisition activity. *Cluster 6* represents interval-like acquisition behavior with no divestment activity in the beginning. Eventually, the acquisitions slow down while divestments start to take off slightly, remaining however lower than the acquisition activity. Finally, *Cluster 7* shows two divestment peaks at the beginning of the sequence, followed by no activity in between those peaks. The acquisition activity starts out strong, however, tapers down over time, resulting in periodical and similar acquisition behavior.

[4]The choice to predetermine the number of clusters is based on the function of the underlying algorithm which requires to set a specific number of clusters. Whilst a smaller number of clusters results in the observational expansion of one specific cluster while all others remain mostly unchanged, the calculations of the algorithm are deemed to be the status quo for this research and no further adjustments took place.

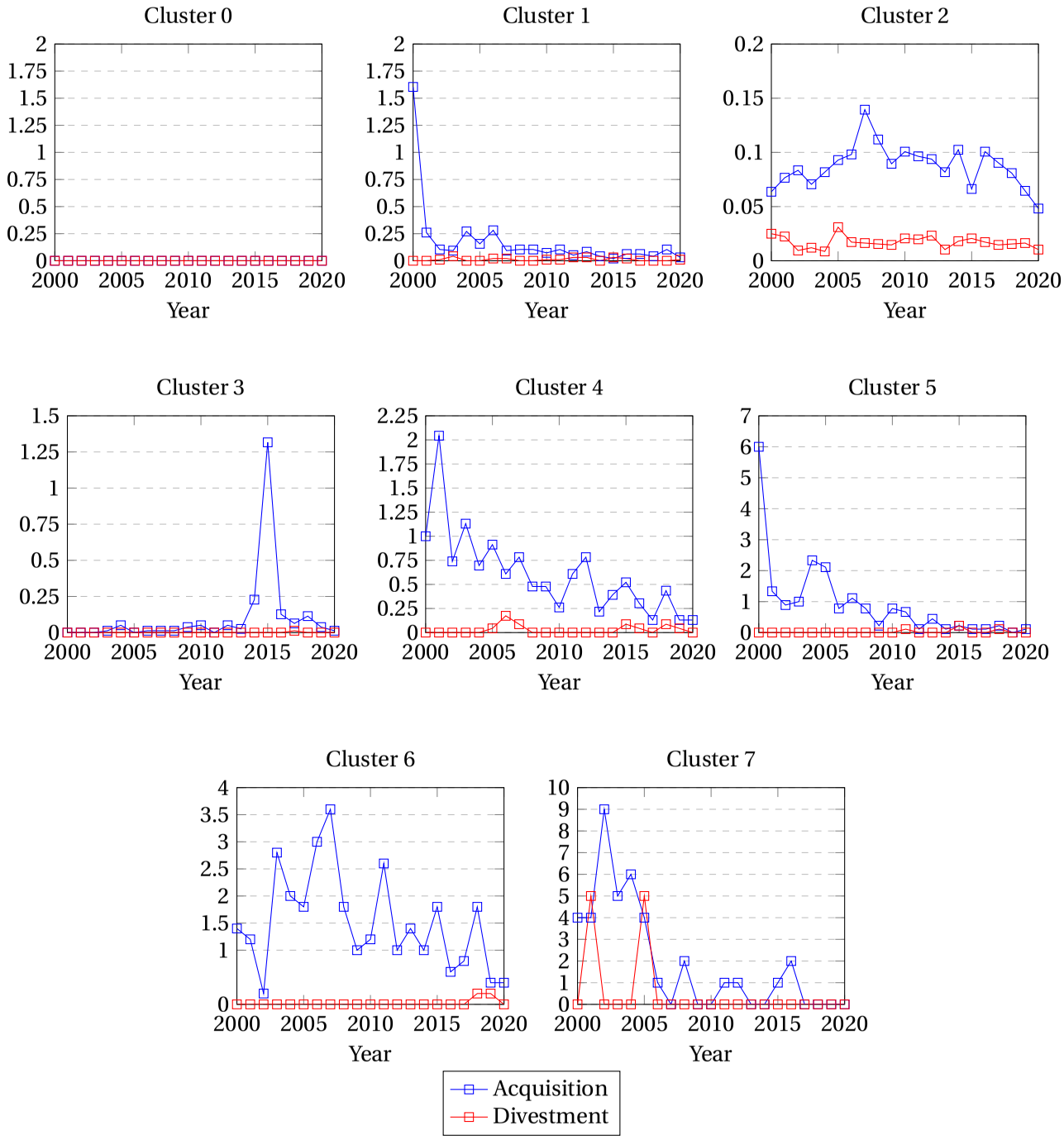


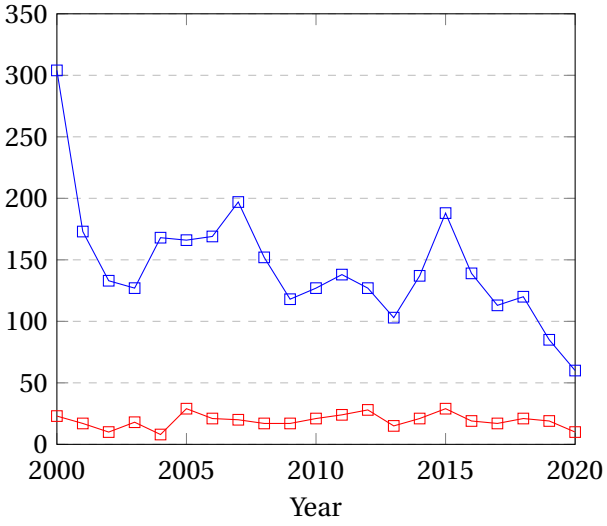
Figure 4.1: Taxonomy of Acquisition and Divestment Sequences

4.2.1.4 Extra-Entrainment

The second independent variable *extra-entrainment* represents the similarity between the firm-specific and the industry-wide sequence pattern. While Shi and Prescott (2012) approach this variable by using a polynomial regression nested in a hierarchical linear model, this approach is not feasible in this research due to time constraints. As a result, a different procedure is pursued, explained in the following two-step procedure.

