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# Competitive dynamics in the wholesale sector: A qualitative comparative analysis

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## Abstract

Research on competitive dynamics has flourished in recent years. While scholars have been able to paint a fine-grained picture of the variables that impact competitive interactions, the research to date lacks an integration of the different themes that have developed in coexistence. While collecting data in the German wholesale sector, this thesis asks: How can managers prevent the loss of revenue, considering the severity of the attack, the economic situation of the attacker, the service capabilities and relationships with partners, when confronted with an attack?

This study applies two consecutive methods for data collection: First, six interviews with industry experts were conducted. Based on the interviews, a survey was created. By applying qualitative comparative analysis as research method to the research stream of competitive dynamics, this study considered the social science phenomena of equifinality, conjunctural causality, and asymmetric causality.

Contrary to previous findings, the analysis revealed the importance of patience when confronted with a competitive attack. It found that competitive responses have rarely been successful, while the importance of environmental factors was underlined. Furthermore, the relevance of integrating the extended resource based view into the analysis of competitive interactions was shown. Last, the interacting effects of good relationships with customers and suppliers with other factors were found, which either improve the strategic capabilities of a firm to respond to an attack or absorb the negative effect of severe competitive attacks.

The importance of integrating multiple factors from different streams is shown by highlighting interrelated effects. More specifically, the 'good relationships with partners' factor interacts with action and response characteristics, which emphasizes the need for further studies. In addition, the analysis provides contradictory results regarding the effect of competitive activity on a firm's performance.

This thesis recommends managers to resist the temptation to always fight back when they experience a competitive attack. Responses should be carefully considered to avoid escalation. Furthermore, enhancing superior service-levels and good relationships with partners have been shown to be effective safeguards against the negative commercial impacts of competitive actions.

### Keywords

Competitive dynamics, competitive interactions, wholesale sector, qualitative comparative analysis

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## Abbreviation

AMC: Awareness-motivation-capability

CLI: Command line interface

Cs/QCA: Crisp set qualitative comparative analysis

GUI: Graphical user interface

EBIT: Earnings before interest and taxes

Fs/QCA: Fuzzy set qualitative comparative analysis

HHI: Herfindahl-Hirschman Index

MNE: Multinational Enterprise

NAICS: North American Industry Classification System

PRI: Proportional reduction in inconsistency

QCA: Qualitative comparative analysis

TMT: Top management team

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# 1 Introduction

The first chapter emphasizes the importance of this thesis and places it in the appropriate context. The relevance of the topic, the problem statement, and research objective are outlined. Contributions to theory and practice are explained, ending with an overview of the following chapters.

## 1.1 Relevance of the topic

The creation of sustainable profits is a necessary condition for the long-term survival of a firm. However, profitability is not God given. In 1950, Joseph Schumpeter (as cited in Chen & Miller, 2012) referred to competition as one major hurdle for the long-term survival of firms by introducing the concept of creative destruction. On a business-level, this concept was defined as the process by which a firm is outperformed by its competitors, ultimately leading to the death of the company.

Since then, many researchers have investigated the topic of competition. Most famously, Michael Porter introduced the market perspective by defining three distinctive strategies to achieve competitive advantage (Porter, 1980). More recently, the research field of competitive dynamics gathered considerable attention within the literature of competition (Chen & Miller, 2015). This stream is defined as the study of detectable *“competitive actions and reactions, their strategic and organizational contexts and their drivers and consequences”* (Baum & Korn, 1996, p. 255).

Competitive dynamics can be analyzed in the domain of the action, the reaction, the attacker the responder, and the environment (Smith, Ferrier, & Ndofor, 2001). In every domain, several attributes are known to have an impact on the performance of an organization. Among others, the aggressiveness (Ferrier, Smith, & Grimm, 1999), the number of actions (Young, Smith, & Grimm, 1996), the response timing (Smith, Ferrier, & Ndofor, 2001), and the response complexity (Miller, 1993) were all shown to have a significant effect on the performance of firms. Since all actions and responses require human agency (Staw, 1991), knowledge on the antecedents and consequences of competitive actions is of great interest for managers (K. Coyne & Horn, 2008).

## 1.2 Problem statement

The literature on competitive dynamics has increased significantly in recent years (Chen & Miller, 2012). Five distinct themes have emerged over time: action-level studies, business-level studies, corporate-level studies, integrative competitor analysis, and competitive perception (Chen & Miller, 2012). Despite this progress, research lacks integrative approaches that connect these themes of competitive dynamics (Chen & Miller, 2012). In particular, the interdependence of multiple factors describing the attack, response options, the attacker and the responder haven't been systematically analyzed. Furthermore, the important social phenomena of equifinality, conjunctural causation, and asymmetric causality have not been sufficiently addressed. Equifinality describes the phenomenon where a certain outcome can be reached by more than one path, while conjunctural causality refers to factors which impact an outcome only in combination with each other. Asymmetric causality describes situations in which factors leading to a particular outcome might be different from factors resulting in the opposing outcome.



### 1.3 Research objective

To overcome these limitations by previous research, this study considers relevant factors from the attack, response, attacker, and responder in this analysis. The relatively new method of qualitative comparative analysis (QCA) (Emmenegger, 2011) is applied in this thesis to the field of competitive dynamics to reduce this gap in research. In general, this method analyzes which factors or combination of factors are required for a certain result. Besides being particularly suitable for medium-sized samples (Marx & Dusa, 2011) and considering equifinality, conjunctural causation, and asymmetric causality (Fiss, 2009), this method effectively combines qualitative case understanding with comparative case comparison (Marx & Dusa, 2011).

This research was conducted at a company, operating in a sub-segment of the German wholesale sector. Due to a small degree of concentration, low profitability (Sparkassen Finanzgruppe, 2015), and frequently occurring competitive interactions, this sub-segment is highly appropriate for competitive dynamics research. Furthermore, the wholesale sector is underrepresented in studies of competitive interactions. The associated company in the research project has 71 operation sites, making it one of the market leaders. Competitive interactions are a primary concern for the top management. Consequently, the Director of Strategy is the assigned contact person for this project. The identification of relevant factors and its analysis follows a systematic approach, visualized by Figure 1.



Figure 1: Structure of the thesis

In this study, an attack is the placement of an aggressive price to the customer of a competitor. Following, two response options by the attacked firm are distinguished: underbidding the competitive offer or making a complaint at the supplier. The objective of this research is to identify responses and combinations of responses that are favorable or not favorable. In this study, favorable is defined as maintaining the long-term revenue of a customer, who is targeted by a competitor. Furthermore, the severity of the attack, the economic situation of the attacker, the service capabilities and relationships with partners are considered as environmental factors, which were identified as highly relevant in this industry. Therefore, this study asks:

RQ: How can managers prevent the loss of revenue, considering the severity of the attack, the economic situation of the attacker, the service capabilities and relationships with partners, when confronted with an attack?

### 1.4 Contribution to theory and practice

Integrating several research domains and considering multiple relevant factors contributes to the integration of research on competitive interactions by this thesis. Therefore, the call for a higher embeddedness in the stream of competitive dynamics, issued by Chen and Miller (2012),

is answered. By applying QCA to this stream of research for the first time, the appeal for a higher variety of research methods is also considered (Chen & Miller, 2012). Specifically, the extended resource based view was identified to be highly relevant in competitive dynamics and requires further analysis. Also, the strengths and pitfalls of QCA in competitive dynamics are elaborated, guiding similar studies in this stream.

From a practical perspective, this research provides two significant implications: First, to maintain long-term revenue from a customer, who is targeted by a competitor of the focal firm, patience is of great importance. Reactions should only be executed selectively, considering the environment. Second, the combination of superior service capabilities and good relationships with a partner was identified to be of great importance in competitive interactions. Therefore, managers should enhance their own capabilities carefully and maintain good relationships with customers and suppliers. Ultimately, these results may contribute to securing profitability and thereby the long-term survival of companies.

## 2 Review of the literature

This chapter is introduced with an explanation on how the review was conducted. In the following, the origin of research on business strategy, competition, and finally competitive dynamics is outlined. The main part gives a systematic summary of relevant literature in the field of competitive dynamics. The term “hypercompetition” is defined and the scientific contributions outlined. In the end, the wholesale sector is sketched.

### 2.1 Methodology of the literature review

The literature review serves as the foundation for the research that is yet to come and is thereby a crucial part of every thesis (Tranfield, Denyer, & Smart, 2003; Webster & Watson, 2002). Going even further, Boote and Beile (2005) argued that understanding the literature is a *conditio sine qua non* for scholars who are working on puzzling topics. Fink (2013, p. 3) defines a literature review as *“a systematic, explicit, and reproducible method for identifying, evaluating, and synthesizing the existing body of completed and recorded work produced by researchers, scholars, and practitioners.”*

In preparation of the literature review, different approaches were analyzed regarding their applicability to this thesis. After neglecting the promising methods by Booth, Sutton, and Papaioannou (2016) and Döring and Bortz (2016) due to the greater complexity of the different stages, the approach by Wolfswinkel, Furtmueller, and Wilderom (2013) was selected. This method was able to reduce complexity by emphasizing the iterative nature of their five stage approach (Wolfswinkel et al., 2013).

The grounded theory approach contains two principles suitable for competitive dynamics: first, change through process is built into the method. Second, the approach rejects the principle of determinism and ascribes actors the means of influencing their destiny (Corbin & Strauss, 1990). Wolfswinkel et al. (2013) utilize the grounded theory approach, as advanced by Strauss and Corbin (1990, 1998) as the foundation for their five stages method. These steps are: defining the keywords (1), collecting relevant literature (2), refining the sample (3), analyzing the literature (4), and structuring the content (5) (Wolfswinkel et al., 2013).

In conclusion to step 1, several keywords were defined with high relevance for this topic. These were “competitive dynamics”, “competitive interactions”, “competitive actions”,

“competitive reactions”, “competitive rivalry”, and “competitive tension”.

During the collection of relevant literature (step 2), multiple sources have been utilized to create a complete picture of the current state of research. The accessed sources are EBSCO, Google Scholar, TU Berlin Primo, and Web of Science. Due to the multiple filter functions, Google Scholar was used as primary source for the research. Mainly papers have been used for this review, but also textbooks and internet sources. Only articles published in the year 2012 and more recently were included, because in 2012, Chen and Miller (2012) published their comprehensive literature review, which is used as a foundation for this thesis.

The identified articles were judged and refined (step 3) based on their abstracts, as well as the chapters’ results and conclusion. In the case of relevancy of the content, the papers were downloaded, and the reference collected, using the citation manager EndNote. Otherwise, the papers were discarded from the collection. Following the afore-described approach utilizing the stated keywords, 454 articles were found, 166 were judged as relevant based on their abstract and the chapters results and conclusion.

Finally, the remaining articles were analyzed in depth (step 4), and the relevant passages cited in this review in a structured way (step 5). In addition to this procedure, papers that were referenced in one of the identified articles or published by the same author were also reviewed and included if applicable. As mentioned before, this five-step method is an iterative process. Therefore each step is passed multiple times. In conclusion, this literature review is based on 76 unique sources, as shown in Table 1, including those previously identified by Chen and Miller (2012).

|  | "competitive dynamics" | "competitive interactions" | "competitive actions" | "competitive reactions" | "competitive rivalry" | "competitive tension" |
|--|------------------------|----------------------------|-----------------------|-------------------------|-----------------------|-----------------------|
| Hits on Google Scholar by keyword (in the title)       | 145                    | 228                        | 29                    | 30                      | 13                    | 9                     |
| Number of papers that were judged as relevant          | 114                    | 7                          | 27                    | 3                       | 10                    | 5                     |
| Total number of sources cited in the literature review | 76                     |                            |                       |                         |                       |                       |

Table 1: Papers found per keyword

## 2.2 Historical origin of business strategy, competition, and competitive dynamics

Henry Mintzberg described the research on strategic management as an elephant and himself and his fellow colleagues as blind explorers: *“Each of us, in trying to cope with the mysteries of the beast, grabs hold of some part or other.”* (Mintzberg & Lampel, 1999, p. 21) Mintzberg refers to the different developments in strategy research as ten schools of thought which he clusters into three distinct groups, namely: the prescriptive school (design, planning, and positioning), the descriptive school (entrepreneurial, cognitive, learning, power, cultural and environmental) and the configuration school (Mintzberg & Lampel, 1999). Mintzberg emphasizes the importance of integrating these schools of thought into each other and going beyond the narrowness of each school to grasp a greater part of the beast, called business strategy (Mintzberg, Ahlstrand, & Lampel, 2005).

The concept of competition first gained considerable attention from Porter (1980), one of the

founders of the aforesaid positioning school of thought (Mintzberg & Lampel, 1999). However, much of the early work on competition was a rather abstract notion of industry analysis (Chen & Miller, 2012) and provided insights into what could happen in constructed market situations rather than what might happen in a given situation (Schmalensee, 1988). Also, game theory (Nalebuff, Brandenburger, & Maulana, 1996), network theory (Tsai, 2002), and population ecology (Freeman, Carroll, & Hannan, 1983) featured competition as the centerpiece. Finally, it was the research stream of competitive dynamics (Baum & Korn, 1996; Smith, Grimm, & Gannon, 1992) that stopped looking at competition as an abstract concept, but as real interactions, and thereby were able to integrate the dynamics of individual decisions (Chen & Miller, 2012). The research stream of competitive dynamics is the centerpiece of this thesis and is elaborated in the following.

### 2.3 Introduction to competitive dynamics literature

The term competitive dynamics is defined as the study of rivalry based on specific interfirm *“competitive actions and reactions, their strategic and organizational contexts and their drivers and consequences”* (Baum & Korn, 1996, p. 255). Thus, this research stream focuses on one of the pillars of economics: the analysis of how firms and individuals interact through market exchange (Hirshleifer, Glazer, & Hirshleifer, 2005). Barney (1986) argues that the superior performance by firms is either temporary or sustained. Temporary above-average results are the consequence of competitive interaction (Barney, 1986), which are imitable and the advantage eroded at a high pace (Hirshleifer et al., 2005). Considering later contributions by Barney, it can be argued that competitive actions could result in sustainable superior performance, if the resources required for the actions are valuable, rare, inimitable, and non-substitutable (Barney, 1991). In conclusion, competitive dynamics analyzes the building blocks of microeconomics literature.

In their literature review, Chen and Miller (2012) summarize the defining features of competitive dynamics: First, competition is perceived as dynamic and interactive, where the actions and reactions form the building blocks of competition. Second, the focus is on actual actions that are exchanged by firms. For example, the introduction of a new product or at reduction of prices. Third, the pairwise comparison of companies and therefore the notion of relativity. Success is always seen in relation to the major competitors. Fourth, the emphasis on the policy maker of a firm. While every attack or response is ultimately approved by a decision maker of a company, factors influencing their decision-making behavior are central to competition and strategy (Hambrick & Mason, 1984; Montgomery, 2008). Following definitions by Mintzberg, Raisinghani, and Theoret (1976) and Mintzberg (1978), the competitive dynamics research regards the term ‘strategy’ as a pattern in the streams of decisions (Chen & Miller, 2012; Smith, Ferrier, & Ndofofor, 2001).

The Austrian school viewed competition as a dynamic market process with a focus on the disequilibrium in contrast to the static neoclassical perspective (Jacobson, 1992; Scherer & Ross, 1990; Von Mises & Greaves, 2006; Young et al., 1996). More specifically, following the argumentation of the Austrian school, a market equilibrium is only established in the absence of competition (Smith, Ferrier, & Ndofofor, 2001). A crucial precondition of the Austrian school is that strategic actions can create a temporary competitive advantage which will eventually erode over time (Porter, 1980; Smith, Ferrier, & Ndofofor, 2001; Winter & Nelson, 1982). The intellectual roots of this micro-level focus on the actions of individuals can be traced back to Schumpeter’s concept of creative destruction, which describes the actions and reactions of firms striving for economic opportunities (Schumpeter, 1950, as cited in Chen & Miller, 2012). The term creative destruction was defined as the eventual and inevitable decline of firms through the process of competitive actions and reactions (Schumpeter, 1950, as cited in Chen & Miller, 2012). If this competitive advantage is eroded at a high pace, the situation is described as hypercompetitive (Smith, Ferrier, & Ndofofor, 2001). This industry status is elaborated further at the end of this chapter. Ferrier et al.

(1999) and Young et al. (1996) advanced the competitive dynamics stream of research and grounded it on the Schumpeterian and Austrian view (Smith, Ferrier, & Ndofor, 2001).

The origin of research in the field of competitive dynamics was a small sample study of responses to a banking innovation (MacMillan, McCaffery, & Van Wijk, 1985) and a case study on competitive interactions between Polaroid and Kodak (Bettis & Weeks, 1987). Bettis and Weeks (1987) collected actions and reactions by Polaroid and Kodak that either strengthened their own competitive position or weakened the competitiveness of the opponent, e.g. the introduction of new products or price cuts. The authors analyzed the effect of the interactions on the stock prices of Polaroid and Kodak (Bettis & Weeks, 1987). The study by MacMillan et al. (1985) centered around the time lag between an innovation by one bank and the measuring up to this innovation by the opponent. Thereby, in both cases, the volatility of advantage got special attention (Chen & Miller, 2012). It was only later that other scholars in different fields adopted the term competitive dynamics to refer to this stream of research (Chen & Miller, 2012).

## 2.4 Competitive dynamics literature: An ontology

Research in competitive dynamics centers around actions and responses exchanged between firms. The general research model of competitive dynamics classifies five toeholds: the attacker, the action, the responder, the response and the environment (Smith, Ferrier, & Ndofor, 2001). In addition, Chen and Miller (2012) clustered research in the field of competitive dynamics along the level of analysis and described them as five research streams. These are competitive interaction: action-level studies (1); strategic competitive behavior and repertoire: business-level studies (2); multimarket and multi-business competition: corporate-level studies (3); integrative competitor analysis (4); and competitive perception (5) (Chen & Miller, 2012). Figure 2 depicts how these relate to each other: streams one to three focus on competitive interaction at different levels of analysis. Stream four integrates research that lies outside the domain of competitive dynamics. Finally, stream five research can be conducted in all four other streams and be independent from them. This literature review on competitive dynamics builds on these five identified streams of research and shows the further development after 2012. Also, some of the sub-streams, identified by Chen and Miller (2012), are adopted for structuring this chapter. Due to the focus of this research on competitive interactions between operation sites, corporate-level studies (3) and competitive perception (5) will only be explained superficially.

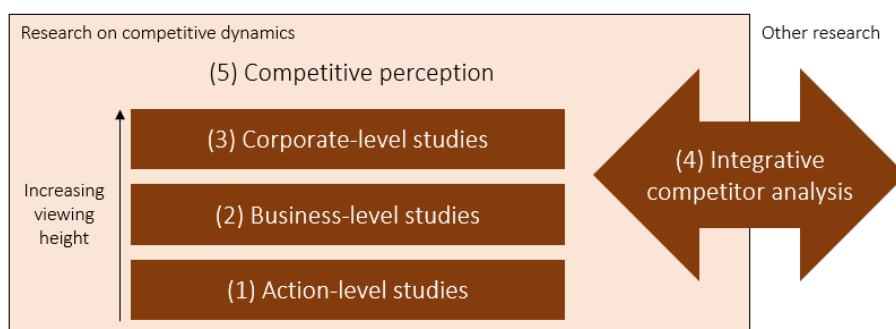


Figure 2: Five research streams as defined by Chen and Miller (2012, p. 10), own illustration

Action-level studies (1) take actions and responses as focal points of analysis. An attack is defined as a distinct and detectable market move by a firm. A response is a distinct and detectable countermove, which is provoked by the attack of a different company. Actions and reactions aim to either gain or defend market share or profit in a certain industry. (Baum &

Korn, 1999; Boyd & Bresser, 2008; Chen & Miller, 1994; Lee, Smith, Grimm, & Schomburg, 2000; Smith, Ferrier, & Ndofor, 2001)

Two sub-streams emerged from the research on action-level studies: first, studies tried to characterize and predict a competitive response by characterizing the attack, the attacker and the defender (Chen & Miller, 2012). Researchers were able to show that competitively active firms outperformed less active firms by profitability (Young et al., 1996), by market share gains, and are also less likely to be dethroned by challengers (Ferrier et al., 1999; Smith, Ferrier, & Grimm, 2001). Recently, researchers separated actions regarding the target into four distinct groups: output actions, input actions, institutional actions and processual actions (Bridoux, Smith, & Grimm, 2008). Bridoux et al. (2008) found that all four type of actions significantly impact performance, with output actions having the greatest and most immediate effect. Another determinant of competitive actions is the complexity of the attack. Ferrier and Lee (2002) found a U-shape relationship between strategic complexity and heterogeneity of competitive actions and the stock price of a firm. Lately, this part of research was advanced by Hughes-Morgan and Ferrier (2014), who looked to the second important determinant of stock returns; the stock risk. The scholars found that the competitive action repertoire that matches the actions of rivals and is stable over time results in lower levels of stock risk (Hughes-Morgan & Ferrier, 2014). In contrast, action repertoires that show a moderate level of simplicity lead to higher levels of stock risk (Hughes-Morgan & Ferrier, 2014). When responding to a competitive action of a rival, a firm also has the possibility to use words instead of actions. By considering the magnitude and complexity of an action, Gao, Yu, and Cannella (2015) predict the likelihood of a response by action or word. Word responses were more likely to occur when the action is of low magnitude and low complexity (Gao et al., 2015).