Firstly, the average sequence of the firms operating in the same industry. This is accomplished by establishing a dummy variable for each corresponding industry and collapsing their aggregate acquisition and divestment activity for each year. The result is the 'average indsutry sequence' for each corresponding industry. Those sequences are displayed in Figure 4.2. Following, the sequences obtained from Figure 4.2 will be visually compared to the previously established sequences displayed in Figure 4.1 to investigate whether there is an appropriately matching cluster for the industry sequence and if so which cluster would be most akin to the sequence clusters. After a visual inspection, the industry sequence pattern 1 matches best with the cluster 4 established in Figure 4.1. The second industry sequence pattern seems to align best with sequence pattern 2 from Figure 4.1. To establish the extra-entrainment variable, a dummy variable is created stating that if the firm is entrained with the industry sequence, it is represented by a 1 and 0 otherwise. The variable is constructed based on the match between the industry sequence and the firm-specific cluster sequence. If the firm's sequence is aligned with the industry sequence, it will obtain the value 1 and 0 otherwise. This variable is used to investigate the importance of extra-entrainment in the final analysis.

Cluster Industry 1: Electronics and Communication (SIC 36)



Cluster Industry 2: Aerospace and Defense (SIC 372/376)

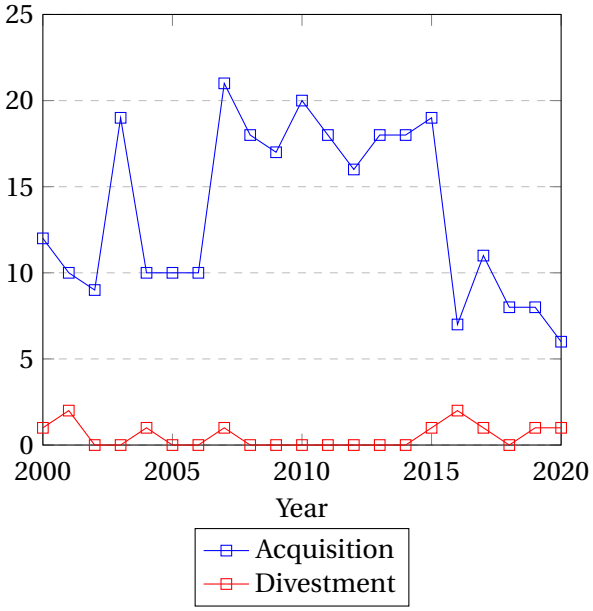


Figure 4.2: Taxonomy of Acquisition and Divestment Sequences (by Industry)

4.2.2 Moderator Variable

The utilized moderator variable will be the *financial slack* of an organization. This variable is measured via the debt-to-equity ratio as it is the most commonly used operationalization for this variable (Bourgeois, 1981; Bradley et al., 2011; Bromiley, 1991; Haleblian and Finkelstein, 1999; Haunschild, 1993, March and Shapira, 1987; Vanacker et al., 2017). As such, a low debt to equity ratio indicates that a firm has more available free cash flow (Haunschild, 1993). Vice versa, an increase in the debt to equity ratio indicates a decrease in freely available funds. This variable is constructed based on the financial data collected from COMPUSTAT.

4.2.3 Control Variables

As for control variables, a selection of additional influential variables will be included.

Firstly, *firm size* will be utilized as a control variable since previous research concluded that a firm's size will influence the performance of a firm (Santoro and McGill, 2005; Skaggs and Youndt, 2004). This variable will be operationalized with the natural logarithm of the number of employees (Damanpour, 2010; Dang and Yang, 2018; Doğan, 2013; Hopkins, 1988; Leal-Rodriguez et al., 2015; Niresh and Thirunavukkarasu, 2014; Speckbacher and Wentges, 2012). To account for time effects, the control variables for all years contained in the dataset are implemented using year dummies. Furthermore, to control for the *internal development of the firm* (Nicholls-Nixon et al., 2003), the firm's research and development (RD) intensity will be measured by dividing the RD expenditures by the total assets (Kang and Kim, 2020). *Relatedness*, a common measure for acquisition risk (Rumelt, 1982), is controlled for through two different variables. Firstly, the acquisition relatedness, measuring how many acquisitions of a firm were performed within the same SIC codes. Similarly, the divestment relatedness measures how many divestments were performed within the same SIC code. The variables are operationalized by following the procedure of Aalbers et al. (2021), taking the three-digit SIC codes for the acquisition and divestment relatedness to estimate the percentage of related activities in form of a ratio between 0 and 1. For both variables, a value of 1 indicates perfect relatedness, meaning that all activity took place in the same industry while a value of 0 indicates perfect unrelatedness, meaning, that all activity took place in different industries. The reason to include them as control variables and not as a second and third moderator variable is that the research investigating relatedness revolves around event studies (Aalbers, 2021; Kang and Kim, 2020; Kavuşan et al., 2020; Kotha et al., 2018, Schijven and Hitt, 2012). As opposed to event studies that investigate acquisitions as stand-alone activities and hence investigate deal-level acquisitions, this research focuses on firm-level sequences which are comprised of several acquisitions and divestments. Therefore, it is sufficient to include this variable as a control since it is not directly related to the aim and scope of this research. Furthermore, the *acquisition and divestment experience* will influence the future