Regarding the time lag between action and reaction, Smith, Ferrier, and Ndofor (2001) found in their literature review among 30 industries, a negative relationship between the time taken by rivals to respond and the focal firm's performance. Research on the time between recourse management action and firm's performance was refined further by Bridoux, Smith, and Grimm (2013). The scholars differentiated between actions to structure, bundle, and leverage resources (Bridoux et al., 2013). The results were rather mixed which lead to the conclusion that managers have to carefully select their action dependent on when the results are desired (Bridoux et al., 2013). In the longitudinal study by Pacheco and Dean (2015), social movement pressure on competitive actions and responses was investigated. They found that the alignment of competitor actions with social movement demands reduces the positive effect of movement activism on firm responses (Pacheco & Dean, 2015).

The second sub-stream that received great attention is the concept of irreversibility which deals with the implications of irrevocable commitment to a certain economic investment and/or revamping organizational and social arrangements (Chen & Miller, 2012). Two kinds of irreversibility were distinguished: internal and external. The former describes, for example, the required inter-organizational coordination to execute a competitive action and tends to escalate competition. The latter in contrast could be the public top management's commitment to an action and has the contrary effect (Chen, Venkataraman, Sloan Black, & MacMillan, 2002).

Studies in the research stream business-level studies (2) strive to explore the organization and contextual antecedents that drive competitive dynamics by concentrating on the firm level. This stream of research can be divided into three sub-streams: the first sub-stream of research is concerned with antecedents and outcome which brings properties such as likelihood to act, responsiveness, execution speed, and action/response into the spotlight (Chen & Miller, 2012). Chen and Hambrick (1995) found that while smaller firms launched more attacks, at a higher

speed with a lower chance of being noticed, they were also less likely and slower to respond when being attacked. In their study among 40 industries over a seven-year period, Ferrier et al. (1999) determined that leaders were more likely to suffer market-share erosion when, compared with market followers, they acted less aggressively, with simpler competitive repertoire and with lower execution speed.

The second sub-stream within business-level studies is concerned with the competitive repertoire of a firm, e.g. market entry, product entry, price initiatives (Chen & Miller, 2012). Studies in this sub-stream are concerned with a firm's competitive inertia or activity, in dependence of its set of competitive actions (Miller & Chen, 1994), the types of complexity of competitive actions and their performance implications (Miller, 1993) and impact of non-confirmative actions with regard to industry norms on financial performance (Miller & Chen, 1996). In a more recent study by Connelly, Tihanyi, Ketchen, Carnes, and Ferrier (2016), they found that it not only depends on the number or extent of competitive actions but its complexity. The scholars advise that managers should strive for this complexity, even though it requires more resources (Connelly et al., 2016).

Conceptual links between competitive actions' literature and strategic competitive behavior and repertoire literature are the third sub-stream within business-level studies. One major contribution by the conceptual links is that the past actions of a firm influence the repertoire of present moves. For instance, past investments limit and simultaneously enable present capabilities (Chen & Miller, 2012). Understanding factors that influence the competitive activity in the first place was at the heart of the study by Major, Maggitti, Smith, Grimm, and Derfus (2016). The results show that prior performance, rivals' similarity, and industry standing moderate the positive effect of prior levels of activity on rival response and firm performance (Major et al., 2016).

Corporate-level studies (3) are the third stream that emerged in competitive dynamics literature. One of three sub-streams is on multimarket competition, which focuses on mutual forbearance; the hypothesis that firms that operate in the same markets recognize the interdependencies of market competition and tailor their competitive actions to avoid escalations (Chen & Miller, 2012). For instance, a study found that companies that compete in multiple markets are less aggressive towards each other (Baum & Korn, 1996). The hypothesis of mutual forbearance was further conceptualized in the study by Andrevski, Ferrier, and Nokelainen (2015), who proposed a theoretical framework to study this stream, analyzed its antecedents and its consequence for competitive dynamics.

The two further sub-streams on corporate level studies are resource allocation as competitive moves and rivalry of multinational enterprises (MNE). While the former is concerned with how resource allocation can steer competitive escalations, the latter sheds light on factors influencing competition of MNE (Chen & Miller, 2012).

Integrative competitor analysis (4) expands the research domain of competitor analysis and includes external approaches. It is important to state here that this stream clearly excludes the integration of the described five themes of research within competitive dynamics. One of these external approaches is market-resource analysis, most famously known for the SWOT (strength, weaknesses, opportunity, threats) analysis by Learned (1969). However, the links to competitive behavior are mostly atavisms (Chen & Miller, 2012). In contrast, Chen (1996) proposed a model that integrated market commonality and resource similarity, shown in Figure 3. Market commonality refers to the degree of overlap in the markets between the focal firm and the competitor, a perspective that originated from the market-based view and the

paradigm by Porter (1980), while resource similarity refers to the extent of comparable strategic endowments with a competitor, which developed from the recourse-based theory by Barney (1991) (Chen & Miller, 2012). The shapes characterize the resources a company possesses. The darker, overlapping areas indicate the extent of direct confrontation between the two companies. A significant result of studies on integrative competitor analysis is the awareness-motivation-capability model (AMC model), which suggests a firm only responds to a competitor's action if it is aware of the attack, motivated to act on it, and capable of responding (Chen & Miller, 2012).

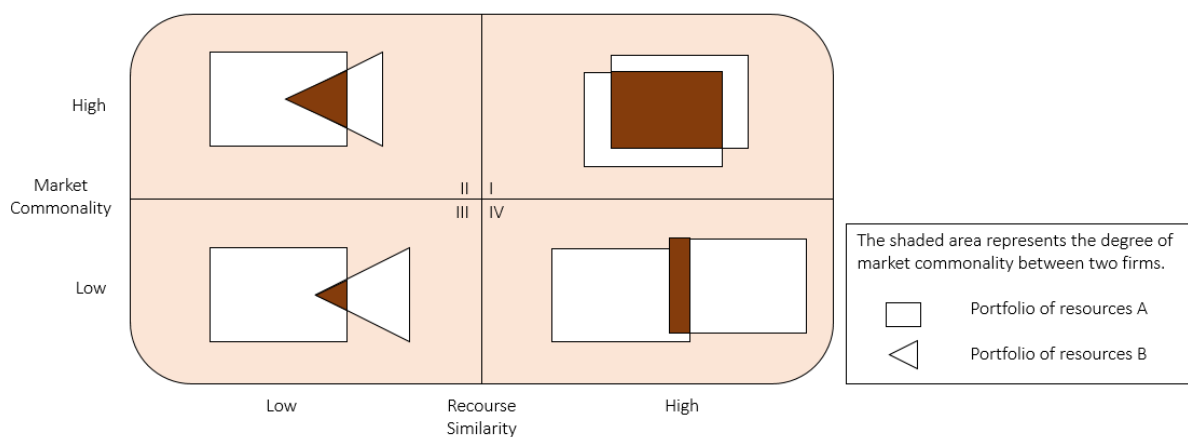


Figure 3: A framework of competitor analysis, adapted from Chen (1996)

Recently, several researchers integrated acquisition research and competitive dynamics: Building on the AMC framework, Haleblan, McNamara, Kolev, and Dykes (2012) investigated how the timing of competitive actions in industry merger waves is influenced. They found that strategic orientation, structure, and resource endowments of a firm have an influence on the firm's timing when entering merger waves (Haleblan et al., 2012). In their study, Keil, Laamanen, and McGrath (2013) strived to dissolve a contradictory view regarding the effect of acquisitions between acquisition research and competitive dynamics. They conducted a study on 1316 software firms. The results support competitive dynamic literature, viewing an acquisition as a competitive action that reduces firm profitability and overrules possible positive effects for profitability due to increased industry concentration (Keil et al., 2013). Also looking into the consequences of acquisition activities, Uhlenbruck, Hughes-Morgan, Hitt, Ferrier, and Brymer (2016) found among others that dependence on the overlapping market with the acquirer and the resource similarity lead to an increased volume, and in some cases also the complexity of competitive actions. Going beyond the boundaries of their own firm, Andrevski, Brass, and Ferrier (2016) looked into the effect of alliance portfolio configuration on competitive action frequency and thereby tried to answer the question of why some firms are able to carry out competitive actions more frequently. Three alliance portfolio attributes were considered in the analysis: opportunity recognition capacity, opportunity development capacity, and action execution capacity (Andrevski et al., 2016). This three-way configuration of portfolio attributes were shown to be especially relevant for more complex competitive actions (Andrevski et al., 2016).

The impact of short term oriented investors, ownership structure, and the composition of boards were at the focus of two different articles. The implications of the occurrence of investors with short time horizons have been analyzed. The researcher looked at over 5,000 competitive actions and discovered that when faced with this kind of pressure, the number of competitive actions increases (Hughes-Morgan & Ferrier, 2016). This effect is even stronger for



companies with poor performance (Hughes-Morgan & Ferrier, 2016). Mitchell (2015) compared in his dissertation the pricing decisions of multi-unit franchisees gas stations with company owned gas stations. He found that franchisees charge higher prices due to a double marginalization on price (Mitchell, 2015). The scholars Withers, Sirmon, Tuggle, and Carnes (2014) investigated the impact of boards on competitive dynamics. They found that board composition has a stronger influence on firm-level competitive behavior in more dynamic environments and a weaker effect in environments with a high concentration of ownership (Withers et al., 2014).

Also, mediating effects of competitive intensity were analyzed. In a study by Andrevski, Richard, Shaw, and Ferrier (2014), the mediating role of competitive intensity on the relationship between racial diversity and firm performance were analyzed. The scholars were able to confirm this mediating role (Andrevski et al., 2014). Furthermore, evidence was provided that racially diverse management groups compete more intensively and perform better when the environment is profitable (Andrevski et al., 2014).

The fifth and last stream that emerged within competitive dynamics is called competitive perception (5). The guiding principle of this research stream is the recognition that all actions require human agency and that human agency is filtered by perception (Staw, 1991). The aforementioned AMC model is suitable to structure the research in this stream (Chen & Miller, 2012). In 2014, Hojecki (2014) contributed to this very stream of research by conducting an experimental study regarding the effect of winning or losing on highly competitive individuals. Even though this study was not explicitly grounded in competitive dynamics research and the results were not statistically significant, the findings agree with previous literature on this topic: winning or losing seems to have an effect on how competitive individuals perceive its counterpart (Hojecki, 2014). Competitive perception research on a micro-level was advanced by Lee, Feiock, and Lee (2012), who looked into the consequences, when local governments perceive strong competition and strong cooperation. In both cases, they found that regional collaboration with other jurisdictions increased (Lee et al., 2012). The authors concluded that their findings imply that local governments are inclined to constitute relationships with cooperative and competitive partners (Lee et al., 2012).

As shown in this ontology of competitive dynamics research, scholars were able to paint a fine-grained picture of influencing factors and potential consequences on competitive interactions. Two literature reviews contributed to the structure of research on this academic stream: First, Smith, Ferrier, and Ndofor (2001) identified five research domains: the actor, the action, the responder, the response, and the competitive environment. Research on competitive dynamics continued to flourish in the following eleven years (Chen & Miller, 2012), which lead to the need to structure the findings further among different dimensions. In 2012, Chen and Miller (2012) created an extensive literature review and defined five distinct streams of research, which also were used in this review to structure all studies since 2012. However, the authors also identified a clear gap in current research: studies failed to systematically integrate different research streams into each other (Chen & Miller, 2012). The authors stated that previous research showed that actions and response characteristics are highly affected by attributes of the attacker and the responder, proving the need for integration (Chen & Miller, 2012). For instance, in several studies, the effect of price initiative on firm performance was investigated (Chen & Miller, 2012) and the moderating effect of the market position on beneficial competitive behavior has been elaborated (Ferrier et al., 1999), but a systematic integration is lacking.

Since 2012, scholars partly followed this appeal by including many moderating factors into their

models, as shown in the literature review above. However, research still lacks studies that systematically integrate the most relevant factors from different research domains, as identified by Smith, Ferrier, and Ndofor (2001) and different streams, as distinguished by Chen and Miller (2012). As will be elaborated in the following chapters, this study addresses this gap in literature, investigating several interrelated factors and their performance outcome. Furthermore, the important social phenomena of equifinality, conjunctural causation, and asymmetric causality will be addressed by applying the relatively new method of qualitative comparative analysis (Emmenegger, 2011) to the field of competitive dynamics for the first time.

## 2.5 Literature on hypercompetition

Industries where competitive advantage is created and eroded at a high pace are defined as hypercompetitive (D'aveni, 1995). The concept of hypercompetition emerged during the late 1980s and early 1990s (Thomas Iii, 1996; Thomas & D'Aveni, 2004). Even though hypercompetitive research and competitive dynamics have emerged separately, both share the aforementioned Austrian school as a common intellectual root (Chen, Lin, & Michel, 2010). Factors that favor the creation of a hypercompetitive environment are the reduction of entry barriers, technological revolutions with short design cycles and improved methods of information dissemination (Bettis & Hitt, 1995).

The concept of hypercompetition has also been introduced to the field of competitive dynamics. Gimeno and Woo (1996) used the framework of competitor analysis, conceptualized by Chen (1996), and looked for the effect of strategic similarity and multimarket contact on hypercompetitive escalation and de-escalation. In competitive dynamics, this concept has been used as a foundation for the aforementioned AMC framework (Chen & Miller, 2012). In a more recent study, Chen et al. (2010) found that a hypercompetitive environment increases the TMT influence on competitive interactions. Hermelo and Vassolo (2010) applied findings from previous research on hypercompetition in Latin America. Among others, he concluded that constantly superior economic performance in hypercompetitive markets is possible and that the risk of exiting this path of superior performance has increased over time (Hermelo & Vassolo, 2010). One possible consequence of a hypercompetitive environment is the so-called Red Queen effect (Chen et al., 2010), which is a state of an industry where market participants have to adapt, evolve, and constantly proliferate simply to sustain themselves in the market (Derfus, Maggitti, Grimm, & Smith, 2008).

## 3 Research model

In contrast to previous studies in competitive dynamics, the following analysis systematically identifies relevant factors that contribute to competitive interactions and analysis their interrelated effects on the outcome of the interaction. Thus, this thesis integrates different domains and streams of research and answers the call for more integrative studies in the field of competitive dynamics (Chen & Miller, 2012). This chapter introduces the six conditions and the outcome, utilized in this thesis. For the identification of these factors, six interviews with industry experts were conducted, which is explained in more detail in chapter 4.3. The procedure of how the six factors were measured is outlined in chapter 4.4. After the definition of the conditions and the outcome, they are grounded in theory and previous competitive dynamics research is mentioned. Last, directional expectations for each condition are stated.

Following previous research in competitive dynamics, this thesis utilized the general research model in competitive dynamics to classify conditions of competitive interactions (Smith, Ferrier, & Ndofor, 2001). This framework was developed to structure studies and results and to provide guidance for further research. As shown in Figure 4 and described in greater detail in the following, the research model consists of factors regarding the actions, the response, the attacker, and the responder. Every competitive interaction starts with an action (also referred to as attack). Therefore, the first condition provides characteristics of the attack. Following the attack, different reaction (also referred to as response) options are possible for the attacked company. This study distinguishes between two alternative responses options. The interaction, comprising of action and response, is affected by attacker and responder characteristics. Therefore, one condition, characterizing the attacker (or aggressor, as referred to in the survey) is defined. Afterwards, two conditions regarding the responder are introduced. Last, the outcome is defined, which is a success measure of the interaction. An even more detailed discussion regarding the choice of the conditions and outcome is attached in chapter 8.1.

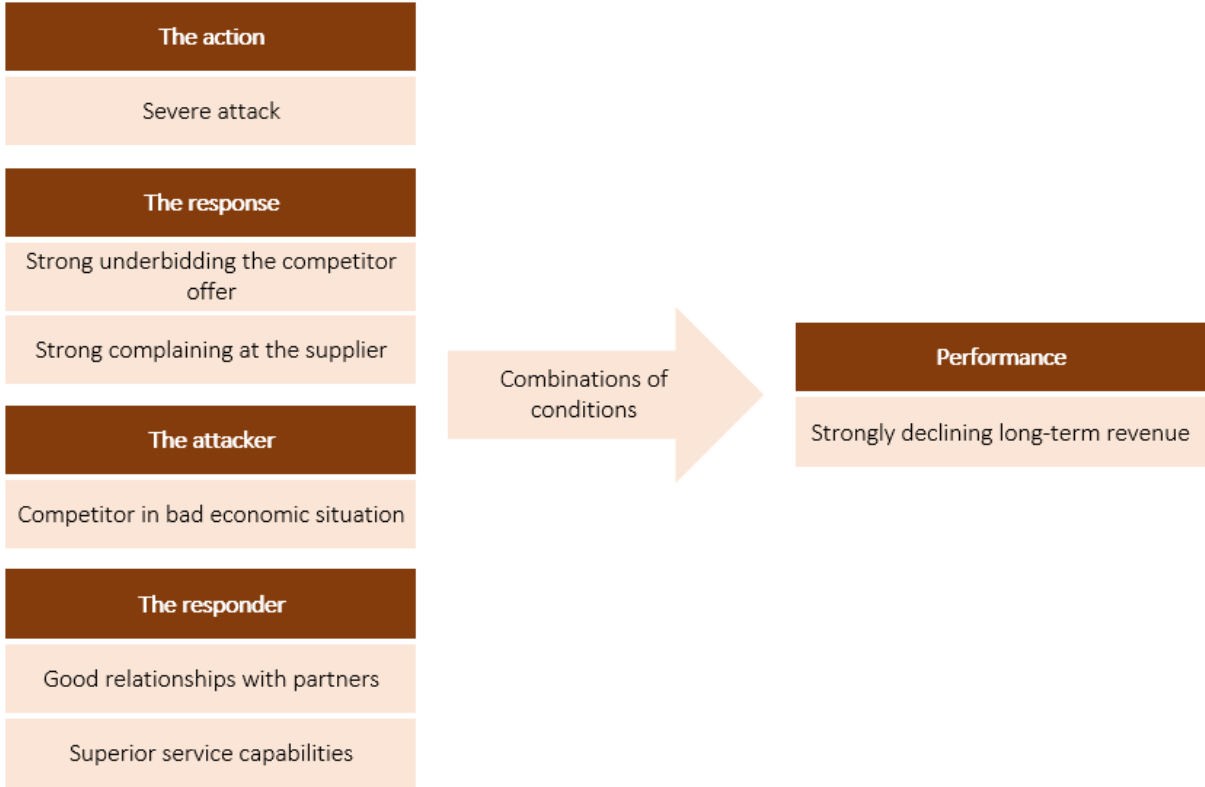


Figure 4: Research model

First, the condition regarding the severity of the attack is described.

**Severe attack (sevattack):** Managers in the interviews stated severe attacks have the potential to destroy mutual trust and thereby the foundation of relationships. This statement relates to the distinction between two levels of communication by Watzlawick, Beavin, and Jackson (1990). Every communication has a content and a relationship aspect, where the latter is the foundation for the former. Thus, the relationship aspect is a form of metacommunication (Watzlawick et al., 1990). Based on the statements made by the managers in the interviews, severe attacks have the potential to destroy the relationship aspect of communication which therefore erases the foundation of cooperation. In contrast, attacks that are not severe only affect the content level of communication and the relationship to the customer remains unaffected.