success of a firm's activities. This is due to the accumulation of knowledge from conducting acquisitions or divestments which eventually translates into better decisions with regard to future activities. While this effect has been particularly investigated for acquisitions (Haleblian and Finkelstein, 1999; Laamanen and Keil, 2008; Zollo and Singh, 2004), similar conclusions for the same reasons can be drawn for the divestment activities. Prior divestment experience allows organizations over time to better identify those businesses that are currently overvalued in the acquisition market. If realized correctly, divesting businesses can hence lead to an improvement in financial performance. Due to the learning effects of acquisitions and divestments respectively taking place over time, the acquired knowledge of previous acquisition and divestment activities can result in an improvement in financial performance. To account for these effects, this dimension is calculated following the approach by Laamanen and Keil (2008). Firstly, the rolling cumulative number of a firm's acquisition and divestment activity over the entire time span is calculated. Following, the result will be divided by the activity of each firm divided by its total activity per year. The reason to calculate the acquisition activities over the entire time span instead of clustering them into smaller and equally sized acquisition and divestment windows is that the data prohibits the proper calculation of smaller windows since few acquisition or divestment activities are taking place in subsequent years. Therefore, the decision to view the entire time span as a single time window is appropriate. Lastly, the control variable *geographical relatedness*, representing an international vs. domestic deal, is incorporated into the estimation. According to some research, geography is known to influence acquisitions (Böckerman and Lehto, 2006; Chakrabarti and Mitchell, 2015; Ellwanger and Boschma, 2013). The literature suggests that geography poses hurdles to efficiently capitalize on the benefits of acquisitions. Research by Ellwanger and Boschma (2013) has shown that geographical proximity is a driver for domestic acquisitions as many organizations take out acquisitions in geographical proximity. Secondly, Chakrabarti and Mitchell (2015) show that the distance between acquirer and target significantly influences the completion of acquisitions. The geographical relatedness is measured in a procedure previously used by McCarthy and Aalbers (2016) and measures the ratio of the yearly active firm's acquisition or divestment activities conducted in the same country over the total firm's acquisition and divestment activities. To calculate this variable, the nation of both parties (active and target firm) serves as the input to calculate the ratio of geographically related vs. unrelated activities. Table 4.2 displays a variable overview aiming to improve understanding for the reader.

Variable Conceptualizations

Variable Function	Variable	Operationalization
Dependent Variable	$\text{ROA}_{i,t}$	$\frac{\text{Net Income}_{i,t}}{\text{Total Assets}_{i,t}}$
Independent Variable	$\text{Temporal Sequence}_{i,t}$	See section "Clustering Method"
	$\text{Extra-Entrainment}_{i,t}$	See Section "Extra-Entrainment"
Moderator Variable	$\text{Financial Slack}_{i,t}$	$\frac{\text{Total Debt}_{i,t}}{\text{Total Shareholders Equity}_{i,t}}$
Control Variable	$\text{Firm Size}_{i,t}$	$ln(\text{number of employees})_{i,t}$
	$\text{R\&D Intensity}_{i,t}$	$\frac{\text{R\&D Expenditure}_{i,t}}{\text{Total Assets}_{i,t}}$
	$\text{Acquisition Experience}_{i,t}$	Cumulative Acquisition $\text{Activity}_{i,t}$
	$\text{Divestment Experience}_{i,t}$	Cumulative Divestment $\text{Activity}_{i,t}$
	Acquisition Industry $\text{Relatedness}_{i,t}$	$\frac{\text{Related Acquisitions}_{i,t}}{\text{Total Acquisitions}_{i,t}}$
	Divestment Industry $\text{Relatedness}_{i,t}$	$\frac{\text{Related Divestments}_{i,t}}{\text{Total Divestments}_{i,t}}$
	$\text{Geographical Relatedness}_{i,t}$	$\frac{\text{Related Activity}_{i,t}}{\text{Total Activity}_{i,t}}$
	Year Dummies	Values of 0 or 1

Table 4.2: Variable Conceptualizations

4.3 Final Sample

After constructing all relevant variables, the years 1997 to 1999 and 2021 are discarded from the dataset. Followingly, all variables with missing ISINs were discarded as those cannot be used to gather financial data for the respective firms[5]. Variables showing missing values underwent the mean imputation procedure to improve the number of observations. Resulting, the final sample contains 5101 firms from all available countries between 2000 and 2020

[5] In total, 62 firms without ISINs had to be discarded. 24 of those were located in the acquisition and divestment data set while 38 were part of the COMPUSTAT data set.

that performed either acquisition or divestment activities, both, or showed no activity at all. Models I to XII include between 51,822 and 51,980 observations, making it a large sample for each corresponding regression model. Approximately 4% of those firms belong to the aerospace and defense industry while the lion's share is part of the electronics and communication industry, representing 96% of the final data set. Investigating the cluster distribution (see Appendix Table A.2), 65% of the firms are located in the reference cluster 0 with no acquisition or divestment activities. Cluster 2 includes 29% of the firms, making it the second-largest cluster. Following, cluster 1 includes approximately 2.5% of the observations, followed by cluster 3 with approximately 2% of all observations. Of those firms partaking in acquisitions or divestments, 92% were unrelated and approximately 2% were related activities. The descriptive statistics for all relevant continuous variables can be investigated in Table 4.3 below.

Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
ROA (lagged)	59402	.006	.107	-10.997	9.574
Firm Size	57200	6.51	1.98	0	14.07
R&D Intensity	53396	.337	18.269	-2.509	3151.1
Acquisition Experience	59402	.581	2.008	0	49
Divestment Experience	59402	.029	.305	0	12
Acquisition Industry Relatedness	59402	0.022	0.145	0	1
Divestment Industry Relatedness	59402	.004	.064	0	1
Geographical Relatedness	59402	.034	.179	0	1
Financial Slack	59310	.393	2.633	-277.333	409.925

Table 4.3: Descriptive Statistics

Table 4.4 below shows the correlation matrix with all relevant variables that could suffer from high correlations. It has to be noted that all dichotomous variables have been excluded from the correlation matrix as their coefficients will not carry any meaningful values that would indicate high correlations. From the table, it can be observed that all coefficients show values of between -0.019 and 0.528. Hair et al. (2019) state that values of > 0.7 indicate high correlations, however, the highest value of 0.528 in the table indicates no existing issues in that regard.

Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) ROA (lagged)	1.000								
(2) Firm Size	0.053	1.000							
(3) F&D Intensity	-0.019	-0.028	1.000						
(4) Acquisition Experience	0.005	0.237	-0.003	1.000					
(5) Divestment Experience	0.002	0.074	-0.001	0.243	1.000				
(6) Acquisition Industry Relatedness	0.003	0.083	-0.002	0.232	0.033	1.000			
(7) Divestment Industry Relatedness	0.001	0.006	-0.001	0.058	0.265	0.016	1.000		
(8) Geographical Relatedness	0.002	0.057	-0.002	0.255	0.128	0.528	0.257	1.000	
(9) Financial Slack	0.001	-0.001	0.002	-0.001	0.001	-0.002	-0.002	-0.002	1.000

Table 4.4: Correlation Matrix

4.4 Estimation

To test the established hypotheses, this research will make use of several OLS regression models with the following model estimation:

$$\begin{aligned} ROA_{i,t-1} = {} & b_0 + b_1 Acquisition_{i,t} + b_2 Divestment_{i,t} + b_3 TemporalSequences_{i,t} \\ & + b_4 TemporalSequences * FinancialSlack_{i,t} + b_5 FinancialSlack_{i,t} \\ & + b_6 Extra-Entrainment_{i,t} + b_7 Controls + \epsilon_{i,t} \end{aligned}$$

The decision to utilize an OLS regression is based on the augmented Dickey-Fuller test (Dickey and Fuller, 1979) indicating that the data is stationary and does not show noticeable trends (p-value < 0.01[6]). As a result, a random- or fixed-effects regression is an inappropriate tool, and therefore, the OLS regression is the chosen method for the analyses. To test the degree of heteroskedasticity, the Breusch-Pagan test will be utilized. In case this assumption is violated, Huber-White standard errors (or robust standard errors) will be applied to the model (White, 1980)[7]. To test for multicollinearity, the variance inflation factor (VIF) has been investigated. As all values for all included variables were below the cutoff value of ≥ 5[8] (Hair et al, 2019), there is no issue with regard to multicollinearity. Lastly, all relationships between the dependent and independent variables are linear[9], hence, fulfilling the last assumption of the analytical procedure.

[6] See Appendix Table A.1.

[7] In all used models, robust standard errors have been applied.

[8] Since some models include interaction terms, high multicollinearity between those variables was expected. As a result, the expectedly higher VIF values for those variables have been excluded from the analysis.

[9] Linear relationships are either given due to the dichotomous nature of the independent variables or investigated via scatter plots.

5 Results

To test the previously established hypotheses, this research made use of multiple ordinary least square (OLS) regression models including robust standard errors. In total, 12 models have been created which are represented in the Tables 5.1, 5.2, and 5.3 below.

5.1 Regression Results and Hypothesis Testing

Investigating the regression Model I, representing the control model without any explanatory variables, it can be observed that the coefficient for firm size is significant with a p-value of < 0.001, indicating that firm size has a significant and positive effect on a firm's performance. Furthermore, acquisition experience shows a significant negative coefficient with p < 0.001, indicating that acquisition experience has a negative effect on financial performance. Furthermore, divestment industry relatedness shows a significant and positive coefficient with p = 0.005.

Model II tests hypothesis $H1_a$ of whether acquisitions are negatively influencing a firm's performance. For this hypothesis, the model indicates an insignificant coefficient with p = 0.19. While the negative coefficient of -0.00396 itself is in line with the proposed hypothesis $H1_a$, it has yet to be rejected in line with statistical procedures (p =0.181). Similarly, Model III tests hypothesis H1b of whether divestments have a positive effect on a firm's performance. This coefficient is positive and significant with a p-value of p = 0.002. Therefore, hypothesis $H1_b$ can be accepted.

Model IV tests the seven sub-hypotheses of H2 of whether certain sequence clusters lead to better or worse financial performance. Excluded is cluster 0 which serves as the reference category including those firms that do not perform any acquisition and divestment activity in the given time period. Hypotheses $H2_a$, $H2_c$, and $H2_g$ are in line with previously hypothesized mechanisms can, therefore, be accepted (p = 0.021, p= 0.037, and p= 0.002, respectively). Hypotheses $H2_b$, $H2_d$, and $H2_e$ are insignificant with p > 0.05 and are, therefore, rejected. Lastly, hypothesis $H2_f$ shows a positive instead of a negative coefficient (p = 0.005) and is, therefore, rejected.

Regression Results (1).

	Model I	Model II	Model III	Model IV
VARIABLES	ROA (lagged)	ROA (lagged)	ROA (lagged)	ROA (lagged)
Constant	-0.00642*	-0.00635*	-0.00644*	-0.00547
	(0.023)	(0.025)	(0.023)	(0.066)
Acquisition		-0.00396		
		(0.188)		
Divestment			0.00194**	
			(0.002)	
Cluster 1				0.00112*
				(0.021)
Cluster 2				0.000927
				(0.055)
Cluster 3				0.000574*
				(0.037)
Cluster 4				0.000880
				(0.202)
Cluster 5				0.00198
				(0.108)
Cluster 6				0.00424**
				(0.005)
Cluster 7				0.0101**
				(0.002)
Firm Size	0.00217***	0.00218***	0.00217***	0.00197***
	(0.000)	(0.000)	(0.000)	(0.000)
R&D Intensity	-0.0000837	-0.0000837	-0.0000837	-0.0000827
	(0.346)	(0.346)	(0.346)	(0.349)
Acquisition Experience	-0.000320***	-0.000265***	-0.000318***	-0.000424***
	(0.000)	(0.000)	(0.000)	(0.000)
Divestment Experience	-0.000109	-0.000195*	-0.000176*	-0.000334**
	(0.154)	(0.038)	(0.039)	(0.009)
Acquisition Industry	0.000235	0.00248	0.000342	0.000200
Relatedness	(0.586)	(0.167)	(0.440)	(0.663)
Divestment Industry	0.00141**	-0.000204	-0.000320	0.00137**
Relatedness	(0.005)	(0.874)	(0.417)	(0.005)
Geographical	0.000547	0.00299	0.000371	0.000141
Relatedness	(0.384)	(0.124)	(0.568)	(0.814)
Year Dummies	YES	YES	YES	YES
N	51980	51980	51980	51827
R^2	0.004	0.004	0.003	0.003
adj. R^2	0.003	0.003	0.003	0.002

p-values in parentheses
* p <0.05, ** p <0.01, *** p <0.001

Table 5.1: Regression Table 1

Following, Model V to Model XI investigate the hypothesis H3 of whether financial slack has a negative moderating effect on the initial sequence cluster – financial performance relationship. In summary, the corresponding models show positively, negatively, or insignificant coefficients. As for the negatively significant coefficients, the Models VII, VIII, and XI show negative coefficients with p values of p = 0.007, p = 0.008, and p < 0.001, respectively. This indicates that financial slack has a positive moderating effect on the initial relationship. For clusters 3 and 7, the effect is strong enough to turn the initially positive into a negative coefficient (p = 0.007, p <0.001, respectively). For cluster 4, the initially insignificant cluster transforms into a negatively significant cluster (p = 0.008). On the other hand, financial slack negatively moderates clusters 5 and 6, transforming the coefficient of cluster 6 from insignificant to positive significant (p = 0.002) and increasing the coefficient of cluster 6 (p = 0.002). Cluster 1 becomes insignificant (p = 0.069) while cluster 2 remains insignificant with p = 0.365. As a result, hypothesis H3 has to be rejected as financial slack shows different directions with the minority of coefficients pointing toward a negative moderation effect of financial slack.