Previous research in competitive dynamics characterized the attack along the dimension of difficulty of implantation, effort and time of execution, and visibility (Chen & Miller, 2012). A theme related to the severity of the attack is the concept of irreversibility of actions. The concept of irreversibility regarding competitive actions is split into internal and external irreversibility. Internal irreversibility refers to the economic costs, political efforts, and structural changes incurred by an attack (Chen et al., 2002). The aspect of economic costs is similar to the severity of the attack, since a price reduction to target a customer incurs costs through margin loss. The study by Chen et al. (2002) found that internal commitment reduces the likelihood of response and the degree of competition (Chen & Miller, 2012). In conclusion, no study could be found that quantifies the severity of the attack, which might result from two difficulties: first, the damage is often hard to calculate. If the attack is, for instance, the introduction of a new product, it becomes difficult to isolate the loss of sales due to the new product by the competitor from other influences. The thesis focuses on the most frequent type of attack in a business to business industry: price actions. This makes them easily quantifiable. Second, data collection on the severity of the attack requires much effort, since it can only be obtained by asking the managers. Therefore, collecting data on this factor was not feasible for many studies.

The directional expectations are twofold: Customers might be increasingly willing to change their supplier if the price differences are growing because the savings from changing the supplier exceed the associated costs (Nielson, 1996). Also, as argued before, severe attacks might harm the relationship aspect of communication (Watzlawick et al., 1990). In contrast, big differences in price could also lead to sepsis regarding the honesty of the offer and the provided service, as a price also conveys information regarding the quality of service (Bergh, Connelly, Ketchen, & Shannon, 2014; Hirshleifer et al., 2005). Despite these contradicting effects, the directional expectation is that a severe attack contributes to the outcome of 'strongly decreasing long-term revenue'. In the language of QCA the directional expectation states as follows: The presence of the condition 'severe attack' implies the presence of the outcome 'strongly declining long-term revenue' and vice versa.

Two questions collect data on the response. While the general research model summarizes factors characterizing responses, like the response timing or response order (Smith, Ferrier, & Ndofo, 2001), this thesis focuses on response types. Based on the interviews and literature, two types of response were identified as reasonable.

**Strongly underbidding the price of the competitor (strundbid):** When the managers in the interviews were asked how they could respond to an attack, underbidding the price of the competitor appeared to be the generic choice of response. However, the interviews further showed that this response is only chosen in some situations, making it an interesting condition.

Giving back as you were given is the underlying principle in this condition. This logic was frequently introduced into competitive research: Building on game theory, Axelrod (1981) tested several interacting strategies in a computer tournament. Among 14 proposed strategies, the simple strategy of copying the past move of the competitor won the tournament (Axelrod, 1981). This strategy was proposed by Professor Anatol Rapoport and was labeled tit for tat (Axelrod, 1981). Decades earlier, Bertrand used the assumption of mutual underbidding competitors to calculate the Bertrand equilibrium (Kreps & Scheinkman, 1983). Assuming harsh constraints, like the homogeneity of goods and the simultaneous price setting of companies, ultimately, this equilibrium is found at the unit cost of each firm (Kreps & Scheinkman, 1983). Recently, Coyne and Horn (2009) found, in their study among 1,825 managers, that reflecting the attack of the competitor is the most common reaction with 55% of the participants. Over

one third did not even consider an alternative to this type of reaction (Coyne & Horn, 2009).

In competitive dynamics, little is known regarding the consequence of matching the attack. Chen et al. (2002) found that external irreversibility prevents the escalation of competition, because competitors match the attacks of the opponent. A different study by Hughes-Morgan and Ferrier (2014), looked at stock risk and found that companies that match the actions of the attacker bear less risk.

Even though this reaction seems trivial at first, the interviews revealed underlying mechanisms: Not every competitive action is a serious threat that the customer will leave. Therefore, overcautiously underbidding any competitive offer will lead to a reduction in revenue and profit. The managers must detect these attacks that have the potential to make the customer change its supplier. Considering these opposing effects, no assumption on the influence on the outcome 'strongly decreasing long-term revenue' by this factor can be made, or in the words of QCA: No directional expectation on the presence or absence of this condition regarding the outcome can be made.

**Strongly complaining at the supplier (strcompl):** Supply chains have received little attention in competitive literature (Hult, Ketchen, & Arrfelt, 2007), even though competitive interaction is not merely a clash of internal resources, but the collective supply chain resources that impact the outcome (Hult et al., 2007). Good personal relationships along the supply chain can achieve a competitive advantage in the factor market, as shown by Pulles, Veldman, Schiele, and Sierksma (2014).

Relating to literature in competitive dynamics, actions at the factor markets can also affect competitive interactions at the product market (Pulles, Vos, & Veldman, 2014). As introduced in the literature review, when responding to a competitive action of a rival, a firm also has the possibility to use words as actions. Word responses were more likely to occur when the action is of low magnitude and low complexity (Gao et al., 2015). However, no performance consequence of word responses was investigated, nor was the effect of word responses on the factor market.

Even though there are good reasons to expect an effect of this reaction in the factor market, the effectiveness on the outcome 'strongly decreasing long-term revenue' remains undisclosed. As before, this translates to: No directional expectation on the presence or absence of this condition regarding the outcome can be made.

After the assessment of responses, the attacker itself is analyzed regarding its impact. The attacker is defined as the firm, launching the initial attack (Smith, Ferrier, & Ndofor, 2001).

**Competitor in a bad economic situation (compfinbad):** During the interviews, several aspects of the attacker were discussed regarding its relevance to competitive interactions. Consensus regarding a high relevance of the economic situation of the attacker on the interaction was found. Competitors in economic struggle tend to act irrationally and lack a clear strategy, which makes them less predictable. Also, nescience was mentioned on how to respond to an attack by a firm in difficulties.

Firm performance has often been used as a dependent variable (Chakravarthy, 1986), but the reverse effect also received attention (Thompson, 1967). The expectation that economic performance also affects competitive actions is grounded in organizational learning theory (Levitt & March, 1988). Organizational learning is defined as including past inferences into future behavior (Levitt & March, 1988). In the theoretical framework for analyzing organizational learning, put forward by Argote and Miron-Spektor (2011), past performance

affects the knowledge of a firm. The knowledge of a firm influences the active context, where learning occurs and firm behavior is adapted. Finally, this adaptation of firm behavior impacts performance and thereby performance experience (Argote & Miron-Spektor, 2011).

As summarized by Smith, Ferrier, and Ndofor (2001), bad past performance influences attributes of competitive dynamics, such as the likelihood of actions, aggressiveness, predictable behavior, and strategic change. Therefore, choosing the optimal competitive strategy also depends on the finances of the interacting firms, as shown by Ferrier et al. (1999). In competitive dynamics, this variable was used to predict actions: Good past performance leads to a conservative selection of well-known (Miller & Chen, 1994) and simpler actions (Miller & Chen, 1996), which are carried out slowly (MacFhionnlaioich, cited in Smith, Ferrier, & Ndofor, 2001). Findings on the effect of past performance on the number of competitive actions were mixed; Young et al. (1996) found a positive relation between good performance and number of actions, while MacFhionnlaioich, as cited in Smith, Ferrier, and Ndofor (2001), discovered a u-shaped relationship. Major et al. (2016) found a mediating effect of prior performance on the relationship between levels of activity and rival response and firm performance. So far, past performance hasn't been used to predict reactions.

The expected effect on the outcome, based on the conducted interviews is ambiguous: On the one hand, customers could recognize the offer as a desperate act and reject it for the long-term relationship with the current supplier. On the other hand, ignoring an attack could make the customer feel not appreciated, hurt the relationship, and thereby impact the revenues. This concludes that in the words of QCA, no directional expectation on the effect of 'competitor in a bad economic situation' on 'declining long-term revenue' can be made.

Following this condition regarding the economic strength of the attacker, two conditions assess characteristics of the responder.

**Good relationships with partners (gorelview):** During the interviews, good relationships with industry partners and customers were repeatedly stated as crucial to succeed in competitive interactions.

The importance of this conditions is grounded in two seminal papers in competitive research: Brandenburger and Nalebuff (1995) introduced the value-net and argued a company can create value by creating and maintaining powerful relationships with customers, complementors, suppliers, and substitutors. In the setting of this study, the suppliers are simultaneously major complementors due to an entangled value chain. The relationship with the substitutor was not included in this thesis due to a strict anti-collusion policy of the focal firm that prohibits any interactions with competitors. The importance of the personal relationship with these stakeholders is grounded in the paper by Dyer and Singh (1998), who argue that good personal relationships with resources that span over firm boundaries can be a source of competitive advantage.

The importance of competitive networks in the stream of competitive dynamics was put forward by Gnyawali and Madhavan (2001) and grounded in two pillars. First, the embeddedness approach argues *"that actors' purposeful actions are embedded in concrete and enduring strategic relationships that impact those actions and their outcomes"* (Gnyawali & Madhavan, 2001, p. 432). Second, resources can reside within the network of a firm and therefore enhance its capabilities and performance (Gnyawali & Madhavan, 2001). As a conclusion, the authors argue that managers must see the firm network as a strategic layer that strengthens or limits the firm in competitive interactions (Gnyawali & Madhavan, 2001).

Following this argumentation, this condition is expected to prevent the outcome 'strongly decreasing long-term revenue'. In QCA terms, this translates to the directional expectation that the condition, 'good relationships with partners' is absent, when the outcome 'decreased revenue' is present and vice versa.

**Superior service-level compared to the competitor (servsup):** The managers stated during the interviews that even though the competitive interactions always cycle around price-interactions, the service-level is greatly important. Therefore, a superior service-level is expected to influence the interactions.

Barney (1991) put forward the idea that a firm could achieve superior operative returns when it possesses resources that are valuable, rare, inimitable, and non-substitutable. The service-level in the wholesale sector enables no lasting advantage, but building these resources requires financial investment and time. Therefore, superior service capabilities imply a temporary advantage compared to a competitor. The idea that companies in commodity industries could also differentiate by service, instead of only by price, was advanced by Mathur (1988).

Even though commodity industries, like the airplane industry, have been studied extensively in competitive dynamics, research lacks consideration of the influence of service-level differences in competitive interactions.

Asking managers for the relative service-level raises concerns regarding a potential bias towards a positive evaluation. Intuitively, operation site managers could have an incentive to overstate their real service-level. The interviews revealed two contradicting mechanisms: Service-level that directly arises from the capability of the sales personnel are the full responsibility of the associated operation site manager and could therefore be overstated. However, investments in facilities and machinery are bound by the approval of the headquarter. Therefore, operation site managers are likely to understate service capabilities that arise from facilities and machinery, lobbying for investments in their operation sites. It can be concluded that, due to these opposing effects, it is assumed that an evaluation of the service-level is rather authentic. This expectation is supported by the Gaussian distribution of the results, as shown in Table 3.

Based on the six interviews with industry experts, the expected effect is similar to the previous condition of 'good relationships with partners': 'superior service-level compared to the competitor' prevents the outcome 'strongly declining long-term revenue'. In QCA terminology, this condition is expected to be absent when the outcome 'strongly declining long-term revenue' is present and vice versa.

During the interviews, several outcome conditions were discussed to assess the success of the interaction. Sustaining the revenue with the supplier was selected as the final measure of success. For a more detailed discussion see chapter 8.1.

**Strongly declining long-term revenue (revdecl):** Maintaining long-term revenue with the customer and preserving the status quo before the attack was repeatedly stated as the most important goal for the operation site managers. This result is consistent with the findings in the McKinsey survey on competitive behavior: the long-term earning is the primary evaluation metric used, when responding to a price change by a competitor (K. Coyne & Horn, 2008). Therefore, this analysis strives to identify options that prevent a decline in revenues.

The considered conditions, including the directional expectation regarding the outcome, are displayed in Table 2. Note that directional expectations indicate counterfactual arguments,

rather than empirically testable hypotheses (Schneider & Wagemann, 2012).

| Condition   | Ceteris paribus,<br>condition produces<br>strongly declining long-<br>term revenue<br>(DECLREV) when ... | Ceteris paribus,<br>condition produces no<br>strongly declining long-<br>term revenue<br>(declrev) when ... |
|---|--|---|
| The action  |  |   |
| Severe attack (sevattack)                                     | Present  | Absent  |
| The response  |  |   |
| Strongly underbidding the price of the competitor (strundbid) | No expectation   | No expectation  |
| Strongly complaining at the industry-partner (strcompl)       | No expectation   | No expectation  |
| The attacker  |  |   |
| Competitor in a bad economic situation (compfinbad)           | No expectation   | No expectation  |
| The responder   |  |   |
| Good relationships with partners (gorelview)                  | Absent   | Present   |
| Superior service-level compared to the competitor (servsup)   | Absent   | Present   |

Table 2: Conditions and directional expectations

These six conditions relate to three streams of competitive dynamics research: The action and the response characteristics emerge from action-level studies and are at the heart of this analysis. By characterizing the reactions, recommendations can be made under which circumstances combinations have been rather successful and which have been proven to be rather ineffective or harmful. Second, business-level aspects are integrated by looking at the overall financial performance of the attacker. Thereby, a factor that was formerly used as a dependent variable is integrated as a condition. Furthermore, several responder characteristics were considered relating to business-level studies. Integrative competitor analysis was used to relate the condition ‘competitor in bad economic situation’ to organizational learning studies, ‘severe attack’ to communication theory, ‘good relationships with partners’ to the relational view, and ‘superior service-level compared to the competitor’ to the resource based view. The reaction options ‘strongly underbidding the price of the competitor’ was related to game theory and ‘strongly complaining at the supplier’ to supply-chain management.

## 4 Research method

In the following section, the research method is elaborated to answer the research question: How can managers prevent the loss of revenue, considering the severity of the attack, the economic situation of the attacker, the service capabilities and relationships with partners, when confronted with an attack? This chapter explains where and how data was obtained, handled and analyzed (Saunders, Lewis, Thornhill, & Wilson, 2009). It begins with data collection methods being applied and then continues with elaborating the two methods; interviews and survey, in detail. Afterwards, how other sources have enriched the collected data is explained. Once all data is collected, the most promising conditions to impact the outcome are explained by providing the theoretical background of each. The chapter data analysis begins with an in-depth explanation of the QCA method and points out the distinct features and advantages. A crucial step is the calibration of the conditions into fuzzy sets.



## 4.1 Research methodology

In contrast to standard statistical techniques, QCA has developed a distinct terminology, which is introduced using an example. A researcher who strives to investigate the independent variables of the dependent variable fire is likely to include oxygen, combustible material and a spark in his analysis. In this analysis he will conclude that fire is an equation of oxygen, combustible material, and a spark. In QCA, these three factors are referred to as “conditions”. The fire would be the “outcome”, that is being explained and the final equation is described as “solution formula” or “solution term” (Schneider & Wagemann, 2010).

The thesis is classified within two dimensions: Practical applicability of the thesis and types of data collection. Gibbons et al. (1994) distinguished in management research between two modes: while the first mode is primarily concerned with fundamental research and few practical applications, mode two research focuses on the creation of relevant practical knowledge. As an alternative to classifying this treatise, the continuum between basic research and applied research by Saunders et al. (2009) can also be used. Even though the research outcome of this treatise is of great theoretical relevance, this work can rather be stated as mode two research (Gibbons et al., 1994) or placed near the applied research end of the continuum (Saunders et al., 2009).

Two major types of studies have shown great significance in competitive dynamics research: field studies and archival studies (Smith, Ferrier, & Ndofor, 2001). Field studies collected data on actions and responses with surveys and interviews and thereby collected comparably small samples. Archival studies in contrast rely on actions and responses published in journals, newspapers, and magazines (Smith, Ferrier, & Ndofor, 2001). At the beginning of research on competitive dynamics, scholars gathered primary data, using field studies. This data collection method resulted in rather small samples of single industries. An example is the study of 22 managers of high-technology electronic firms that generated 47 actions and reactions (Smith, Grimm, Chen, & Gannon, 1989). Later, archival studies were applied to gather greater samples from multiple industries (Smith, Ferrier, & Ndofor, 2001). Public sources such as the Aviation Daily were reviewed and coded for actions and interactions (Chen, Smith, & Grimm, 1992). This method also enabled scholars to create large samples of many industries and study the behavior and performance over a longer period. Examples of archival samples are the airline (e.g. Chen et al., 1992), brewing, personal computers, telecommunication (Lee et al., 2000), and software (Young et al., 1996) industries. Consistent with the previously argued differences between field studies and archival studies, this thesis will be classified as a field study. 65 operation site managers returned the survey and generated data on 130 interactions (n = 130).

The term ethics in the context of research refers to the appropriateness of all behavior “*in relation to the rights of those who become the subject of work, or are affected by it*” (Saunders et al., 2009, p. 183-184). To comply with the highest ethical standards during the research, every step will be challenged by ethical considerations and potential conflicts of interest are communicated proactively with the supervisor of this thesis. For example, the anonymous character of the interviews and the survey is of great importance to the researcher and the option to opt-out of the data collection is possible, without disclosing the identity of the individual.

## 4.2 Research object

This research was conducted at a firm which is active in a sub-segment of the German wholesale sector. For confidentiality reasons, this sub-segment and the firm itself are described in greater

detail in the confidential appendix. The following four reasons are provided as to why this sector is a great source to conduct competitive dynamics research. These statements regarding the industry are made on the basis of the interviews with industry experts. First, Germany in general and the wholesale sector in particular are characterized by strong competition. Germany has recently been ranked as number four in the global competitiveness survey by the World Economic Forum (2016). In Figure 5 the performance indicators (operating margin and EBIT-margin) of the wholesale sector are shown in dependence of revenue size (n = 697 in 2012 and 647 in 2013). The average (median) operating profit margin in this industry improved slightly from 3.0% in 2012 to 3.1% in 2013 (Sparkassen Finanzgruppe, 2015). The median EBIT-margin increased as well from 3.8% in 2012 to 4.1% in 2013 (Sparkassen Finanzgruppe, 2015). Remarkably, the operating margin and EBIT-margin decreased with increasing revenue size in both years. Industries with a high degree of competition have been used extensively for research on competitive dynamics, for example, the U.S. retail industry (Boyd & Bresser, 2008) and the airline industry (Chen et al., 1992). These industries favor intense competition because industry structural conditions offer limited protection for market positions (Scherer & Ross, 1990). Second, most of the business is conducted with business customers. The customers are therefore not an anonymous crowd but clearly recognizable which helps to identify and distinguish competitive actions and reactions. Third, in this very market, prices are hardly fixed. Most of the time they are created within the buying process between two companies. Therefore, the market position of a company in comparison to its competitors is immediately reflected in prices (Schmalensee, 1988). Fourth, products and services in the market are commoditized. Competitors primarily differentiate by price which makes competitive actions more easily detectable and quantifiable than research, advertising, and design activities for instance (Schmalensee, 1988). Considering these characteristics, the wholesale sector is an excellent research object for competitive dynamics research.

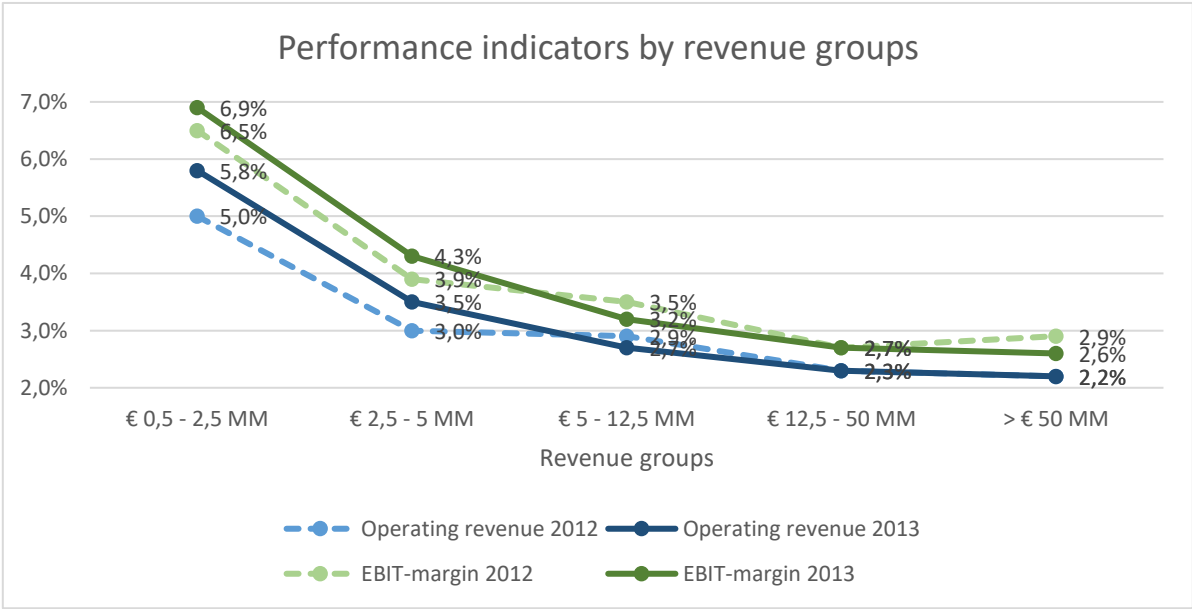


Figure 5: Performance indicators by revenue groups, own visualization

### 4.3 Interviews

Following prior research on competitive dynamics (Chen et al., 2010; Smith et al., 1989) and recommendations by advocates on the technique of quality comparative analysis (Schneider &

Wagemann, 2010), this study makes use of two consecutive methods for the collection of data. First, interviews are utilized to broaden the understanding and the applicability of conditions to the wholesale sector. Following these interviews, a survey was conducted to collect data on the identified conditions.