Lastly, Model XII investigates hypothesis H4 of whether those firms that are externally entrained with their corresponding industry sequence will experience superior financial performance effects. However, the model indicates that this effect seems to be reversed as the coefficient for the variable Extra-Entrainment is negative with a p-value of p = 0.011 and is, therefore, statistically significant. As a result, this model outcome is not in line with the outlined argumentation. Therefore, hypothesis H4 has to be rejected.

A robustness test has been performed with $ROA_{i,t-2}$ as the dependent variable. The results are rather consistent as all significant coefficients from the main analyses are approximating the robustness analyses. It has to be mentioned, however, that the robustness test concluded that cluster 2 is positively significant as well. All other effects are comparable to the main analyses. In a second robustness test, all highly skewed variables underwent a logarithmic transformation to normally distribute their data points. The following analysis showed that the transformation did not change the underlying structure of the data in ways that significantly change the results of the analyses. Hence, the reported main analysis includes all variables in their original form.

Regression Results (2).

	Model V	Model VI	Model VII	Model VIII
VARIABLES	ROA (lagged)	ROA (lagged)	ROA (lagged)	ROA (lagged)
Constant	-0.00516	-0.00534	-0.00515	-0.00514
	(0.073)	(0.071)	(0.073)	(0.074)
Cluster 1 * Financial Slack	-0.00105			
	(0.061)			
Cluster 2 * Financial Slack		-0.0000648		
		(0.196)		
Cluster 3 * Financial Slack			-0.00197**	
			(0.007)	
Cluster 4 * Financial Slack				-0.00283**
				(0.008)
Cluster 1	0.000697**			
	(0.009)			
Cluster 2		0.000746		
		(0.086)		
Cluster 3			0.000906**	
			(0.007)	
Cluster 4				0.0000704
				(0.896)
Financial Slack	0.0000264	0.0000456	0.0000266	0.0000262
	(0.424)	(0.348)	(0.422)	(0.428)
Firm Size	0.00197***	0.00197***	0.00198***	0.00198***
	(0.000)	(0.000)	(0.000)	(0.000)
R&D Intensity	-0.0000828	-0.0000827	-0.0000828	-0.0000828
	(0.349)	(0.349)	(0.349)	(0.349)
Acquisition Experience	-0.000300***	-0.000310***	-0.000294***	-0.000280***
	(0.000)	(0.000)	(0.000)	(0.000)
Divestment Experience	-0.0000832	-0.000145	-0.0000923	-0.000102
	(0.263)	(0.143)	(0.206)	(0.177)
Acquisition Industry	0.000288	0.000166	0.000286	0.000291
Relatedness	(0.501)	(0.718)	(0.506)	(0.494)
Divestment Industry	0.00129**	0.00113*	0.00131**	0.00132**
Relatedness	(0.008)	(0.017)	(0.008)	(0.007)
Geographical	0.000394	0.000189	0.000406	0.000390
Relatedness	(0.529)	(0.752)	(0.518)	(0.533)
Year Dummies	YES	YES	YES	YES
N	51822	51822	51822	51822
R^2	0.003	0.003	0.003	0.003
adj. R^2	0.002	0.002	0.002	0.002

p-values in parentheses
* p <0.05, ** p <0.01, *** p <0.001

Table 5.2: Regression Table 2

Regression Results (3).

	Model IX	Model X	Model XI	Model XII
VARIABLES	ROA (lagged)	ROA (lagged)	ROA (lagged)	ROA (lagged)
Constant	-0.00514	-0.00516	-0.00517	-0.00515
	(0.074)	(0.073)	(0.073)	(0.074)
Cluster 5 * Financial Slack	0.00518*			
	(0.014)			
Cluster 6 * Financial Slack		0.00796**		
		(0.002)		
Cluster 7 * Financial Slack			-0.0369***	
			(0.000)	
Extra-Entrainment				-0.00101*
				(0.011)
Cluster 5	-0.00286*			
	(0.046)			
Cluster 6		-0.00266		
		(0.128)		
Cluster 7			0.0252***	
			(0.000)	
Financial Slack	0.0000260	0.0000260	0.0000261	
	(0.430)	(0.431)	(0.429)	
Firm Size	0.00198***	0.00198***	0.00198***	0.00198***
	(0.000)	(0.000)	(0.000)	(0.000)
R&D Intensity	-0.0000828	-0.0000828	-0.0000828	-0.0000828
	(0.349)	(0.349)	(0.349)	(0.349)
Acquisition Experience	-0.000287***	-0.000307***	-0.000306***	-0.000278***
	(0.000)	(0.000)	(0.000)	(0.000)
Divestment Experience	-0.000105	-0.0000712	-0.000288***	-0.000108
	(0.184)	(0.362)	(0.001)	(0.151)
Acquisition Industry	0.000295	0.00310	0.000319	0.000296
Relatedness	(0.491)	(0.473)	(0.457)	(0.489)
Divestment Industry	0.00131**	0.00133**	0.00155**	0.00129**
Relatedness	(0.007)	(0.007)	(0.002)	(0.008)
Geographical	0.000395	0.000377	0.000431	0.000429
Relatedness	(0.528)	(0.547)	(0.494)	(0.497)
Year Dummies	YES	YES	YES	YES
N	51822	51822	51822	51827
R^2	0.003	0.003	0.003	0.003
adj. R^2	0.002	0.002	0.002	0.002

p-values in parentheses
* p <0.05, ** p <0.01, *** p <0.001

Table 5.3: Regression Table 3

6 Discussion and Conclusion

This research aimed to study the relationship between sequence patterns and a firm's financial performance and contributes to the lacking body of research on the joint allocation of resources (Lovallo et al., 2022). To study the phenomenon of the joint activities of acquisitions and divestments, sequence data from firms located in two high-tech industries, namely, 'electronics and communications' and 'aerospace and defense' (SIC codes 36 and 372+ 276) allowed to investigate the structure of sequential decision-making under ROR. The results of the analysis allowed a deeper understanding of ROR and how the different options, namely, defer, invest, and divest, are interrelated and overlap with each other, eventually leading to differences in performance outcomes with regard to the respective hypotheses. Furthermore, this research contributed by investigating the importance of acquisition and divestment activities over time under the lens of ROR which has not been studied in detail thus far. The discussion will be represented by showing the most important contributions and explanations in descending order while answering the posed research questions in the respective subchapters.

6.1 How do temporal sequences of acquisitions and divestments affect the financial performance of organizations positioned in high-tech industries?

Lovallo et al. (2022) stated that the joint allocation of resources in acquisition and divestment activities has not been studied thus far, asking for more research in that field. While previous research by Shi and Prescott (2011) performed similar research concerning acquisition and alliance behavior, the present research turned its focus on the asked for acquisition and divestment dimensions. The findings of the present paper attempt to make the first strides into this new field of literature, establishing the first empirical evidence about the sequential acquisition and divestment activities of firms located in the high-tech industry. Resulting, the first theoretical contribution adds insights to the newly emerging discussion on the temporal ordering of acquisition and divestment activities over time. This research branch has been neglected thus far, however, is recognized as an intertwined and important dimension to study the financial success of organizations. Resulting, this research offers the first attempt to investigate this dimension by means of sequence patterns derived from firms' acquisition and divestment activities. The results show that some acquisition and divestment strategies (clusters) outperform others. This means that the more successful strategies are

preferred over those that perform worse, leading to the rejection of the notion that linearly-occurring activities are superior to sequentially changing ones. The sequential approach of ROR allows decision-makers to follow a multistep approach to resource allocation (Klingebiel and Adner, 2015), investigating potential downside risks and profitability prospects (McGrath and Nerkar, 2004). As investment or divestment decisions are made in the context of long-range strategic planning (Driouchi and Bennett, 2012), acquisitions and divestments can hence, be considered linked steps in a sequential process. Part of the sequential process is the interweaving of the three options given under ROR, namely, invest, divest, and defer. With regards to the cluster investigating $H2_a$, companies of that strategy firstly acquire and follow up with periodical divestments. This indicates that this sequencing strategy follows a particular arrangement of options, namely, constantly acquiring while initially deferring divestments which eventually turn into actionable divestment undertakings. Under ROR, this implies that firms would first and continuously acquire those businesses that are thought suitable to the firm's configuration. In subsequent decision-making cycles, those businesses that turn out to be less profitable given the new portfolio will be divested, improving the overall financial performance of the firm by focusing on profitable businesses while discarding the unprofitable ones. Investigating the cluster testing $H2_c$, few acquisitions are taking place over the years, however, one divestment peak is observable in the middle of the sequence while divestments only take place slightly after the peak acquisition. As a result, this strategy follows the options of initially few acquisitions to 'test the waters', eventually leading up to a peak acquisition where it becomes clear what the organization needs to acquire to remain profitable, eventually followed by a later divestment of those businesses that display underperformance. Under ROR, those firms closely investigate the acquisition market with the intent to purchase a business when the right opportunity presents itself. After the acquisition, decision-makers investigate the existing portfolio according to performance metrics and divest those lines that fall short of the new performance baseline. Lastly, $H2_f$ shows a wave-like acquisition pattern throughout the entire time span followed by late divestments. According to ROR, those firms strategize to heavily acquire to absorb as many potentially successful businesses as possible which subsequently are evaluated and discarded if they do not show the promised performance outcomes. Resulting, these three strategies follow an 'early acquisition – late divestment' strategy. Different from the previous successful clusters, the cluster for $H2_g$ is characterized by spiking early divestments with simultaneous peak acquisition activity. Eventually, divestments fall to zero after two divestment spikes while the acquisitions fade out slowly over time. Under ROR, the early divestment eliminates unprofitable businesses while simultaneously providing a firm with additional financial means to conduct its strong acquisition policy. This strategic acquisition maneuver continues in a periodical manner to investigate relevant businesses first, followed by subsequent acquisitions until the capacities of the organization are reached, leaving a firm with profitable businesses that lead to enhanced financial performance.

However, as the decision to invest or divest depends on the bounded rational decisions made by the decision-maker (Kahneman, 2003), not all sequences perform equally well as their coefficients vary. A theoretical explanation could be that the sequences that perform better in direct comparison had better decision-makers in place, hence, steering the organization towards success. Those decision-makers may be characterized by high reasoning skills aligned with organizational demands, leading to better performance in the long run. While CEO characteristics are influencing various performance variables (Devers et al., 2020), this research has not taken those factors into account. Therefore, future research could pick up on those dimensions where this research left off and improve the accuracy and predictive power of the model by including such variables. Furthermore, attention has to be paid to the observational count of the individual cluster sequences. Given the summary statistics displayed in Table A.2, the low number of observations, particularly for clusters 6 and 7, caution is advised with regards to deriving meaningful and representative interpretations from the model results. To alleviate this issue, further research could focus on collecting a larger data set including more divestment data to develop clusters that show a higher observational count.

6.2 How does financial slack moderate the relationship of temporal sequences on the financial performance of organizations positioned in high-tech industries?

The second contribution revolves around the importance of financial slack and its moderating effect on the initial relationship. Here, it can be observed that, given a decrease in financial slack, some sequence patterns should be preferred over others, particularly those that show early acquisition activities followed by late divestment activities. Contrarily, those sequence patterns characterized by no or early divestment activity should be pursued by firms that have more financial capacities as their performance outcomes are improving under this condition. Resulting, the financial performance of a firm given a chosen sequence pattern does depend on the level of financial slack, however, the explanations for the positive or negative outcomes are mixed.