Conducting interviews has two purposes: First, it strives to deepen the understanding of the wholesale sector. Advocates in QCA emphasize the importance of profound knowledge in the intended field of research before the actual analysis takes place (Schneider & Wagemann, 2010). Second, the interviews are utilized as the foundation for the survey to identify conditions relevant for the outcome of competitive interactions.

Following the classification of interviews by Saunders et al. (2009), these interviews fall into the category of semi-structured interviews. Before the interview, a guideline is developed. The guideline is based on the literature review and survey characteristics of previous studies on competitive interactions. It is structured according to the general research model in competitive dynamics. The model was developed as a result of the literature review by Smith, Ferrier, and Ndofofor (2001) and structured the research into five main parts: First, questions regarding the attacker; second, concerning the competitive action; third, the industry competitive environment; fourth, regarding the responder; and last, concerning the competitive response to the action. The interview guideline (in German) is attached in the confidential appendix of this thesis. By building on substantial theoretical knowledge from the research model of competitive dynamics, the inclusion of theoretical knowledge is secured. Also, feedback from the assigned manager of the participating company on the interview guideline was considered to ensure the applicability of the questions towards the wholesale sector.

Six interviews with open questions were conducted between the 17.06.2016 and the 12.07.2016 in person or via telephone with three regional sales managers and three operation site managers. The guideline above served as the structure for the interviews and to ensure all questions were answered. When necessary, further questions concerning one of the five topics were asked to deepen understanding. The interviews were recorded, transcribed, and are attached to the confidential appendix.

After conducting the interviews, the transcripts were utilized to identify the most relevant conditions for the survey. These major conditions were then compared and matched with the long list of conditions generated from the general research model (Smith, Ferrier, & Ndofofor, 2001). This approach follows previous qualitative research within the field of competitive dynamics (Ferrier et al., 1999; Young et al., 1996). Therefore, the creation of the survey is based on theoretical literature and interviews with practitioners.

#### 4.4 Survey

This thesis utilizes a survey as a data collection method and thereby follows the appeal by Chen and Miller (2012) towards surveys as data collection methods to capture the dynamic and relative aspects of competitive dynamics. The survey is based on the identified conditions derived from the interviews. Overall, it comprises 27 unique questions, of which eight are optional. 23 questions are asked twice because the respondents were supposed to provide data to two interactions. The survey (in German) is attached in the confidential appendix of this thesis. Following the recommendations by Saunders et al. (2009), negative and positive statements are included to ensure awareness of the respondents. The rating is performed on a six-point Likert-type scale, ranging from 1 (far worse / very bad, etc.) to 6 (far better / very

good, etc.).

Likert scales have been used extensively in competitive dynamics research (e.g., Chen et al., 2010; Smith et al., 1989). Besides their broad distribution in the field of competitive dynamics, Likert scales are also favorable for QCA research (e.g., Ali, Kan, & Sarstedt, 2016; Emmenegger, Schraff, & Walter, 2014). In fuzzy sets particularly, they maximize the utilized information by including the true meaning of the answer, not just the deviation from the mean (Emmenegger et al., 2014). Another advantage of Likert scales is the unidimensional questions, to which the attendee either agrees or disagrees (Saunders et al., 2009; Schindler & Cooper, 2005). While bipolar scales, such as Semantic Differential Scales, seem to intuitively cover a broader range of possible answers (Schindler & Cooper, 2005), in the strict sense, they survey two sets. For example, a typical four-point Semantic Differential Scale question would be: How satisfied are you with the activity of your Government? 1. Completely dissatisfied; 2. Dissatisfied; 3. Satisfied; 4. Completely satisfied. From a QCA point of view, these are two sets: satisfaction and dissatisfaction. It can be argued that one is satisfied and dissatisfied at the same time, but at different degrees. Calibrated conditions are defined in the context of membership to a single set (Ragin, 2007).

In contrast to previous applications in the stream of competitive dynamics (Chen et al., 2010; Smith et al., 1989), a scale with an even number of prospects was selected, dissolving the ambiguity of the midpoint. While scholars like Saunders et al. (2009) state the advantage of providing a midpoint is the less threatening appearance of the question to attendees, such scales lead to a serious problem in the context of QCA: the calibration of the midpoint. As shown by Emmenegger et al. (2014), calibrating this center into either “more in than out” or “more out than in” requires a bold justification. To avoid possible inaccuracies, originating from the forced dichotomy in QCA, no midpoint is provided.

The survey was created in an iterative process in close collaboration with the associated corporation. After finalizing the survey, it was completed first by six operation managers in a test run. The managers were explicitly asked to give feedback and point out any inaccuracies, and to evaluate the comprehensibility of the survey questions. Based on their feedback, one question was rephrased to make it more comprehensible. The data from the test run on this question was still included because the managers had the right understanding of the question. Even though the test run led to very positive feedback, it was decided to make telephone support optional for all respondents. The advantages of the optional telephone support are an increased flexibility by the attendee, while simultaneously providing an instant contact possibility to prevent misunderstandings. This compromise leads presumably to a higher return rate of the surveys and an improvement of data quality. Three phone calls from managers were received. All three had different technical issues with starting the survey, due to incompatible software. These issues could all be solved by using a different computer to fill out the survey.

The survey was sent out by email to all 71 operation site managers with the request to complete it within ten days. The email also contained instructions and information for the participants. Overdue participants were reminded in a second email that the deadline had passed and asked kindly to participate. Conscious resistance to participate in the survey was accepted without disclosing the identity of the manager. This procedure resulted in 65 responses, accounting for 130 described interactions (response rate of 91.5%). One of these 65 responses was empty, resulting in complete data on 128 interactions (a valid response rate of 90.1%). All answers were collected between 01.08.2016 and 26.08.2016.

An important determinant in competitive dynamics is the concept of relativity (Chen & Miller,

2012). Therefore, important conditions in competitive dynamics, like market share, size, and performance, are measured in relation to the competitors (Chen & Miller, 2012). The acknowledgment that competitive interactions require human agency gave birth to the aforementioned fifth research stream in competitive dynamics research: the notion of perception (Staw, 1991). Following this core principle, the operation site managers were asked in the survey to provide data on the perceived situation, e.g., “How do you rate the market knowledge of the operation site manager of your competitor?”

Following, the survey-questions for the six conditions and the outcome are stated. All factors that were measured with Likert scales are statements, to which the managers had to state their approval:

- **Severe attack:** The condition “severe attack” is defined as the damage directly caused from the attack and measured with the question, “How many Euros gross margin was directly destroyed by the attack of the competitor?”
- **Strongly underbidding the price of the competitor:** The first possible reaction to an attack is to strongly underbid the competitor’s offer. This condition was measured with two consecutive questions: First, using Boolean algebra, the question asks “Did you underbid the offer of the competitor?” followed by the question, “If yes, in comparison to previous interactions, you did underbid the offer of your competitor by far.”
- **Strongly complaining at the supplier:** This indirect reaction was again measured with two questions, the first asking, “Did you complain about the action of your competitor at your industry partner?” followed by, “If yes, the complaint was, compared to previous complaints, more aggressive (number of complaints, complaint to the supervisor).”
- **Competitor in a bad economic situation:** The translated survey question that supplies data in the condition ‘competitor in a bad economic situation’ states, “At the time when the interaction occurred, the overall economic situation of the competitor was bad.”
- **Good relationships with partners:** The condition “good relationship with partners” is a construct of two questions, which translations state, “Your personal relationship with your supplier, whose product (or substitute product) was subject to the competitive action of your competitor, was good prior to the competitive action” and “Your personal relationship with your customer, who was attacked by your competitor, was good prior to the competitive action.” This condition is formed by combining these two question with the logical AND operator, which is described in chapter 4.9.
- **Superior service-level compared to the competitor:** This condition was measured by the question, “The service-level (sales personnel, logistic performance, product availability) of your operation site was superior to the service-level of your competitor at the time of the interaction.”
- **Strongly declining long-term revenue:** The outcome in this QCA results from the question, “The revenue from the customer, who was targeted in a competitive move by your competitor, declined in the aftermath of the interaction, compared to the time before.”

#### 4.5 Potential biases

While surveys are a great source of data collection, they also inhibit a viable threat: They require the participation of individuals (Rogelberg & Stanton, 2007). These non-responses can create several problems, most importantly the non-response bias. Non-response bias can lead to misleading conclusions that do not generalize within the entire population (Rogelberg & Luong,

1998). In striving to alleviate the consequence of this bias, Rogelberg and Stanton (2007) proposed nine “N-BIAS Techniques” and qualitatively rated their impact on their effect on the non-response bias.

The best way to avoid the non-response bias is by increasing the response rate. This survey has a valid response rate of > 90%. This high rate of response is largely due to efforts to increase the rate of responses, as recommended by Rogelberg and Stanton (2007). The managers were notified in an extensive email about the purpose, importance, and benefit of this study. The survey was carefully designed and kept at a manageable length. Last, overdue answers were recorded, and reminders sent in a second email. For ethical purposes, the possibility of non-participation was mentioned to the participants.

Four of the six non-responses that occurred can be explained: One manager only joined the organization a few days before the survey started and therefore lacked the knowledge to answer the questions. Another manager was on a two-week vacation when the survey was sent out. Due to organizational restructuring, two managers took charge of two operation sites each, but only filled in one survey each. As stated above, one manager responded but indicated that he could not recall and competitive interaction. This concluded that only two responses remain unexplained, which results in <3% of unexplained non-responses. Therefore, the non-response bias is disregarded in this study.

Common method bias is an endogenous threat in self-reporting survey research when the dependent and independent variables are derived from the same respondents (Podsakoff & Organ, 1986). Therefore, variances in answers occur that cannot be explained by real life situations, but by the tendency of participants to report coherent results (Paulssen, Temme, & Lutz, 2009). Consequently, self-reported data may create false relationships or neglect real relationships (Chang, Van Witteloostuijn, & Eden, 2010). Even though the effects of common method bias are not undisputed in research (Spector, 2006), this thesis tries to alleviate the effects as much as possible.

The data collection in this setting requires the active participation of dozens of operation managers. Unfortunately, data collection of explanatory factors and outcome factors that were turned in separated by time and location was not possible due to time constraints of the participants. The introduction of the survey emphasizes the anonymous character of the survey and no right or wrong answers exist. The survey is separated into different parts, with approximately equal lengths. Thereby, the outcome factors are separated from the explanatory factors which will reduce the potential risk if there are interferences between these two kinds of questions. The questions also ask in different directions, for example, “You are satisfied with the results of the interaction” and “The revenue did decrease in the aftermath of the interaction”. Consequently, it becomes harder for the participants to harmonize the different answers actively. It is concluded that these actions are likely to reduce the common method bias to an acceptable level.

Finally, the questions regarding the conditions ‘competitor in a bad economic situation’ and ‘superior service-level compared to the competitor’ imply that the operation-site managers are capable to assess the situation realistically. Favoring this assumption, the operation site manager have on average 27 years of experience in the industry. Therefore, it is assumed that they can assess the economic strenght of competitors realistically. Furthermore, Johanson and Vahlne (2009) argues that firms are likely to engage in knowledge sharing activities with important suppliers. The interviews revealed that good relationships with suppliers are of crucial importance in this wholesale sector. Thus, it is likely that suppliers spread informations

across competitors, which enhances the capability of operation site managers to assess the economic situation of competitors and the relative service-level compared to the competitor realistically.

#### 4.6 Cleaning and enrichment of the survey data

Before the raw data could be processed, it had to be cleaned. First, the formatting was unified. Some answers that were supposed to be numbered were given in words (e.g., “zwei” instead of “2”). Second, all numbers were transferred into equal units. If an answer which was supposed to be in millions, was answered including the six zeros, it was brought into the right format. Third, deviating answers that meant the same were corrected. For instance, one question asked for the name of the competitor and the next for the total number of operation sites this competitor had. When the same competitor was mentioned in the former question, but the latter had deviating answers due to a factual error, the latter answer was corrected. When possible, the answers were corrected based on external knowledge (e.g., the website of the competitor). Whenever this option was not feasible, the average of the answer regarding the same topic was used. Fourth, spelling errors were corrected. Fifth, answers that gave a range instead of a concrete number were replaced with the midpoint of this range. Finally, responses that showed no variation within the questions or included statements that indicated resistance or unfeasibility of answering truthfully were removed.

The data collected through the survey was enriched by information from two different sources: performance indicators on each operation site, provided by the associated company, such as market share, revenue, and profitability and data concerning the market environment of the operation sites. This data on market environment originated from a consulting project by a German management consulting firm, conducted in 2016 at the associated company. This data was also sanity checked: One data point (profitability of one operation site) was removed because it could not result from normal business. This data enrichment was used to gain a deeper understanding of the individual situations and thereby be able to interpret the cases better.

#### 4.7 Sampling

As emphasized by Schneider and Wagemann (2010), explicitly stating the sampling decision is greatly important in QCA, because the causal inference is not based on notions derived from inferential statistics. Case selection in QCA shares two important objectives with random sampling: a sample should represent the whole population and should hold useful variations in the conditions of interest (Seawright & Gerring, 2008).

Following the classification of cross-case methods of case selection by Seawright and Gerring (2008), this research utilizes the typical case method, which is useful in confirmatory research either to agree or disagree with a given theory. This research builds on the set theory of competitive dynamics, applying a deductive approach by grounding the survey on the general research model and inductively matching the results to set theories. The typical case method is thereby highly appropriate for this research.

The sample for the survey comprises 64 operations managers, each responsible for one operation site of the German wholesale company. The German wholesaler has bundled its operation sites in six sales areas. The email with the survey was sent to all operation sites of all six sales areas. Therefore, no sampling was conducted regarding the choice of the participants.

However, every operation site manager was asked to provide data on two interactions of his choice, with a request to select cases with variation in the conditions. This supports the collection of cases that show variations. As a result, the two objectives stated above for representativeness and variations are met.

The 128 cases are derived from 64 operation site managers. This setting leads to the concern of dependencies between these two interactions per manager. To evaluate this concern, the cases were analyzed, comparing the described attacker. The analysis shows that only eight (12.5%) operation site managers described interactions with the same competitor, which indicates a high independency between the two provided cases.

#### 4.8 Data analysis

The following paragraphs strive to describe the method used to analyze the data. The research stream of competitive dynamics has benefited from the heterogeneity of applied methods from which none have been proven superior to others (Chen & Miller, 2012). Therefore, as the first study that applies fs/QCA to the research stream, competitive dynamics beneficially increase the diversity of research methods and deepen our understanding of these interactions.

Qualitative comparative analysis (QCA) was developed by Ragin (1987) as a chimera between qualitative and quantitative social research to overcome the lack of analysis with a medium-sized sample (Marx & Dusa, 2011). The integrity of incidents as multidimensional constructions of causal factors is thereby maintained, while simultaneously enabling a heuristic analysis of similarities and differences in causal factors across multiple incidents (Greckhamer, Misangyi, Elms, & Lacey, 2007). This method is based on set theory and causal claims generated by means of subsets and supersets (Ragin, 2008b). Therefore, this theory contrasts correlation-based methods that focus on tendential relationships, such as regression analysis (Emmenegger, 2011).

The imperative of dichotomization of conditions and outcomes, resulting in an undesired loss of information, has been criticized (Emmenegger, 2011). For example, a company had to be squeezed into the categories “successful” or “not successful”, a country into “democratic” or “not democratic”, and an economy had to “grow” or “not to grow” (Wagemann, Buche, & Siewert, 2016). Responding to the critiques, Ragin (2000) developed fuzzy set qualitative comparative analysis (fs/QCA), which is a combination of fuzzy set theory and qualitative comparative analysis. Fuzzy sets allow for partial membership of sets, which breaks the imperative of dichotomy (Emmenegger, 2011).

Now, almost 30 years after the beginning of the “*Ragin Revolution*” (Vaisey & Ragin, 2009, p. 308), QCA has been used in multiple scientific disciplines for many years, while for social scholars, it is still relatively new (Emmenegger, 2011; Ragin, 2006; 2007; Schneider & Wagemann, 2010). Despite only recent applications, QCA has become increasingly dominant in business and management research (Wagemann et al., 2016). As shown in Figure 6, business and management publications in scientific journals have become the most flourishing environment for QCA publications (Wagemann et al., 2016).



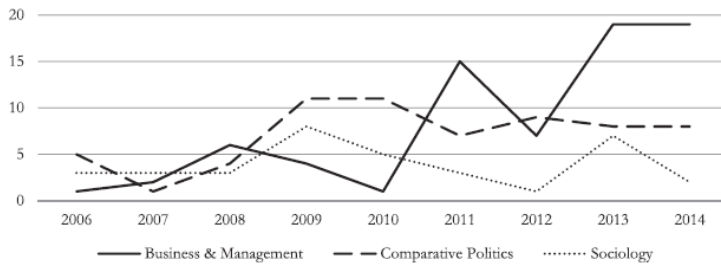


Figure 6: Number of articles by discipline (Wagemann et al., 2016)

The data collected by the survey will be analyzed with the fuzzy set qualitative comparative analysis (fs/QCA) method (Ragin, 2008b; Rihoux & Ragin, 2009; Schneider & Wagemann, 2012) to identify necessary and sufficient conditions for a positive and a negative outcome of competitive interactions. The inclusion of six conditions into the analysis leads to the challenges regarding conjunctural causality, equifinality, asymmetric causality, and multicollinearity. The method of fs/QCA is especially appropriate to dissolve these issues.

First, this set-theoretic method identifies conditions which might display no outcome on its own, but only in conjunction with other conditions. Thereby the notion of conjunctural causality is covered (Wagemann et al., 2016). Some quantitative statistical methods are limited regarding the inclusion and combined analysis of variables (Fiss, 2009). Factors that lead to an outcome only in conjunction with each other are at the focus of this study, as elaborated in the last paragraphs of chapter 2.4.

The second strength of fs/QCA is the capability to determine the number and complexity of alternative combinations leading to a desired or undesired outcome by using Boolean and fuzzy algebra (Fiss, 2011; Greckhamer et al., 2007; Ragin, 2008b). By embracing this set-theoretic approach, the social phenomena of equifinality is considered (Schneider & Wagemann, 2012). Thereby, it is particularly suitable for analysis in multifactor comparative studies (Lacey & Fiss, 2009). Combining the conjunctural causality and the aforementioned equifinality implies the recognition of “insufficient but necessary parts of a condition which is itself unnecessary but sufficient for the results” (Goertz, 2003; Mahoney, 2008; Schneider & Wagemann, 2012) and “sufficient, but an unnecessary part of a factor that is insufficient, but necessary for the result” (Mahoney, Kimball, & Koivu, 2009).

Third, asymmetric causality means that factors leading to a particular outcome might be different from factors resulting in the negated outcome (Hinterleitner, Sager, & Thomann, 2016). By utilizing QCA as a research method for the previously described integration of the three themes in competitive dynamics effectively addresses these drawbacks. Therefore, QCA is highly appropriate as a research method to answer the stated research question.

Fourth, and in contrast to most analysis in social science, fs/QCA acknowledges the multicollinearity of conditions (Ragin & Sonnett, 2005). Multicollinearity is the result of one or more independent factors in a model that are highly correlated (Cooper, Schindler, & Sun, 2003). McGahan and Porter (2002) criticize that variance-decomposition research approaches a glass ceiling and suggests that new methods must be explored to identify the cross-sectional relationship between the industry, corporate-parent, and business specific effects.

Furthermore, this method lends itself to studies on small samples (Greckhamer et al., 2007). As described, Charles Ragin developed QCA to overcome the lack of research with medium-sized samples (Marx & Dusa, 2011). Therefore, QCA builds a bridge between small and large samples by preserving the integrity of cases as complex compositions of causal conditions, while

allowing for a systematic cross-case analysis of similarities and differences (Greckhamer et al., 2007).