With regards to the negative effect of increased financial slack on financial performance, it can be argued that, under ROR, improved financial slack diminishes the demand to react to performance shortfalls, hence, holding on to unprofitable businesses which eventually dampen the financial success of a firm. Further evidence considering the agency theory suggests that the absence of appropriate monitoring systems leads managers to wastefully allocate excess resources and engage in overinvesting (Jensen and Meckling, 1976). Moreover, Mosakowski (2002) argues that large resource endowments bring core rigidities and reduce the willingness to experiment, resulting in worse financial performance outcomes.

Additionally, some evidence suggests that a higher degree of financial slack allows firms to engage in more aggressive acquisition behavior (Iyer and Miller, 2008; Yang et al., 2019), resulting in an increased likelihood to engage in value-destroying activities (Jensen, 1986). Research by Yaghoubi et al. (2016) investigated this effect and stated that less financial slack leads to improved monitoring activities of the management team. Furthermore, the inhibited capacities restrict the 'reckless' investment into new ventures (Lang et al., 1991; Maloney et al., 1990) and decrease the likelihood to retain unprofitable or low-performing undertakings (Cheng and Kesner, 1997). Moreover, prior research by Kuusela et al. (2017) states that improved financial slack can act as a buffer to defer or stall divestment decisions of poorly performing businesses. Adjacently, high levels of slack could show that organizations did not reemploy their unused resources quickly, therefore, inhibiting the expansion into new businesses or the intensification of resource allocation into already existing businesses (Mishina et al., 2004). Further explanations reach into behavioral realms, stating that incomplete information and limited computational capacities (Conlisk, 1996; March, 1978) and succumbing to heuristics (Samuelson and Zweckhauser, 1988) result in decreased performance outcomes.

With regards to the positive effect of increased financial slack on financial performance, an explanation is that an increase in financial slack gives a firm more autonomy to adapt to necessary changes imposed by the organization's environment (Suzuki, 2019). Furthermore, a possible theoretical explanation could be that the freed-up resources allow organizations to employ more resources for particular, high-value acquisitions which promise great returns. Often, acquisitions pose a significant investment requiring great monetary capacities. If available, firms can partake in high-stake acquisitions and acquire companies that have high growth potential, eventually resulting in improved financial performance (Iyer and Miller, 2008). Furthermore, if more acquisitions can be finalized, a firm has greater possibilities to diversify its portfolio and protect itself in times of economic downturns (Alessandri et al., 2014). Regarding the divestments, it can be argued under ROR that a firm holding on to its monetary capacities has not found suitable businesses to acquire or divest, nor has it found methods to employ its excessive capacities in existing businesses, therefore, deferring any acquisition or divestment activities. As a result, it could be argued that firms experiencing this situation of indecisiveness and, hence, hold on to their current success formula without increasing their business budgets or business scope. This holds particularly for the initially positively significant clusters 3 and 7 which reverse their directional effect, indicating that an increase in financial slack positively influences a firm's financial performance. However, due to the inconsistency in the results, future research could improve upon this research by taking financial slack as a focal point of investigation to establish a clear relationship between the sequence clusters and financial performance metrics. This could be done by developing separate hypotheses under the lens of ROR such that each cluster shows an individual

explanation of the directional outcome.

6.3 How does extra-entrainment affect the financial performance of organizations positioned in high-tech industries?

The third contribution is that this research enters a new strand of research, investigating the entrainment perspective in an organizational context. As such, this research investigated whether following the average industry sequence allows firms who follow a similar pattern will outperform those companies that do not follow this pattern. However, this seems not the be the case; In fact, extra-entrainment seems to be inversely related to the financial performance of a firm. Resulting, firms that do not align their activities with the corresponding industry sequence will outperform those companies that follow that strategy, indicating that pro-cyclical behavior is counterproductive and harm a firm's financial performance.

Explaining this phenomenon is based on theoretical considerations since little research examines the importance of this relationship (Shi and Prescott, 2012). Under ROR, it could be argued that the firm-specific demands are of increased importance in comparison to the industry movements. As such, a firm may be compelled to largely focus on its own scoping needs that suit its particular strategic stance in its current environment. A firm enjoying few financial capacities may not be able to acquire in an industry-specific acquisition wave but rather takes part as the divesting party to sell off businesses at beneficial prices. Contrarily, firms enjoying financial capacities, however, owning few businesses may be inclined to pursue a strong acquisition strategy without partaking in a current divestment wave. This argumentation shows that firms could be more focused on their own internal and external demands and scoping needs such that pro-cyclical industry-wide acquisition and divestment activities are disregarded for the long-term benefit of the organization. Adjacently to the prior point, a further possible explanation for the negative relationship could be that following the industry sequence leads to 'boom-and-bust' cycles comparable to those occurring regularly in, for instance, labor and financial markets (Cooley and Prescott, 1995). In the context of this research, the 'boom-and-bust cycle' analogy can be forwarded to acquisition and divestment 'waves' which take place over longer observed time periods. Arguing based on the general economic 'law' of supply and demand (Gale, 1955), acquiring when others acquire could drive up prices for target businesses, leading to substantial investment costs which suppress the financial performance of a firm. With regards to the divestment side, divesting businesses during a sell-off phase could mean that firms have to sell the possessed business below market value, leading to losses in firm profitability. As a result, it could be beneficial to acquire and divest counter-cyclically, hence, avoiding exaggerated pricing on both ends. Future research could focus on this theorized mechanism and establish further explanations grounded in empirical evidence.