Last, unlike correlational relationships, fs/QCA allows for causal asymmetry (Fiss, 2011; Ragin, 2008b). Causal asymmetry is the idea that a set of conditions, leading to the presence of a particular outcome, need not be contrarious to the conditions leading to the absence of the outcome (Fiss, 2011). As exemplified by Ragin (2008b), the correlation between development and democracy is undercut by many less developed countries that are democratic. However, these cases do not undermine or weaken the consistency of the same set-theoretic claim.

Given the maturity of the research in competitive dynamics in general and the factors derived from the general research model (Smith, Ferrier, & Ndofor, 2001) in particular, the expectations of high degrees of asymmetry, and the dataset of 130 interactions, the fs/QCA approach is highly appropriate in this setting.

#### 4.9 Membership scores calibration

An important step of every fs/QCA is the calibration of data. Following the advice by Schneider and Wagemann (2010), appropriate software was utilized for calibration, minimizing truth table rows and identifying sufficient and necessary conditions. Prior to calibration, several software programs have been reviewed. The website Compass.org provides a comprehensive summary of software, suitable to apply fs/QCA (Compass, 2016). On this website, the different software programs are classified as graphical user interface (GUI), command line interface (CLI), and R packages. Finally, the GUI program fs/QCA 2.5, created by Ragin and Davey (2014) Charles Ragin, was selected due to the high dissemination of the software among researcher, as shown in Figure 7.

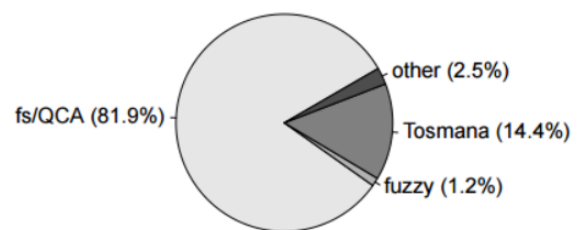


Figure 7: Market share of QCA-software (Thiem & Dusa, 2013)

Easy and difficult counterfactuals are simplifying assumptions that are used to reduce the solution path (Schneider & Wagemann, 2012). Easy counterfactuals are on the former extreme of the continuum between parsimony and complexity. They describe the assumption that adding a redundant causal condition to a configuration, known to produce a certain outcome, still produces the same outcome (Ragin & Sonnett, 2005). On the other end of the extreme, between parsimony and complexity, are difficult counterfactuals. In contrast to easy counterfactuals, they describe the attempt to dissolve a known causal condition from a configuration, producing a certain outcome, on the assumption this condition is superfluous for the creation of this outcome (Ragin & Sonnett, 2005). Following the recommendation by Emmenegger (2011); Schneider and Wagemann (2012), no difficult counterfactuals are included in the simplification that lead to the intermediate solution. Also, as advised by Ragin (2003), any simplifying assumptions incorporated into the solutions are discussed in chapter 3 and documented in Table 2.

For the justification of counterfactual assumptions, several underlying theories are introduced. While theory testing is an elementary part of qualitative social science research, it is not feasible in set-theoretic research for two reasons: First, set theoretic research is characterized by a back and forth between model and evidence (Schneider & Wagemann, 2010; 2012). In contrast, analysis based on inferential statistic requires that the researcher has not analyzed the data

prior to formulating the hypothesis (Schneider & Wagemann, 2012). It is concluded that testing a hypothesis with QCA either violates standards of good practice of set-theoretic methods or interferes with the core principles of hypothesis development and testing (Schneider & Wagemann, 2012). Second, as mentioned before, QCA accounts for causal complexity, and thereby equifinality and conjunctural causation (Schneider & Wagemann, 2012). Statistical models in contrast have practical limits regarding the inclusion of multiple variables. This concludes that set-theoretic research and hypothesis testing appears to be incompatible. Nevertheless, the integration of theories as fundamentals of directional expectations is crucial, as argued by Schneider and Wagemann (2012). Therefore, a discussion of underlying theories is included in the introduction of each condition.

A descriptive analysis of the distribution of answers among the conditions is provided in Table 3. Note that the two reaction types are calibrated from zero to six, as will be explained later. Furthermore, the condition ‘severe attack’ is not displayed because the answers are provided in Euros and not on a Likert scale. Since this factor is calibrated using percentiles, as will be explained later in this chapter, the cases are distributed according the percentile thresholds, which makes a careful consideration of the distribution superfluous. The sets ‘good relationship with supplier’ and ‘good relationship with customer’ are skewed. This issue is resolved by creating the set ‘good relationships with partners’, using the logical AND, and will be explained later in detail. Overall, the values show a good variance in the data, fulfilling an important objective of case selection in QCA, as argued in chapter 4.7.

| Scale | Strongly underbidding the price of the competitor (strundbid) | Strongly complaining at the industry-partner (strcompl) | Competitor in a bad economic situation (compfinbad) | Good relationship with supplier | Good relationship with customer | Superior service-level compared to the competitor (servsup) | Declining revenue (revdecl) |
|-------|---|---|---|---------------------------------|---------------------------------|---|-----------------------------|
| 0     | 96  | 42  | n/a   | n/a                             | n/a                             | n/a   | n/a                         |
| 1     | 16  | 1   | 47  | 7                               | 5                               | 10  | 50                          |
| 2     | 10  | 13  | 42  | 15                              | 15                              | 24  | 32                          |
| 3     | 4   | 19  | 26  | 26                              | 9                               | 28  | 17                          |
| 4     | 0   | 16  | 11  | 21                              | 12                              | 27  | 9                           |
| 5     | 1   | 23  | 2   | 33                              | 37                              | 27  | 12                          |
| 6     | 1   | 14  | 0   | 26                              | 50                              | 12  | 8                           |

Table 3: Conditions and distribution of values; "n/a" indicates that value does not exist

In the following, the factors introduced in chapter 3 are calibrated. In QCA, calibration is separated between crisp sets and fuzzy sets. While crisp sets define membership scores as either “fully in” or “fully out”, fuzzy sets allow scholars a more differentiated rating: The score can become any value in the range between 1 (fully in) and 0 (fully out). Qualitative anchors are established at a fuzzy value  $\geq 0.95$  (condition fully present) and  $\leq 0.05$  (condition fully absent). As seen in Table 4, the value 0.5 is point of maximum ambiguity. Any factor that surpasses this threshold is treated as “rather in than out” or “fully in”. Any value that undercuts this threshold is treated as “rather out than in” or “fully out”. (Ragin, 2000)

| Fuzzy value | The condition is              |
|-------------|-------------------------------|
| 1           | Fully in                      |
| 0.9         | Almost fully in               |
| 0.8         | Mostly in                     |
| 0.6         | More in than out              |
| 0.5         | Crossover: neither in nor out |
| 0.4         | More out than in              |
| 0.2         | Mostly out                    |
| 0.1         | Almost fully out              |
| 0           | Fully out                     |

Table 4: Verbal description of fuzzy-set scores, adapted from Ragin (2000)

In contrast to conventional social science, where scores are only meaningful compared to each other, fuzzy sets require a calibration relative to external standards (Ragin, 2008b). Ragin (2008b) uses the temperature of water to illustrate the importance of calibration: While, in conventional social science, the scores make it possible to be compared to each other and to create a ranking, important crossing points, such as 0° and 100° Celsius, are neglected. Such important external standards are included by calibrating the values. In the previous example, which strives to find conditions that explain the result fire, these standards could be the minimum amount of oxygen in the air needed for a fire and a minimum threshold of flammability for a material to catch fire. This calibration prevents severing the direct link to real data into theoretical constructs, as might happen in regression-based methods (Emmenegger et al., 2014). Following the recommendation of advocates of fs/QCA, the calibration of the variables is outlined in the following in a clear and transparent manner (Ragin, 2007; Schneider & Wagemann, 2010). As advised by Ragin (2008b) and Ragin and Sonnett (2005), substantive and theoretical knowledge is used when calibrating variables and converting them into membership scores.

Three crucial operators for performing set-theoretic methods exist: The first one is the logical “AND” and describes a combination of at least two conditions necessary to be all present to produce a certain outcome. This operator is formally written as “ $\cap$ ” and called a *conjunction* or a *logical AND conjunction* (Schneider & Wagemann, 2012). Following that, the expression by the utilized fs/QCA software (Ragin & Davey, 2014) and the convention by other researchers (Hinterleitner et al., 2016), the “\*” is used in the following to indicate the logical AND. The second operator is the logical “OR” and describes a combination of at least two conditions, from which at least one must be present to produce a certain outcome. This operator is formally written as “ $\cup$ ” and is called a *union*, a *disjunction* or a *logical disjunction* (Schneider & Wagemann, 2012). Again, the convention of other researchers is followed (Hinterleitner et al., 2016; Ragin & Davey, 2014), and the “+” used to indicate the logical OR. The third and last operator is the logical “NOT” or the complement and describes the negation of conditions. This operator is formally written as “ $\neg$ ” (Schneider & Wagemann, 2012).

As argued by Ragin (2007), measuring a condition by different and correlated scales is expected to lead to better results. The questions regarding good relationships with supplier and customer are exposed to a potential bias towards a positive response. A manager might at least answer one of the questions, indicating a good relationship with either the customer or supplier, to show his capability to create and maintain good strong ties with stakeholders. To account for this tendency, the logical AND operator is used, selecting the minimum value of both sets. This procedure results in a set with a rather even distribution of values, as shown in Table 3.

Fuzzy-sets can be calibrated with the direct and the indirect approach: the direct approach uses a logistic function to migrate the raw data between the three aforementioned anchors of “full membership”, “point of indifference”, and “full non-membership.” The indirect method requires a grouping of the cases into the fuzzy values (Schneider & Wagemann, 2012). As shown by Emmenegger (2011); Schneider and Wagemann (2012), as long as the qualitative anchors are carefully selected, no substantive differences are arising from applying the direct or indirect method. All conditions surveyed with a single Likert scaled question are calibrated using the direct method and the following qualitative anchors: 1 = 0.05 = fully out and 6 = 0.95 = fully in. The anchors are 0.05 and 0.95 because a logistic function is used for calibration (Schneider & Wagemann, 2012). The midpoint requires an individual consideration of each condition.

The question, measuring the severity of the attack, is the only set not measured using a Likert scale. The managers reported the direct loss in gross margin caused by the attack in Euros. The data on this question exposes two outliers, indicating attacks with big consequences: one attack led to the loss of 100,000 Euros in gross margin, the second to the loss of 60,000 Euros. These two outliers show the great importance of interactions in the wholesale sector. As seen in Table 12, the median in this condition is at 4,350 Euros. Calibrating this set, percentiles were calculated as described by Fiss (2011); Misangyi and Acharya (2014). The 25 percentile shows 500 Euros. To avoid the exclusion of cases that fall exactly on this value, it is lowered to 499 Euros. The 50 percentile is at 1,200 Euros, which is adapted to 1,199 Euros for the same reason. Finally, the 75 percentile is at 3,975 Euros, which is again modified to 3,976 Euro. Note that the threshold for fully out is set slightly beneath the 25 percentile, while the threshold for fully in is set slightly above. Therefore, more cases are placed into the range between fully in and fully out, which enables a more fine-grained analysis.

The two conditions that consider the reaction options are constructs of two questions each. While the first question asks whether the reaction option was used, the second asks for the strength of reaction. When the first question was answered with a “No”, the overall score of the reaction was given a “0”. When the first question was answered with a “Yes”, the value from the follow-up question was used for the overall score. Therefore, a scale from zero to six was created. The mid-point was set at 0.5 for all three reaction options, accounting for the “Yes” in the first question and thereby the fact that a reaction was initiated.

The cases for the condition ‘competitor in a bad economic situation’ are strongly skewed, as shown in Table 3. The majority of managers indicated their rejection of the statement, “At the time when the interaction occurred, the overall economic situation of the competitor was bad.” Following the classification by Hinterleitner et al. (2016), a set is considered as strongly skewed if the proportion of cases with membership  $> 0.5$  is  $< 25$  or  $> 75\%$ . Skewed value can lead to false assumptions when applying the parameters of fit: consistency and coverage (Schneider & Wagemann, 2012). Thus the economic situation is put in relation to each other which implies modifying the threshold of indifference. Therefore, the midpoint is set at 2.5, considering the uneven distribution of cases in this set.

The other three conditions (‘good relationships with supplier’, ‘good relationships with customer’, and ‘superior service-level compared to the competitor’) describing the responder show a rather even distribution of cases. Therefore, the natural midpoint of 3.5 can be applied. The conditions, “good relationship with partners” and “good relationship with customers”, are combined to “good relationships with partners”, using the logical AND after the calibration of each set.

Finally, the outcome was calibrated. Again, the distribution of cases has been considered.

Striving for a rather even distribution, the midpoint was set at 2.5. A similar calibration procedure was performed by other researchers, like Fiss (2011); Misangyi and Acharya (2014), who calculated 50 percentile. The conditions and their calibration are summarized in Table 5.

|                     |  |  | Calibration (set membership) |                    |          |
|---------------------|--|--|------------------------------|--------------------|----------|
| Set                 |  | Measurement  | Fully out                    | Neither in nor out | Fully in |
|                     |  |  | 0.05                         | 0.5                | 0.95     |
| Attack condition    | Severe attack (sevattack)  | Measured in Euro   | 499                          | 1.199              | 3.976    |
| Response condition  | Strongly underbidding the price of the competitor (strundbid)                | Combining a dichotomous variable and a six-point Likert-scale to a seven-point scale | 0                            | 0.5                | 6        |
| Response condition  | Strongly complaining at the industry-partner (strcompl)                      | Combining a dichotomous variable and a six-point Likert-scale to a seven-point scale | 0                            | 0.5                | 6        |
| Attacker condition  | Competitor in a bad economic situation (compfinbad)                          | Measured on a six-point Likert scale   | 1                            | 2.5                | 6        |
| Responder condition | Good relationship with supplier AND  | Measured on a six-point Likert scale   | 1                            | 3.5                | 6        |
|                     | Good relationship with customer  | Measured on a six-point Likert scale   | 1                            | 3.5                | 6        |
| Responder condition | Superior service-level compared to the competitor (servsup)                  | Measured on a six-point Likert scale   | 1                            | 3.5                | 6        |
| Outcome             | Declining revenue with the customer in the aftermath of the attack (revdecl) | Measured on a six-point Likert scale   | 1                            | 2.5                | 6        |

Table 5: Measurement and calibration

As introduced above, sets in QCA can alternatively be calibrated with percentiles, as shown by (Fiss, 2011; Löwik, 2013). Thus, for example the upper and the lower 25 percentiles are used as thresholds for full membership and full non-membership respectively and 0.5 percentile as a cross over point. This calibration method has the advantage that it automatically corrects skewed sets of data. The disadvantage is that the true meaning of the Likert scales gets lost. This study performs a calibration of data, using percentiles as a robustness check, as advised by Schneider and Wagemann (2012) and discusses the results in chapter 5.3.

#### 4.10 Truth tables

A truth table is a representation of all cases that exist or could exist in a set of data. Therefore, it displays a list of all possible combinations of conditions. Cases that comprise the same conditions are grouped together, uncovering agreement or disagreement regarding the outcome (Ragin, 2008b).

One issue of QCA is limited diversity, which describes the state that not all possible combinations might be present in the real world (Ragin, 1987; Ragin & Sonnett, 2005). The scholars Ragin and Sonnett (2005) state that limited diversity is an endemic trademark of naturally occurring social phenomena. While Ragin and Sonnett (2005) argue that in small and medium samples, limited diversity is the rule, not an exemption, Ragin (2003) showed that big samples with  $n = 758$  might also be affected by this phenomenon (providing data for only 13 out of 32 rows of the truth table). The direct consequences of limited diversity are combinations of causal conditions that lack empirical cases, which are referred to as “remainder” (Ragin, 2008b).

Schneider and Wagemann (2012), distinguish between three mutually non-exclusive forms for limited diversity: arithmetic remainders, clustered remainders, and impossible remainders. Arithmetic remainders describe the case where the number of truth table rows (number of truth table rows equals  $2^k$ , where  $k$  is the number of conditions) outnumber the cases.

Clustered remainders describe the social reality, which tends to pre-structure by social, political, and historical processes. Last, impossible remainders also exist, a combination of conditions that suspend each other (Schneider & Wagemann, 2012).

In this analysis the truth table comprises 64 rows ( $2^6$ ), from which 19 (29.7%) are empty due to limited diversity. As argued, this is neither surprising nor an issue in the analysis.

To reduce the number of contradictory rows, the truth table algorithm (also called the Quine-McCluskey algorithm) is applied. In most studies with a small sample, all configurations that show at least one instance are included in the analysis and are not treated as a remainder, as discussed above (Ragin, 2003). However, in studies with a large sample size, it is common to establish the truth table algorithm, which requires a relevance threshold (Schneider & Wagemann, 2010). Therefore, only configurations that exceed a certain number of instances are considered in the truth table and further analysis. In QCA, no universal threshold exists, because this depends on the specific research characteristics (Schneider & Wagemann, 2010). Setting this threshold is a trade-off between a safeguard against measurement errors, which might occur in large sample studies (Ragin, 2003) and the attempt to include at least 80% of the cases in the analysis (Misangyi & Acharya, 2014).

Given the sample size of 128 interactions, this study utilized a relevance threshold of at least two cases, which resulted in including 109 cases (85.2%). Consequently, a substantive barrier against measurement errors is erected and the clear majority of cases in the analysis is still included.

Two important measures used to evaluate set-theoretic relationships in fuzzy sets are consistency and coverage. Consistency assesses the degree to which the combination of causal conditions produces the same outcome. Therefore, consistency displays how closely the subset relation is approximated. Coverage evaluates how often the combination of causal conditions accounts for a certain outcome. If this outcome is produced by several paths, the coverage of any path might be small. In combination, the two measures can determine whether a causal condition is necessary, but not sufficient, for an outcome (Ragin, 2006).

In crisp set, qualitative comparative analysis (where sets can only have the value of one or zero), consistency is measured as the proportion of cases on or in that triangular shape above the diagonal of a XY plot. These plots visualize the membership of each case in the causal condition on the X-axis and its membership in the outcome on the Y-axis. However, concerning fuzzy sets, this analysis does not account for strong vs. weak membership in the causal condition or combination of causal conditions. Therefore, an alternative measure of consistency is put forward by Ragin (2006): Similar to the previously described consistency calculation of crisp sets, a case above the diagonal is consistent, while a case beneath is inconsistent. Fuzzy membership scores are utilized to rectify the scoring, by dividing the sum of the consistent membership scores of causal conditions by the sum of all membership scores (Ragin, 2003). The formula can be amended further by adding to the numerator the value of the outcome of the inconsistent membership score, that is consistent with the outcome. This measure gives credit for a close miss of consistency and a penalty for a miss by a large margin. This calculation of fuzzy set-theoretic consistency can be formalized as:

$$Consistency(X_i \leq Y_i) = \frac{\sum(\min(X_i, Y_i))}{\sum(X_i)},$$

where “min” demands to choose the smaller of the two values. Even though the level of consistency is research specific, the closer the consistency value is to one, the better (Schneider

& Wagemann, 2010).

As a general rule for sufficient conditions, the consistency value should exceed 0.75 (Ragin, 2008b; Schneider & Wagemann, 2012) and for necessary conditions 0.9 (Schneider & Wagemann, 2012). The thesis applied the same thresholds and sets the consistency value at 0.9 for necessary conditions. The threshold for sufficiency is determined based on gaps in consistency between truth table rows. In fs/QCA, the proportional reduction in inconsistency (PRI) value is the primary indicator (Ragin, 2008b).

Following Ragin (2006), the calculation of the set-theoretic coverage is conducted after the assessment of the consistency. Only after the threshold for consistency is surpassed, the measure for coverage should be calculated (Schneider & Wagemann, 2012). Therefore, after determining how consistent the results are, this formula displays how relevant the path for the outcome is. The formula, provided by Ragin (2006), reads:

$$Coverage(X_i \leq Y_i) = \frac{\sum(\min(X_i, Y_i))}{\sum(Y_i)}$$

where “min” again demands choosing the smaller of the two values.

Both numbers are often a trade-off: increasing consistency often means decreasing coverage and vice versa (Schneider & Wagemann, 2012). The coverage value is an important measure for all paths that surpass the consistency threshold.

Rows with a logical opposition to each other are called contradictory in cs/QCA and inconsistent in fs/QCA (Schneider & Wagemann, 2010). The definition of contradictory truth table rows is configurations of conditions, containing cases with different outcomes (Schneider & Wagemann, 2010). The advocate of QCA, Ragin (2008b), suggests these contradictions can be resolved by adding more conditions to the truth table. Schneider and Wagemann (2010) advise to exclude cases or to re-conceptualize the outcome. However, all of these actions have disadvantages: Adding conditions to the cases increases limited diversity and excluding cases or re-conceptualizing the outcome requires firm justifications, which might be lacking. Handling contradictory truth table rows is also a trade-off between coverage and consistency: the exclusion of contradictory rows diminishes the coverage of the QCA solution term, while vice versa, including these rows results in lower consistency due to the inclusion of cases with an opposing outcome (Schneider & Wagemann, 2010). Contradictory rows are considered in the utilized fs/QCA software by stating the predefined directional expectation of the conditions. Based on these and the complex and the parsimonious solution, the intermediate solution is created. As recommended by Schneider and Wagemann (2010), the number and treatment of inconsistent rows are explicitly stated.

These truth tables are the foundation for the development of solution paths. In these paths a condition can be present, absent, or not shown at all. It is important to state that there is an important difference between the last two: If a condition is absent, it must not occur. In contrast, if a condition is not shown at all, it does not matter in this path (Schneider & Wagemann, 2012).

## 5 Results

In the following, detailed information is provided how the results are derived, which choices have been made, and what outcomes have been found. Due to space restrictions, not all graphs



and tables are presented in this chapter. Therefore, an extensive appendix is provided that contains all relevant information. The structure of the appendix is based on the study by Hinterleitner et al. (2016), which was highlighted for good practices of QCA documentation (Wagemann & Schneider, 2015). The analysis of data, presented in the following chapter is structured using the Table 6, adapted from Löwik (2013). Note that the different sections of analysis always start with the negated outcome, representing interactions that resulted in retaining the long-term revenue, thereby the intuitive focus of interest is put first.

| Step #  | Description   | Activity   |
|---------|---|--|
| Step 1  | Analysis of necessary conditions  | <ul style="list-style-type: none"> <li>– Calculation of necessary conditions</li> <li>– Threshold of <math>\geq 0.9</math> (Ragin, 2008b)</li> </ul>   |
| Step 2  | Analysis of sufficient conditions   |  |
| Step 2a | Identify sufficient condition combinations                                  | <ul style="list-style-type: none"> <li>– Calculate fuzzy-set truth table for the negation of ‘declining long-term revenue’</li> <li>– Set case frequency <math>\geq 2</math></li> <li>– Select cases consistency <math>&gt; 0.75</math> (Ragin, 2008b)</li> <li>– Select intermediate model as solution</li> <li>– Choose paths with the highest coverage</li> </ul> |
| Step 2b | Create XY plot for the absence of the outcome ‘declining long-term revenue’ | <ul style="list-style-type: none"> <li>– Calculate combination of conditions, as identified in step 2a</li> <li>– Create XY plot for these solution paths</li> <li>– Critically evaluate plot and look for contradictory cases</li> <li>– Report contradictory cases</li> </ul>  |
| Step 3  | Determine the final configurations  | <ul style="list-style-type: none"> <li>– Select the solution formula with the least contradictions</li> <li>– Repeat step 2a to 3 for the opposite outcome</li> </ul>  |

Table 6: Overview of the systematic analysis process, based on Löwik (2013)

In this chapter, the presence and absence of conditions and outcome are indicated, following the overall convention in QCA, as exemplified by Schneider and Wagemann (2012). Conditions and outcome, written in capital letters, indicate the presence of this set. Lowercase letters are utilized to indicate the absence of a particular factor. In the following, the necessary and sufficient conditions are analyzed. Following the paper “Standards of Good Practice in Qualitative Comparative Analysis” by Schneider and Wagemann (2010), the sufficient and necessary conditions are analyzed in two separate analytical steps, with the former coming first (Schneider & Wagemann, 2007; 2010).

## 5.1 Necessary conditions

Necessary conditions describe factors that must be present for the outcome (Schneider & Wagemann, 2012). Simultaneously, they enable analysts to look at the data and predict: if you don’t do this, you won’t succeed (Dul, 2015). In other words, the outcome is a subset of the conditions (Löwik, 2013). An example would be as follows: the presence of fuel is a necessary condition for an Otto engine to work. Without fuel, the engine won’t run. However, fuel is not sufficient, since air (oxygen, to be more precise) and the ignition must be present as well. Following the recommendation by Ragin (2008b), the consistency threshold for the necessary conditions is set at 0.9.

First, the analysis for the negated outcome ‘declining long-term revenue’ is conducted. As shown in Table 7, the negated outcome has no condition that surpasses the consistency threshold of 0.9. Following Schneider and Wagemann (2012), this result is neither surprising nor problematic in the further analysis.

| Conditions tested: | Outcome variable: revdecl |          | Outcome variable: REVDECL |          |
|--------------------|---------------------------|----------|---------------------------|----------|
|                    | Consistency               | Coverage | Consistency               | Coverage |
| compfinbad         | 0.396                     | 0.806    | 0.520                     | 0.610    |
| ~compfinbad        | 0.808                     | 0.745    | 0.834                     | 0.443    |
| sevattack          | 0.556                     | 0.719    | 0.573                     | 0.427    |
| ~sevattack         | 0.557                     | 0.693    | 0.624                     | 0.448    |
| gorelview          | 0.718                     | 0.789    | 0.652                     | 0.413    |
| ~gorelview         | 0.466                     | 0.699    | 0.667                     | 0.577    |
| servsup            | 0.640                     | 0.789    | 0.626                     | 0.445    |
| ~servsup           | 0.550                     | 0.718    | 0.703                     | 0.530    |
| strundbid          | 0.287                     | 0.901    | 0.238                     | 0.430    |
| ~strundbid*        | 0.818                     | 0.651    | <b>0.945</b>              | 0.433    |
| strcompl           | 0.663                     | 0.715    | 0.685                     | 0.426    |
| ~strcompl          | 0.469                     | 0.721    | 0.542                     | 0.481    |

Table 7: Analysis of necessity; conditions with consistency  $\geq 0.9$  in bold; \*indications of trivialness

After this first analysis, the second examination reveals one conditions with a consistency value of  $>0.9$  for the presence of the outcome ‘declining long-term revenue’ (in bold). Following these results, the conditions ‘strongly underbidding the price of the competitor’ must be absent, for the outcome to be present. The results are depicted in Table 7. From a practical perspective, the high consistency value implies that a company can only suffer a decline in long-term revenue when the manager decides not to underbid the price of the competitor. Therefore, managers should underbid the offer by the competitor under all circumstances to avoid the decline of long-term revenue.

To enhance the trustworthiness of the results, this condition is analyzed regarding trivialness and screened for disconfirming cases (Booth, Carroll, Ilott, Low, & Cooper, 2013). A condition is viewed to be trivial if it is constant across all cases (Goertz, 2006). For instance, all armies require water and gravity to operate, which makes the conditions necessary, but they are also trivial because these are universal factors (Downs, 1989). A XY plot is created to look for contradictory cases (Schneider & Wagemann, 2012) and the overall distribution (Schneider & Wagemann, 2012). Cases below the diagonal indicate necessity, while cases above the diagonal indicate sufficiency (Schneider & Wagemann, 2012). A clustering of cases close to the right vertical axis suggest trivialness of the condition (Schneider & Wagemann, 2012). The XY plot in Figure 8 shows that the absence of the condition ‘strongly underbidding the price of the competitor’ has contradictory cases: The cases with the number 27, 3, 59, and 60 (in the marked top left quadrant) are contradicting the necessity. Due to overlapping intersections the XY plot appears to be rather empty, but the raw data uncovers a strong clustering along the right vertical axis, indicating the trivialness of the condition.

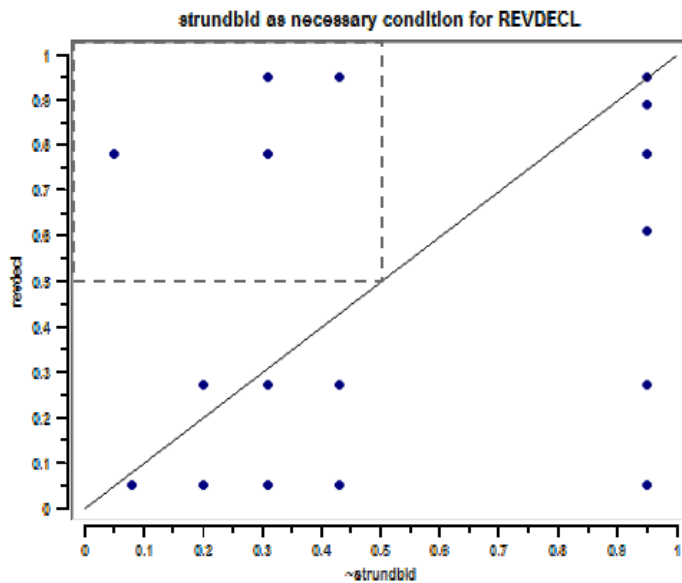


Figure 8: XY plot depicts absence of ‘strongly underbidding the price of the competitor’

Potential trivialness can also be assessed by the coverage value. Following the advice by Schneider and Wagemann (2012), the coverage value is thereby assessed for the relevance of the potentially necessary condition: a high coverage value indicates relevance, while a low value reports trivialness. Even though no universal threshold for trivialness exists, the coverage value of the identified condition is rather low. This concludes that the absence of the condition ‘strongly underbidding the price of the competitor’ with a consistency value of  $>0.9$  shows several contradictories and clear signs of trivialness. Therefore, it cannot be referred to as necessary condition.

The relativization of the necessity of this condition is in conformity with the previous introduction of this condition: literature (as mentioned in chapter 3) and conducted interviews provide reasons for situations in which underbidding is not necessary or beneficial. Furthermore, as discussed before, these values of fit must be interpreted with caution: The XY plot Figure 8 displays cases where low values of the condition also lead to declining long-term revenue, contradicting the necessity of the condition. In addition, signs that indicate trivialness were found.

## 5.2 Sufficient conditions

In this chapter the sufficient conditions are investigated. First, the analysis focuses on the absence of the outcome ‘declining long-term revenue’. In the second part, the presence of the outcome becomes central to the analysis and solution paths are analyzed for sufficiency. A condition (or a path of conditions) is sufficient for an outcome if it is only present when the outcome occurs, but the outcome can also occur without the conditions (Schneider & Wagemann, 2012). Technically speaking, the cause is a subset of the outcome. An example is the condition fire and the outcome destruction. Whenever fire is present (condition), destruction is also present (outcome). However, destruction (outcome) can also be present without fire (condition). As recommended by Ragin (2008b), the consistency threshold is set above 0.75 in any case. The precise determination of the threshold is based on the consistency gaps between the truth table rows. Large gaps between consistency values indicate significant differences in the composition of these rows that leads to the inclusion of contradicting cases (Schneider & Wagemann, 2012). A frequency threshold of at least two cases is implemented to

avoid measurement errors (Ragin, 2003). The resulting truth tables are displayed in the appendix, Table 14 and Table 18.

As recommended by advocates of QCA, three formulas are created: first, the complex solution (Table 15), which inhibits no simplifying assumptions. Second, the parsimonious solution (Table 16), which is based on simplifying assumptions for the logical remainder. To derive this solution, easy and difficult counterfactuals are used. Therefore, it is the counterpart of the first analysis. An alternative to both is the intermediate solution (Table 17), based only on easy counterfactuals, which were explained earlier in more detail (Ragin, 2008b; Schneider & Wagemann, 2010). Following the convention by other QCA studies (Hinterleitner et al., 2016) and the argumentation by Schneider and Wagemann (2012), the intermediate solution is put in the center of analysis. Since the complex, intermediate, and parsimonious solutions are displaying the same paths at different levels of complexity, a comparison among each other is not included. The solution paths of the intermediate solution that display the highest coverage are described, interpreted, and discussed in the following. In Table 8 are the three solution paths of the intermediate solution with the highest coverage, leading to the absence of the outcome 'declining long-term revenue' displayed. Again, XY plots are made to sanity check the results. The paths, identified to be sufficient for the solution, are set on the X-axis, while the outcome is displayed along the Y-axis. Contrary to the analysis of necessity, cases above the diagonal indicate sufficiency (Schneider & Wagemann, 2012). Contradicting cases are in the marked bottom right quadrant.

First, a truth table is created (attached in the appendix in Table 14) displaying paths that lead to the absence of the outcome 'declining long-term revenue'. Analyzing the truth table, a consistency threshold of 0.95 was set, due to the large gap in consistency between 0.955 and 0.922. The directional expectations, as stated in Table 2 are used in this analysis and the three forms of solutions created. To improve the structure of this chapter, the paths are numbered, which does not imply a hierarchic order.

| Conditions  | Solutions                                  |   |                                      |
|---|--|---|--------------------------------------|
|   | Path 1:<br>Outperforming<br>the competitor | Path 2:<br>Overpowering<br>the attacker | Path 3:<br>Impregnable<br>stronghold |
| The action  |  |   |                                      |
| Severe attack (sevattack)                                     |  |   | ⊗                                    |
| The response  |  |   |                                      |
| Strongly underbidding the price of the competitor (strundbid) | ⊗  | ⊗                                       | ⊗                                    |
| Strongly complaining at the industry-partner (strcompl)       | ⊗  |   | ⊗                                    |
| The attacker  |  |   |                                      |
| Competitor in a bad economic situation (compfinbad)           | ●  | ●                                       |                                      |
| The responder   |  |   |                                      |
| Good relationships with partners (gorelview)                  |  | ●                                       | ●                                    |
| Superior service-level compared to the competitor (servsup)   | ●  | ●                                       | ●                                    |
| Raw coverage  | 0.216                                      | 0.262                                   | 0.189                                |
| Unique coverage   | 0.018                                      | 0.055                                   | 0.003                                |
| Consistency   | 0.926                                      | 0.916                                   | 0.950                                |

Table 8: Selection of intermediate solutions for absence of the outcome 'declining long-term revenue' with the highest coverage; black circles indicate the presence of a conditions, circles with "X" indicate absence

The first path, leading to the absence of the outcome 'declining long-term revenue' comprises of four conditions. The reaction options 'strongly underbidding the price of the competitor' and

'strongly complaining at the supplier' are absent, while the condition 'superior service-level compared to the competitor' is present. In addition, the condition 'competitor in a bad economic situation' is present as well. Situations in which a 'superior service-level compared to the competitor' prevents the loss of revenue are labeled 'outperforming the competitor'. The constructed XY plot (Figure 9) displays one contradictory case (#53). This case describes an interaction in which the combination of conditions did result in a decline of revenue. A close examination revealed a possible explanation for this case: The manager did not have to underbid the offer by the competitor, because the customer did accept the more expensive offer, which can be explained by the superior service-level and the good relationships. Despite this success, the revenue declined in the aftermath of the interaction. This could be due to a strategic decision by the customer to source simpler and more standardized products at the competitor with inferior service capabilities, but lower prices. According to the interviews, this is a course of action that some customers take to save costs.

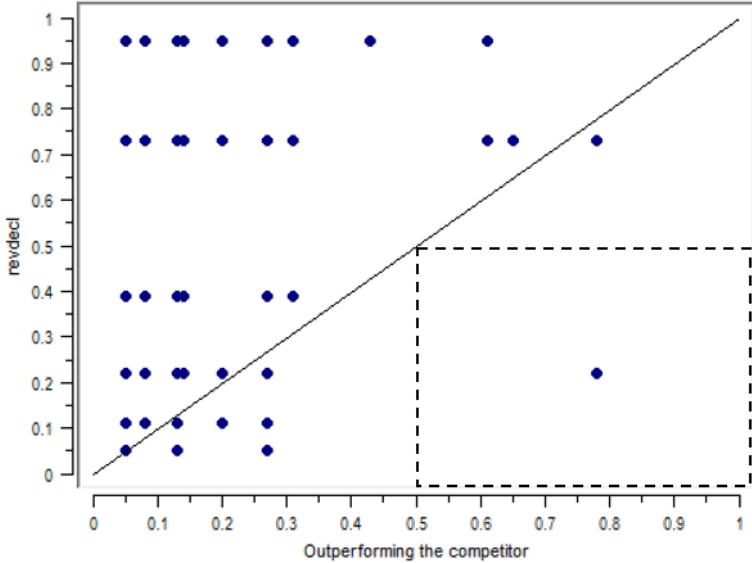


Figure 9: XY plot of path 1

The second path comprises of four conditions as well. Again, the reaction option 'strongly complaining at the supplier' is absent. This time, the attack by a 'competitor in a bad economic situation' is held up by the combination of present conditions 'good relationships with partners' and 'superior service-level compared to the competitor'. This path is named 'overpowering the attacker' due to the bad economic situation of the competitor. The XY plot (Figure 10) displays the contradictory case #53, the same case as in the first path. Thus, a similar reasoning applies for the existence of this contradictory case.

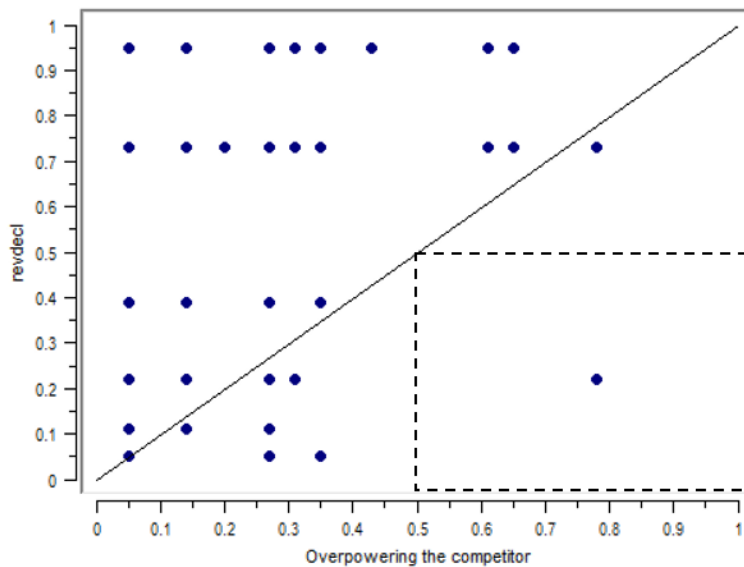


Figure 10: XY plot of path 2

The last combination comprises of five conditions. This combination could be described as the 'impregnable stronghold'. As in the previous path, the two conditions describing the responder 'superior service-level compared to the competitor' and 'good relationships with partners' are present. In this situation the focal company is attacked by a not 'severe attack'. Similar to the first path the two reaction options 'strongly underbidding the price of the competitor' and 'strongly complaining at the supplier' are absent. In conclusion, it appears that providing superior service capabilities and simultaneously maintaining good relationships with suppliers and customers is a viable alternative to avoid the necessity to react. The XY plot (Figure 11) identifies no contradictory cases, which supports the high consistency value of the path of 0.95 in Table 8.