6.4 Further Contributions

Furthermore, previous research showed that divestment activities are understudied in management research (Silva and Moreira, 2019), therefore asking for more attention from the scientific realm. While the previously existing research indicated a positive effect on financial performance (Barkema and Schijven, 2008; Dranikoff et al., 2002; Hillier et al., 2009), the yet limited body on that topic asks for more empirical evidence to allow for causal inference. Next to acquisition activities, this research considers the divestitures of firms as an additional focal point and contributes therefore to the sparse research body on divestitures. This research contributes, therefore, by offering additional empirical evidence to the yet not clearly established effect of whether divestment activities lead to positive financial performance outcomes. Whilst the larger body of research indicated that divestment activities are positively associated with financial performance (Barkema and Schijven, 2008; Dranikoff et al., 2002; Haynes et al., 2002; Moliterno and Wiersema, 2007), some research still suggested otherwise, establishing that divestments harm a firm's financial performance. This research offers empirical evidence that supports the majority of previous research that divestment activities are positively correlated with a firm's financial performance. According to ROR, previous research by Hillier et al. (2009) offers an explanation for this effect and elaborates that after firms decrease their scope, they can increase their focus on the remaining retained businesses, allowing them to allocate more resources towards those activities. As a result, the performance of a firm may increase as a result of an increased focus, helping an organization to concentrate on fewer activities and achieve accelerated excellence which translates into improved financial performance outcomes. Hence, this paper empirically supports the existing literature and ROR as the theoretical lens.

Concerning the practical implications, this research offers some advice for managers who are part of the strategic decision-making process, particularly in managing acquisition and divestment decisions. Firstly, as indicated by the results, it can be seen that certain clusters outperform others. Therefore, managers could focus on mimicking those sequences that show superior performance outcomes, starting with the most feasible option given the constraints of an organization. Furthermore, the research shows that an increased amount of financial slack leads to different performance outcomes, depending on which cluster sequence is adopted. Hence, it could be argued that firms should pick their strategy depending on the level of financial slack present in the organization. This way, firms are able to extract as much as possible from their strategy, leaving it with superior firm performance. Contrarily, if a pursued strategy is predetermined, it would be sensible to limit the monetary access for those sequences that are particularly vulnerable to higher degrees of financial slack. This could be particularly important for budgeting functions that oversee the reallocation of monetary resources throughout the organization.

7 Limitations

As this research is making first strides into a new stream of literature, the limitations accompanying this study are manyfold. Firstly, further characteristics besides the scoping boundaries of each acquisition and divestment deal were not investigated. However, it could be the case that certain sequence patterns are only applicable to certain types of acquisitions and divestments or certain industries. Further research should therefore aim to close those gaps by extending the findings of this investigation. A second limitation pointed out by previous research is that the dates provided in the SDC database are not necessarily reliable, displaying inaccurate values (Anand and Khanna, 2000; McGahan and Villalonga, 2003; Villalonga and McGahan, 2005). This implies that the sequence patterns may have a misleading underlying structure, eventually leading to unreliable results. Further research could however focus on, for instance, constructing and employing deal level data with accurate dates, resulting in a more accurate and different representation of sequence patterns, potentially delivering different results to the analyses. Adjacent to the previous point, the data set contains a limited amount of divestment activity, resulting in an unbalanced data set with disproportionally more acquisitions than divestments. The underlying characteristic of an acquisition-focused data set could skew the results in its favor, which is also observable in the mostly lower divestment activities compared to acquisition activities represented in the clusters in Figure 4.1. Moreover, this research makes use of only 2 high-tech industries. However, there are more industries falling into the high-tech category. Therefore, the generalizability of the results for the high-tech industry as a whole is questionable. Further research could include all respective industries located in the high-tech sector and give more representative results for this particular umbrella industry. Adjacent to the previous limitation, the two investigated industries are not equally represented in the data set, showing approximately a 1:20 ratio favoring the 'electronics and communication' industry. Therefore, the results can only confidently infer interpretations for the previously named industry. To ensure more accurate results for the 'aerospace and defense' industry, a separate analysis without the inclusion of other industries could be conducted. Moreover, for all corresponding models, the adjusted R^2 value lies between 0.002 and 0.003. The rather low values indicate that the model does not provide a large amount of explanatory power and have to be taken with caution. Furthermore, this research employs a static methodological approach, considering each firm to be part of a single cluster at any given point in time. However, a dynamic approach, adding a firm's acquisition and divestment activity after one another and calculating

clusters based on the outcomes per year would be more realistic since the cluster in which that particular firm falls would be calculated based on the cumulative activity over the entire time span. Moreover, the methodological approach inhibits the development of specific cluster sequences. Since the defining characteristics of the clusters are only described after the clusters have been methodologically derived, it is not possible to make assumptions about the underlying characteristics of specific clusters a priori to the sequencing process. As a result, the potential to theoretically unravel factors characterizing specific sequence clusters remains an unresolved procedural issue. Regarding the theoretical explanation of the effect of the moderator variable 'financial slack', it can be argued that the effect of this variable is conditional on the different cluster sequences. As such, financial slack may have a positive effect on one sequence while displaying a negative effect on another cluster. As a result, room to improve on the present research exists by making conditionally dependent moderators for each separate sequence to dissect the effect in more detail, making it a case-specific analysis allowing for more precise interpretations.

8 Research Ethics

This research was conducted with due regard for the ethical principles as described by the APA (Smith, 2003). Since this thesis is of quantitative nature, making use of data from Thomson Reuters SDC Platinum and COMPUSTAT databases raises questions regarding issues revolving around confidentiality, and privacy, but are not of concern. To prohibit any form of deception created by mistreated data it will be stored in raw and processed versions and only transformed with caution and reference when necessary. Additionally, no data was altered or deleted without good reason and corresponding reference. Lastly, signing the research integrity firm acts as a final step to ensure ethical conduct. This code of conduct was monitored closely as the present research is part of ongoing Ph.D. research.

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A Appendix

Augmented Dickey-Fuller Test
Dickey Fuller = -39.967, Lag order =38, p-value = 0.01
Alternative hypothesis: stationary

Table A.1: Augmented Dickey-Fuller Test

Frequency Table - Clusters

Cluster	Freq.	Percent	Cum.
0	34618	65.05	65.05
1	1353	2.54	67.59
2	15461	29.05	96.64
3	1089	2.05	98.69
4	421	0.79	99.48
5	160	0.30	99.78
6	98	0.18	99.96
7	20	0.04	100.00
Total	53220	100.00	

Table A.2: Frequency Table - Clusters