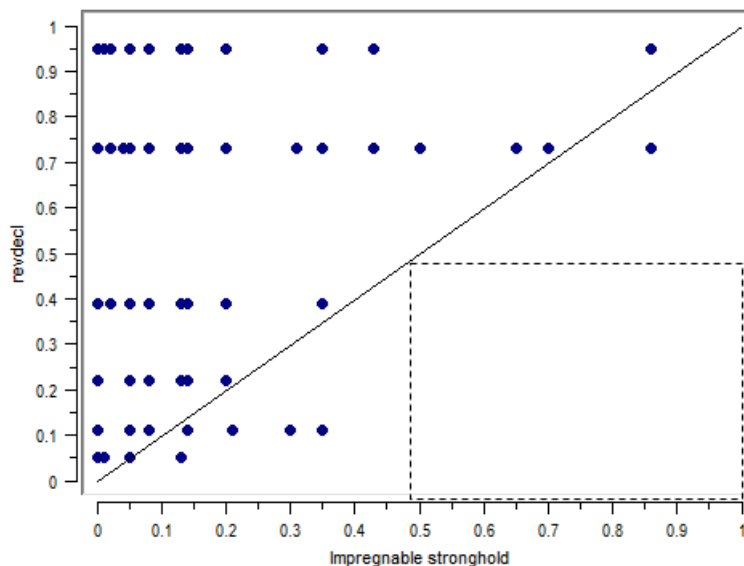


Figure 11: XY plot of path 3

After the analysis for sufficient conditions, displaying the absence of the outcome 'declining long-term revenue', a second analysis for its presence is conducted. Following this first analysis, a second truth table is created (Table 18 in the appendix), displaying paths that lead to the presence of the outcome 'declining long-term revenue'. The same directional expectations are used as before and three solution forms are created: The complex, the parsimonious, and the

full intermediate solutions are presented in the appendix in Table 19, Table 20, and Table 21. The consistency threshold was set at 0.8, due to the gap in consistency between two paths, displaying values of 0.807 and 0.797. The three paths of the intermediate solutions, displaying the highest coverage are summarized in Table 9. To improve the structure of the chapter, the numeration of paths is continued, making them path numbers 4, 5, and 6.

| Conditions  | Solutions                    |                                |                       |
|---|------------------------------|--------------------------------|-----------------------|
|   | Path 4: Laying down the arms | Path 5: Wallowing in self-pity | Path 6: Lonely defeat |
| The action  |                              |                                |                       |
| Severe attack (sevattack)                                     |                              | ●                              | ●                     |
| The response  |                              |                                |                       |
| Strongly underbidding the price of the competitor (strundbid) | ⊗                            | ⊗                              | ⊗                     |
| Strongly complaining at the industry-partner (strcompl)       | ⊗                            | ●                              |                       |
| The attacker  |                              |                                |                       |
| Competitor in a bad economic situation (compfinbad)           | ⊗                            |                                | ●                     |
| The responder   |                              |                                |                       |
| Good relationships with partners (gorelview)                  | ●                            | ⊗                              | ⊗                     |
| Superior service-level compared to the competitor (servsup)   | ⊗                            | ⊗                              | ●                     |
| Raw coverage  | 0.314                        | 0.281                          | 0.260                 |
| Unique coverage   | 0.070                        | 0.076                          | 0.035                 |
| Consistency   | 0.732                        | 0.785                          | 0.786                 |

Table 9: Selection of intermediate solutions for presence of outcome ‘declining long-term revenue’ with the highest coverage; black circles indicate the presence of a condition, circles with “X” indicate absence

The fourth path comprises of five conditions in total. Besides the absence of the two reaction options, the conditions ‘superior service-level compared to the competitor’ and ‘competitor in a bad economic situation’ are absent and the condition ‘good relationships with partners’ is present. This path covers interactions in which managers decided not to react, even though they indicated good relationships with suppliers and customers. This decision led to a decline in revenue and is referred to as ‘laying down the arms’. A XY plot is created to look for contradictory cases. Figure 12 shows the first path inhibits case #44 as contradictory interaction. When analyzing this case in-depth, it is striking that the operation site that reported case #44 is one of the five largest of the wholesaler and roughly twice the size of the attacker. It is reasonable to assume that the customer perceived the relative size of its supplier, compared to the attacker, as an important factor that was considered in the future business relationship.

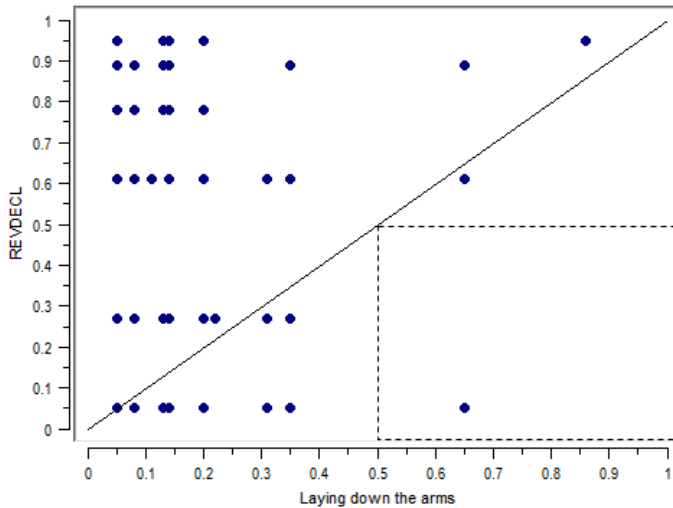


Figure 12: XY plot of path 4

The fifth path comprises of five conditions. The attacked company reacts by ‘strongly complaining at the supplier’, but not ‘strongly underbidding the price of the competitor’. Also, the conditions ‘superior service-level compared to the competitor’ and ‘good relationships with partners’ are absent, while the company is hit by a ‘severe attack’. This path describes a situation best referred to as ‘wallowing in self-pity’: While the conditions of good relationships with the customer and supplier and superior service capabilities are absent, the attacked company complains at the supplier. The focal firm hasn’t done anything to protect itself, and when attacked, only complains at the supplier instead of fighting back on his own. The XY plot shows two contradictory cases (#7, #39) for this combination, as seen in Figure 13. These two cases are interactions in which the displayed path did not lead to the outcome ‘revenue decline’. A close assessment of the cases #7 and #39 reveals one interesting similarity: The responsible contact person at the customer in both interactions has been a purchasing agent. In the interviews, it was stated that while good relationships with the customers are important, this effect vanishes with purchasing agents, since they are only focused on the cheapest price. In these two interactions, the opposite effect could be true as well: The severe attack and the absence of good relationships do not affect the future business relationships, resulting in the absence of ‘declining long-term revenue’.

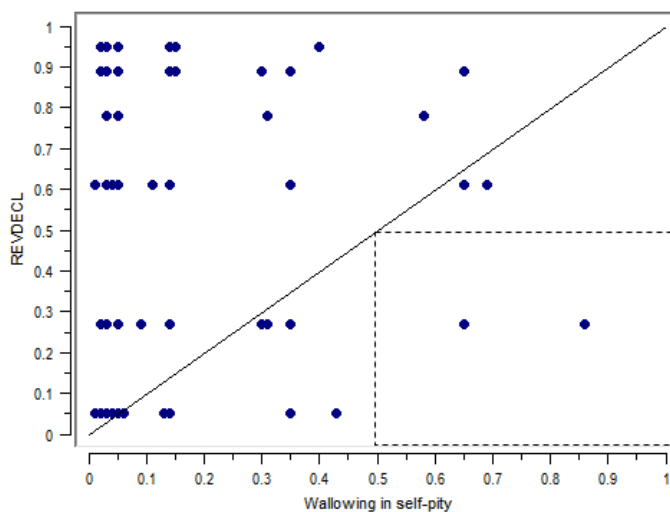


Figure 13: XY plot of path 5



The sixth path also comprises of five conditions. The focal company is attacked by a ‘competitor in a bad economic situation’, launching a ‘severe attack’. While the attacked company has ‘superior service-level compared to the competitor’, it suffers from the absence of ‘good relationships with partners’. Last, the manager decides not to underbid the attacker, which ultimately results in the decline of revenue. The path is referred to as ‘lonely defeat’. The XY plot in Figure 14 displays two contradictory cases, which are interactions #15 and #81. In these interactions, the just described conditions resulted in stable long-term revenue. The analysis of these two interactions reveals that in both situations the competitive position of the operation sites was superior to the competitor, which could have contributed to the absence of ‘declining long-term revenue’. Furthermore, case #81 describes one of the few interactions where the managers decided to counterattack the competitor by targeting one of his customers with a reaction that even exceeded the initial attack. The interviews suggested that this behavior might result in a retreat of the attacker. Due to skewed data, this condition couldn’t be included in this analysis.

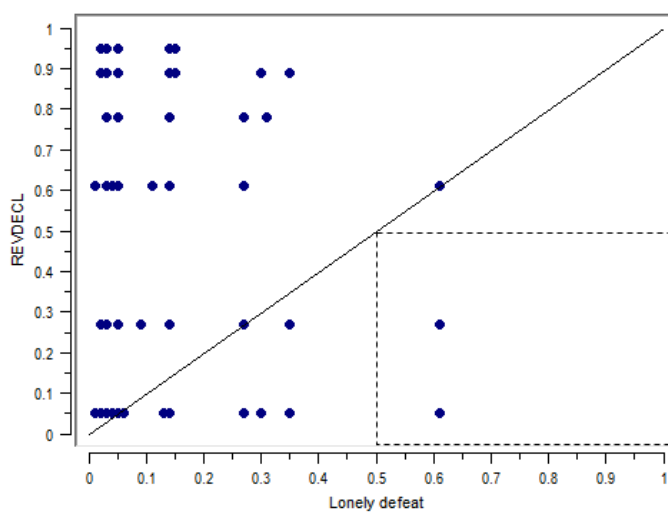


Figure 14: XY plot of path 6

### 5.3 Robustness

Threats to the reliability of the findings, like the common method bias or the nonresponse bias, are of constant concern to the researcher and are addressed in chapter 4.5. Furthermore, potential measurement errors are addressed by an in-depth understanding of the cases, based on six expert interviews and the advice from the supervisor of the associated company. Also, a relevance threshold of two cases was established to guard against measurement errors. Finally, as advised by Schneider and Wagemann (2012), all results are subject to robustness tests. However, robustness tests in QCA cannot simply copy those derived for standard quantitative techniques (Schneider & Wagemann, 2012). Before introducing the tests applied in the following, robustness in the QCA context has to be defined: Solution terms are considered to be robust in set-theoretic research if they involve similar necessary and sufficient conditions and low variation in consistency and coverage along different model specifications (Schneider & Wagemann, 2012).

Two forms of robustness tests are applied in this study: First, the calibration method of the cases is changed. As mentioned in chapter 4.9, the cases can be calibrated using percentiles to determine the threshold (Fiss, 2011). The effects of changing the calibration by using percentiles cannot be foreseen (Schneider & Wagemann, 2012). Second, the thresholds are

manipulated and the results checked for variations. The expected effects are very straightforward: Increasing the consistency threshold implies solutions with higher consistency, lower coverage and an improved subset relationship of the solution. Lowering the consistency threshold implies solutions with lower consistency, higher coverage and a worsened subset relationship of the solution (Schneider & Wagemann, 2012).

Calibration is one of the determining features in QCA (Ragin, 2008a). Defining the thresholds gives some room for interpretation to the scholar (Schneider & Wagemann, 2012). An alternative calibration method to the one previously applied is calibrating, using percentile (Fiss, 2011). Since only the midpoint severely affects the results, it is recalibrated using the 0.5 percentile. The procedure is performed according to the robustness check by Hinterleitner et al. (2016) and documented in the appendix, chapter 8.2. The analysis revealed that several conditions can be calibrated using an alternative threshold for the point of ambiguity. Due to different thresholds, a few of the results did adapt, however the changes were rather small and coherent to the overall value characteristics, indicating robustness of the results. Concluding, none of the alternative thresholds have been found to be superior to the original.

As introduced before, manipulating the consistency thresholds is another popular robustness measure: Following the recommendation by Schneider and Wagemann (2012), the threshold is set once above and once beneath the primal value. In any case this threshold is set above 0.75, as advised by Ragin (2008b). Therefore, larger gaps in consistency between truth table rows are chosen as alternative thresholds (Ragin, 2008a). This procedure results in an alternative higher threshold of 0.96 (between 0.955 and 0.963) for the absence of the outcome 'declining long-term revenue'. The analysis shows no changes in the solution. Last, the consistency threshold was lowered for the absence of the outcome 'declining long-term revenue'. The consistency threshold is set at 0.925 (between 0.922 and 0.93). Lowering the consistency threshold did not affect the solution paths either.

The same procedure is conducted for the presence of the outcome 'declining long-term revenue'. This procedure results in an alternative higher threshold of 0.816 (between 0.815 and 0.82). Raising this threshold results in no changes in the fourth path 'laying down the arms'. In the fifth path, the absent condition 'superior service-level compared to the competitor' is replaced by the presence of the condition 'competitor in a bad economic situation'. The sixth path is not displayed in the solution after raising the threshold. Concluding, the two paths with the highest coverage are barely affected by the raise of the consistency threshold. Furthermore, it is important to acknowledge that the primary threshold value was already set rather high. However, it must be stated that the sixth path is sensible for raising the threshold. Afterwards, the threshold for the same outcome was lowered to 0.79 (between 0.786 and 0.792). The analysis showed no adjustments to the previously presented paths of the intermediate solution. In addition, an additional path with a coverage of 0.3 did appear. To summarize, also lowering the consistency threshold does not lead to great differences in the solution 'declining long-term revenue', indicating a high level of robustness. Concluding, even though the analysis shows a few deviations when manipulating the threshold of consistency, the overall results are rather stable regarding different thresholds of consistency.

## 6 Discussion and conclusion

This chapter shows how the research question "How can managers prevent the loss of revenue, considering the severity of the attack, the economic situation of the attacker, the service

capabilities and relationships with partners, when confronted with an attack?” has been answered. In following, the results are transferred into a broader picture by concluding theoretical and practical contributions. Last, limitations of the study are discussed, and directions for further research are outlined.

## 6.1 Key findings

In general, the previous chapter showed three successful interactions, which lead to no decline of long-term revenue. Afterwards, three paths lead to an unsuccessful result, indicated by the decline of revenue. In the following, three major findings are presented, grounded in literature, explained by the interviews, and classified into the research streams. Last, four important characteristics found in the analysis are mentioned and explained.

The first major finding is the overwhelming absence of reactions. Path one and two state that the focal company must not react by underbidding nor by strong complaining to prevent the loss of long-term revenue. Path number five, labeled ‘wallowing in self-pity’ even requires a reaction and leads to the decline of long-term revenue. This finding is even more interesting, since it contradicts previous findings in competitive dynamic’s literature: Ferrier et al. (1999); Smith, Ferrier, and Grimm (2001); Young et al. (1996) suggest that competitively active firms outperform inactive ones by profitability, market share gains, and maintaining their market leader position. When comparing this finding to studies of competition, outside the stream of competitive dynamics, similarities to game theory are striking: Based on the findings of the first computer tournament, Axelrod (2006) identified another strategy that would have done even better than the tit for tat winning strategy. He named this strategy tit for two tats. The distinct feature is that this strategy is more forgiving, since it only defects after two consecutive defects of the opponent. A strategy that is rather forgiving, than punishing appears to be promising in competitive interactions as well. Therefore, this result offers contrasting findings to the stream of action-level studies in competitive dynamics.

The second finding centers around the combined effect of two factors. Path two and three incorporate the presence of the two conditions ‘superior service-level compared to the competitor’ and ‘good relationships with partners’. These two factors describe the attacked company and the findings suggest a complementary effect between them: The presence of these two conditions in combination prevents decline of long-term revenue. This finding is remarkable, since both conditions are grounded in two distinct theories of research: As argued in chapter 3, the condition ‘superior service capabilities compared to the competitor’ is derived from the recourse based view, while ‘good relationships with partners’ attribute to the network theory. The complementary effect of the presence of both conditions was already mentioned in the study by Peteraf (1993), who argues that the sustainability of the resource based competitive advantage might also rely on good relationships with supplier and customer. Lavie (2006) conceptualized the integration of these two streams by formulating the extended resource based view. Following the argumentation by Lavie (2006), the competitive advantage can be created by the network recourses of a firm. Also, findings from the interviews contribute to the explanation of this finding: The focal wholesale company is frequently in the role of the intermediary between supplier and customer, with little value added by the company itself. This implies that the service-level that is offered to the customer, like logistics performance and product availability, is influenced by the goodwill of the supplier. As stated repeatedly by interviewees, this goodwill depends on their relationship with the supplier. Therefore, these two factors mutually improve each other. By identifying the extended resource based view, this

analysis contributes to the fourth stream of competitive dynamics, introduced in chapter 2.4: integrative competitor analysis.

The third remarkable result is the central role of the condition 'good relationships with partners'. When these good relationships are missing, two contrary effects on two other factors are striking: First, the harmful effect by a 'severe attack' is clearly recognizable in the fifth and sixth path. Missing good relationships with customers can therefore be seen as a precondition for a successful severe attack. In the interviews, it was repeatedly stated by managers that a severe attack is a liability for the relationship with the customer because a big difference in price suggests deceptive pricing by the wholesaler. The absence of good relationships with partners is a fertile soil for this suspicion in these interactions. The result is the loss of long-term revenue. Second, missing 'good relationships with partners' seems to prevent a positive impact by the reaction 'strongly complaining at the supplier', as shown in the fifth path. The interviews support this finding: The supplier must be interested in the wellbeing of the wholesaler in order to act in his interest. When this good relationship is absent, a complaint at the supplier does not prevent 'declining long-term revenue'. The central role of 'good relationships with partners' relates to the second stream of competitive dynamics: business-level studies and emphasizes the importance of including factors from this level into the analysis of actions and responses.

Besides these three major findings, four additional characteristics have been found. In order to allow a focus on the three major findings stated above, these characteristics are presented in a reduced form.

First, paths that prevent the loss of revenue and paths that do not, are often rather similar. For instance, path one and path six have the occurrence of the factors 'superior service-level compared to the competitor' and 'competitor in a bad economic situation' in common. Furthermore, they both show that the competitor must not be underbid. It is important to state that the indicated absence of a condition is different to its non-appearance. While the absence indicates that the condition must not appear, the non-appearance indicates that the condition does not matter. Furthermore, the high similarities between paths, resulting in opposing outcomes indicate the marginal difference between success and failure in these interactions. The interrelated effects of the conditions imply that small adjustments might have large consequences.

Furthermore, it is striking that the focal company must not underbid the price of the competitor in all six described paths. As argued in chapter 5.1, this condition shows signs of trivialness which implies a high rate of appearance of this factor. In contrast, Table 15 and Table 19 (complex solutions for absence and presence of 'long-term revenue declined') show both one path, inhibiting the condition 'strongly underbidding the price of the competitor'. This shows that the interrelatedness of this factor is more complex than indicated by the featured intermediate solutions.

Third, the conditions 'superior service capabilities compared to the competitor' appears in all three paths that prevent the loss of long-term revenue. However, as shown in chapter 5.1, this condition is not necessary, indicating the importance of interrelated effects in competitive dynamics. This finding is consistently reflected in the interviews with the managers. The competitive actions in the wholesale industry are exchanged by lowering prices. However, as stated by these industry experts, the bottom line is often the offered service-level. Therefore, the service-level ultimately influences the outcome of the interaction.

Last, the condition 'competitor in bad economic situation' appears to have a central role in

paths one and two, preventing declining long-term revenue. As discussed in chapter 3, a bad economic situation might undermine the trustworthiness of the competitive offer and question the sustainability of the cooperation. This result favors the assumption by some managers, who state that customers are more interested in a stable and lasting relationship than in penny-pinching. However, a struggling opponent is not harmless as shown by the sixth path, leading to the decline in revenue: when a 'severe attack' is combined with missing 'good relationships with partners', the attacker might succeed and win the customer.

## 6.2 Theoretical contributions and directions for future research

The first research stream of action-level studies is enriched by these findings. The results contradict several previous findings in competitive dynamics by Ferrier et al. (1999); Smith, Ferrier, and Grimm (2001); Young et al. (1996). While these researchers repeatedly stated the importance of competitive activity, the previously described findings recommend a rather forgiving response-strategy. Further studies in the field of competitive dynamics must assess whether this finding is reproducible in different settings and how these contrary results arose.

Second, this analysis contributes to the fourth stream of competitive dynamics research: integrative competitive analysis. In addition to the first paragraph, the extended recourse based view in particular appeared to be highly relevant in competitive interactions. Research in competitive dynamics has so far neglected the complementary effect of a resource based advantage and a strong network. Future researchers are well advised to include the extended recourse based view in their analysis to further elaborate the effects on competitive interactions.

In addition, this study contributes to the second research stream of competitive dynamics: business-level studies. The findings in this analysis emphasize the importance of environmental conditions, such as relationships with customers and suppliers, superior service capabilities and the economically bad position of competitors. Thereby, the importance of integrating multiple conditions into the analysis and considering the social science phenomena of equifinality, conjunctural causation, and asymmetric causality is shown. As displayed in the results, effective combinations of environmental factors can replace the necessity to launch a reaction. The general research model in competitive dynamics incorporates several additional opportunities for integrating additional factors, striving for a more holistic understanding of competitive dynamics.

Last, this study enriches the field of research in competitive dynamics by analyzing a German sample, which is a rare exception since most samples are derived from the USA (Chen et al., 2010). Therefore, a different cultural background is included. This research setting could also be transferred to other companies, industries, and countries, thereby including different beliefs, norms, and cultures. This could help interpret the findings stated above, identify contradicting outcomes, and supply generalizable results for industries and countries.

## 6.3 Practical implications

In this chapter, recommendations for practitioners are stated. Research on competitive interactions is of great interest for managers in various industries, as shown in the McKinsey survey of global executives (K. Coyne & Horn, 2008). By including various factors in the analysis, the complex reality faced by managers in competitive interactions is partly replicated. Building on the three elaborated main findings in this study, three recommendations are also stated.

First, managers are well advised not to overreact to competitive actions. Naturally, fighting back in an attack can be appealing: It demonstrates strength, determination, and activeness. Therefore, managers could be inclined to react to actions frequently and/or exaggerating the reactions. In contrast, this study suggests patience and reticence when faced with an attack. Reactions should be implemented selectively and crafted carefully.

Second, and complementary to the former and following recommendation, the central role of good relationships with partners should be considered when planning the reaction and developing their own capabilities: The reaction of complaining at the supplier has been shown to backfire when good relationships are missing. Furthermore, a lack of good relationships with partners makes a firm vulnerable to severe attacks.

The time horizon for the last recommendation is more strategic: The analysis showed the strong combined effect of 'superior service-level compared to the competitor' and 'good relationships with partners' on competitive interactions. In order to be more successful, when attacked by a competitor, managers should strategically improve their service-level to a higher standard than the service-level of the competitor and simultaneously they should actively develop and maintain their relationships with customers and suppliers.

#### 6.4 Limitations

No ambitious project comes without limitations: Therefore, some constraints regarding this thesis must also be stated. Even though the unique and valuable sample provided by the associated company in the wholesale sector enabled this project, the findings are constrained by it as well. Generalizability or external validity describes whether the research findings apply equally in other research settings (Saunders et al., 2009). Befani (2013) argued that QCA overcomes the trade-off between in-depth case understanding and the ability to generalize the results. In a recent study, fs/QCA was compared to a regression analysis with a medium-sized sample (n=53) (Vis, 2012). The results showed both methods were equally suitable to analyze the data, while fs/QCA led to a fuller understanding (Vis, 2012). However, QCA also comes with some limitations regarding the generalizability: most importantly, the robustness of the QCA findings do not have systematic attention in the literature (Befani, 2013). Furthermore, robustness does not imply causality. Staying in the terminology of QCA, robustness is a necessary, but not a sufficient condition for causal deduction (Emmenegger et al., 2014). Therefore, the limitation must be made that conditions and outcome might not exist in a causal relationship. In the following, the discussion is split into generalizability within the organization of research and generalizability within in the industry.

As explicitly stated by Schneider and Wagemann (2010), results first and foremost hold for the cases examined. Within the organization, this study has characteristics that support the generalizable: the sample includes almost all operation site managers, while most of the missing answers could be explained. Second, the results show high degrees of consistency and a reasonable coverage, indicating coherent results, which represent an adequate number of interactions. Therefore, within the organization, the results are likely to be generalizable.

Within the industry, some specifics of this research must be considered. First, all data comes from one organization, operating in one industry sector in Germany. Therefore, this data might show characteristics unique to this sector and country. Therefore, the answers might be biased towards the specific actions, perceptions, and beliefs, which make it difficult to transfer the results to different environments. Also, the sample is limited to German managers, which restricts the explanatory power to cultures with similar norms and conventions, e.g., Hofstede

(1984). A rather large sample of competitive interactions and a theory-based process of identifying conditions strengthen the external validity of the results. Concluding, even though the results are of great relevance for other managers of wholesale companies, one must be careful in generalizing the results.

Internal validity describes the extent to which the results can be attributed to the interventions, rather than flaws in the research design (Saunders et al., 2009). While every step in this analysis strived to maximize internal validity, some limitations must be stated: Previous research suggests a reverse effect. The research design assumes an effect of the perceived economic situation of the competitor on the performance of the interaction. Findings by Lee et al. (2012) also suggest an effect in the reverse direction: The interaction outcome might affect the perception of the economic situation of the competitor. These interactions might be the bases for further studies in competitive dynamics.

Furthermore, space limitations made it necessary to focus on only one kind of action: Targeting the customer of a competitor with a lower price. According to the six interviews, this action is by far the most frequent one. Also, the focus on this one type kept the interpretation of the results to a reasonable length. However, the action repertoire in the wholesale sector is not limited to price action. Alternative options to attack a competitor are the offering of new products or services, headhunting personnel or opening new operation sites. Also, a third reaction possibility that was mentioned in the interviews was excluded from the analysis, due to highly skewed data: reciprocating the attacked by targeting one of the customers of the attacker. It will be interesting to see the effect of this progressive reaction on the outcome in future studies.

Besides the construction of barriers to prevent biases, as stated in chapter 4.5, a few questions might be exposed to a social desirability bias. This error can arise when respondents frame their answers in a direction that they believe favors their reputation, prevents potential harm, or is socially desirable. A social desirability response bias affects the data validity (Huang, Liao, & Chang, 1998). The conditions 'good relationships with partners' and 'superior service-level compared to the competitor' could be exposed to this bias. Different validated scales have been developed to measure this error, most famously the 33 item Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960). Due to its length, including such a scale into the survey was not a feasible option. Even though potential alleviating effects are discussed in chapter 3, this potential bias cannot be systematically negated.

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## 8 Appendices

### 8.1 Appendix: Data collection and analysis

Based on the six interviews with industry experts, 23 unique questions were formulated. The research model only consists of six conditions and one outcome, which is the result of ten questions ('good relations with industry partners' and 'good relations with customers' were aggregated into one question, and the three reactions are a construct of two questions each).

Alternatively, to the combination of 'good relations with industry partner' and 'good relations with customers', the combination of 'good relations with customer' and 'superior service-level' was also considered. Analyzing the data with the correlation coefficient showed that while the first two are correlated with 0.6, the latter two have a correlation of only 0.2. Therefore, it was decided to combine the two questions that showed a higher correlation and kept the condition with the lower correlation separated.

When formulating the statement for the outcome, the intention was to measure success by the assessment of three statements: "Overall, you are satisfied with the result of your reaction" was intended to be a universal measure of success. On the basis of the interviews, two further statements were formulated that aimed to assess at a more detailed level: "The revenue with the customer who was targeted in a competitive move by your competitor, declined in the aftermath of the interaction, compared to the time before" and "The attacker acted more aggressively in the aftermath of the interaction". Again, the correlation coefficient was calculated to test the expectation, that the overall satisfaction partly covers the other two questions. As shown in Table 10, the results showed otherwise: While the overall satisfaction negatively correlates with declining long-term revenue, the aggressiveness of the attacker appears to be uncorrelated with both of them. Therefore, the statement "The revenue with the customer who was targeted in a competitive move by your competitor, declined in the aftermath of the interaction, compared to the time before" was used as outcome.

|  | Overall, you are satisfied with the result of your reaction. | The revenue with the customer, who was targeted in a competitive move by your competitor, declined in the aftermath of the interaction, compared to the time before. | The attacker acted more aggressively in the aftermath of the interaction. |
|--|--|--|---|
| Overall, you are satisfied with the result of your reaction.   |  | -0,26  | 0,03  |
| The revenue with the customer, who was targeted in a competitive move by your competitor, declined in the aftermath of the interaction, compared to the time before. | -0,26  |  | 0,04  |
| The attacker acted more aggressively in the aftermath of the interaction.  | 0,03   | 0,04   |   |

Table 10: Correlations between the outcome-questions

| THE ACTOR                 | THE ACTION                  | COMPETITIVE ENVIRONMENT          | THE RESPONDER                | THE RESPONSE         |
|---------------------------|-----------------------------|----------------------------------|------------------------------|----------------------|
| <b>Awareness</b>          | Radicality                  | Industry structure and actions   | Actor characteristics        | Response Timing      |
| Market diversity          | Magnitude                   | Market commonality               | External orientation         | Response Order       |
| Organizational age        | Scope                       | Resource similarity              | Internal orientation         | Imitation            |
| TMT demographics          | Threat                      | Strategic similarity             | Organizational formalization | Response Likelihood  |
| Size                      | Implementation requirements | Environmental instability        | Structural complexity        | Response Type        |
| Age                       | Action irreversibility      | Market growth                    | Organizational slack         | Number of responders |
| Education                 | Type                        | Rate of new entry                | TMT demography               | Response Delay       |
| Tenure                    | Visibility                  | Industry concentration           | Competitor dependence        | Response match       |
| Functional background     | Centrality                  | # of firms in industry           |                              | Response difficulty  |
| And their heterogeneity   | Speed                       | Level of product differentiation |                              | Response speed       |
| <b>Motivation</b>         | Timing                      | Barriers to entry/exit           |                              | Response visibility  |
| Past competitive behavior | Sequencing                  | Market uncertainty               |                              |                      |
| Market share              | Intensity                   |                                  |                              |                      |
| Past performance          | aggressiveness              |                                  |                              |                      |
| <b>Capability</b>         | Competitive impact          |                                  |                              |                      |
| Organizational size       | Competitive inertia         |                                  |                              |                      |
| Slack                     | Repertoire simplicity       |                                  |                              |                      |
|                           | Repertoire nonconformity    |                                  |                              |                      |

Table 11: Long list of potential conditions, based on Smith, Ferrier, and Ndofor (2001)

| Condition   | Mean  | SD     | Min  | Max     | Percentiles |       |       |
|-------------|-------|--------|------|---------|-------------|-------|-------|
|             |       |        |      |         | 25%         | 50%   | 75%   |
| sevattack   | 4.444 | 11.063 | 0    | 100.000 | 500         | 1.200 | 3.975 |
| strunbid    | 0.46  | 0.99   | 0.00 | 6.00    | 0.00        | 0.00  | 0.75  |
| strcompl    | 2.71  | 2.20   | 0.00 | 6.00    | 0.00        | 3.00  | 5.00  |
| compfinbad  | 2.05  | 1.03   | 1.00 | 5.00    | 1.00        | 2.00  | 3.00  |
| vhltpartgut | 4.06  | 1.49   | 1.00 | 6.00    | 3.00        | 4.00  | 5.00  |
| verhltkundg | 4.65  | 1.52   | 1.00 | 6.00    | 4.00        | 5.00  | 6.00  |
| servsup     | 3.57  | 1.44   | 1.00 | 6.00    | 2.00        | 4.00  | 5.00  |
| revdecl     | 2.41  | 1.57   | 1.00 | 6.00    | 1.00        | 2.00  | 3.00  |

Table 12: Descriptive statistics of raw variables

### Calibration commands, used in fs/QCA 2.5

```

compute: compfinbad = calibrate(unccompfinbad,6,2.5,1)
compute: sevattack = calibrate(uncsevattack,3976,1199,499)
compute: vhltpartgut = calibrate(uncvhltpartgut,6,3.5,1)
compute: verhltkundgu = calibrate(uncverhltkundgu,6,3.5,1)
compute: gorelview = fuzzyand(vhltpartgut,verhltkundgu)
compute: servsup = calibrate(uncservsup,6,3.5,1)
compute: strunbid = calibrate(uncstrunbid,6,0.5,0)
compute: strcompl = calibrate(uncstrcompl,6,0.5,0)
compute: revdecl = calibrate(uncrevdecl,6,2.5,1)

```

| compfinbad | sevattack | vhltpartgut | verhltkundgu | gorelview | servsup | strundbid | strcompl | revdecl |
|------------|-----------|-------------|--------------|-----------|---------|-----------|----------|---------|
| 0,27       | 0,18      | 0,86        | 0,86         | 0,86      | 0,65    | 0,69      | 0,87     | 0,05    |
| 0,27       | 1,0       | 0,95        | 0,95         | 0,95      | 0,35    | 0,57      | 0,92     | 0,05    |
| 0,05       | 0,02      | 0,95        | 0,86         | 0,86      | 0,14    | 0,69      | 0,95     | 0,95    |
| 0,89       | 0,8       | 0,35        | 0,95         | 0,35      | 0,14    | 0,05      | 0,87     | 0,61    |
| 0,05       | 0,8       | 0,86        | 0,86         | 0,86      | 0,35    | 0,05      | 0,95     | 0,95    |
| 0,27       | 0,98      | 0,86        | 0,86         | 0,86      | 0,65    | 0,69      | 0,8      | 0,27    |
| 0,61       | 0,74      | 0,95        | 0,35         | 0,35      | 0,35    | 0,05      | 0,95     | 0,27    |
| 0,05       | 1,0       | 0,95        | 0,86         | 0,86      | 0,86    | 0,05      | 0,95     | 0,05    |
| 0,61       | 0,03      | 0,65        | 0,65         | 0,65      | 0,86    | 0,05      | 0,87     | 0,27    |
| 0,05       | 0,03      | 0,95        | 0,95         | 0,95      | 0,35    | 0,05      | 0,8      | 0,61    |
| 0,78       | 0,7       | 0,65        | 0,86         | 0,65      | 0,86    | 0,05      | 0,8      | 0,05    |
| 0,05       | 0,79      | 0,35        | 0,35         | 0,35      | 0,35    | 0,05      | 0,05     | 0,89    |

Table 13: Extract of calibrated fuzzy data-sets

| compfinbad | sevattack | gorelview | servsup | strundbid | strcompl | number | ~revdecl | raw consist. | PRI consist. |
|------------|-----------|-----------|---------|-----------|----------|--------|----------|--------------|--------------|
| 0          | 1         | 0         | 0       | 1         | 0        | 2      | 1        | 1.000        | 1.000        |
| 0          | 0         | 1         | 1       | 1         | 0        | 2      | 1        | 1.000        | 1.000        |
| 0          | 1         | 1         | 1       | 1         | 1        | 6      | 1        | 0.988        | 0.968        |
| 0          | 1         | 1         | 0       | 1         | 1        | 2      | 1        | 0.985        | 0.937        |
| 1          | 0         | 1         | 1       | 0         | 0        | 2      | 1        | 0.977        | 0.899        |
| 1          | 1         | 0         | 1       | 0         | 0        | 2      | 1        | 0.975        | 0.886        |
| 0          | 0         | 0         | 0       | 1         | 1        | 2      | 1        | 0.973        | 0.897        |
| 0          | 0         | 1         | 1       | 1         | 1        | 2      | 1        | 0.972        | 0.900        |
| 1          | 1         | 1         | 1       | 0         | 1        | 4      | 1        | 0.963        | 0.884        |
| 0          | 0         | 1         | 1       | 0         | 0        | 2      | 1        | 0.955        | 0.865        |
| 0          | 1         | 1         | 1       | 0         | 1        | 8      | 0        | 0.922        | 0.844        |
| 0          | 1         | 1         | 1       | 0         | 0        | 4      | 0        | 0.920        | 0.796        |
| 0          | 1         | 0         | 0       | 0         | 0        | 2      | 0        | 0.911        | 0.713        |
| 0          | 1         | 1         | 0       | 0         | 1        | 5      | 0        | 0.893        | 0.755        |
| 0          | 0         | 0         | 1       | 0         | 1        | 2      | 0        | 0.890        | 0.709        |
| 1          | 0         | 0         | 0       | 0         | 1        | 4      | 0        | 0.877        | 0.619        |
| 1          | 0         | 1         | 0       | 0         | 1        | 2      | 0        | 0.876        | 0.531        |
| 0          | 1         | 0         | 1       | 0         | 1        | 3      | 0        | 0.873        | 0.627        |
| 1          | 1         | 0         | 1       | 0         | 1        | 5      | 0        | 0.872        | 0.551        |
| 0          | 1         | 0         | 1       | 0         | 0        | 2      | 0        | 0.863        | 0.573        |
| 0          | 0         | 1         | 0       | 1         | 1        | 4      | 0        | 0.861        | 0.624        |
| 0          | 0         | 1         | 0       | 0         | 1        | 6      | 0        | 0.858        | 0.692        |
| 0          | 0         | 1         | 0       | 0         | 0        | 4      | 0        | 0.857        | 0.555        |
| 0          | 1         | 0         | 0       | 0         | 1        | 2      | 0        | 0.857        | 0.569        |
| 0          | 0         | 1         | 1       | 0         | 1        | 10     | 0        | 0.845        | 0.696        |
| 0          | 0         | 0         | 0       | 0         | 0        | 7      | 0        | 0.844        | 0.620        |
| 0          | 0         | 0         | 0       | 0         | 1        | 4      | 0        | 0.841        | 0.618        |
| 1          | 1         | 0         | 0       | 0         | 1        | 6      | 0        | 0.839        | 0.426        |

Table 14: Truth table for the absence of the outcome 'declining long-term revenue'

**Limited diversity:** 19 out of 64 configurations are logical remainders (29.7%). Directional expectations see Table 2.

**Raw consistency threshold:** 0.95 (gap between 0.955 and 0.922)

**Frequency threshold:** 2

For the following fs/QCA tables, the expressions, as used in the software fs/QCA 2.5 (Ragin & Davey, 2014) are used. As explained in chapter 4.9, the prefix “~” stands for the negation of a condition and “\*” indicates the logical AND. For example, the path ‘OXYGEN\*wood→fire’ translates to: The condition ‘OXYGEN’ is present, ‘wood’ is absent, and the outcome ‘fire’ is

absent. “\*” indicates a logical AND, while “+” expresses the logical OR.

| Complex solution  | raw coverage | unique coverage | consistency |
|---|--------------|-----------------|-------------|
| ~sevattack*gorelview*servsup*~strundbid*~strcompl             | 0.189        | 0.077           | 0.950       |
| ~compfinbad*~sevattack*gorelview*servsup*strundbid            | 0.116        | 0.019           | 0.977       |
| ~compfinbad*sevattack*gorelview*strundbid*strcompl            | 0.148        | 0.045           | 0.989       |
| ~compfinbad*sevattack*~gorelview*~servsup*strundbid*~strcompl | 0.102        | 0.015           | 1.000       |
| ~compfinbad*~sevattack*~gorelview*~servsup*strundbid*strcompl | 0.096        | 0.016           | 0.973       |
| compfinbad*sevattack*~gorelview*servsup*~strundbid*~strcompl  | 0.135        | 0.020           | 0.975       |
| compfinbad*sevattack*gorelview*servsup*~strundbid*strcompl    | 0.152        | 0.041           | 0.963       |
| <b>solution coverage: 0.397</b>                               |              |                 |             |
| <b>solution consistency: 0.955</b>                            |              |                 |             |

Table 15: Complex solution for the absence of the outcome ‘declining long-term revenue’; frequency cutoff: 2; consistency cutoff: 0.955

| Parsimonious solution              | raw coverage | unique coverage | consistency |
|------------------------------------|--------------|-----------------|-------------|
| compfinbad*~strcompl               | 0.254        | 0.027           | 0.897       |
| ~gorelview*strundbid               | 0.171        | 0.014           | 0.959       |
| sevattack*strundbid                | 0.198        | 0.019           | 0.966       |
| servsup*strundbid                  | 0.217        | 0.012           | 0.968       |
| ~sevattack*servsup*~strcompl       | 0.224        | 0.048           | 0.904       |
| compfinbad*gorelview*servsup       | 0.279        | 0.055           | 0.920       |
| <b>solution coverage: 0.508702</b> |              |                 |             |
| <b>solution consistency: 0.888</b> |              |                 |             |

Table 16: Parsimonious solution for the absence of the outcome ‘declining long-term revenue’; frequency cutoff: 2; consistency cutoff: 0.955

| Intermediate solution                              | raw coverage | unique coverage | consistency |
|--|--------------|-----------------|-------------|
| strundbid*~gorelview*~sevattack*~compfinbad        | 0.114        | 0.016           | 0.976       |
| ~strcompl*~strundbid*servsup*compfinbad            | 0.216        | 0.018           | 0.926       |
| strundbid*gorelview*sevattack*~compfinbad          | 0.166        | 0.010           | 0.985       |
| ~strundbid*servsup*gorelview*compfinbad            | 0.262        | 0.055           | 0.916       |
| ~strcompl*strundbid*sevattack*~compfinbad          | 0.129        | 0.017           | 0.992       |
| strundbid*servsup*gorelview*~compfinbad            | 0.182        | 0.011           | 0.985       |
| ~strcompl*servsup*gorelview*~sevattack*~compfinbad | 0.182        | 0.005           | 0.957       |
| ~strcompl*~strundbid*servsup*gorelview*~sevattack  | 0.189        | 0.003           | 0.950       |
| <b>solution coverage: 0.449</b>                    |              |                 |             |
| <b>solution consistency: 0.925</b>                 |              |                 |             |

Table 17: Intermediate solution for the absence of the outcome ‘declining long-term revenue’; frequency cutoff: 2; consistency cutoff: 0.955

| compfinbad | sevattack | gorelview | servsup | strundbid | strcompl | number | revdecl | raw consist. | PRI consist. |
|------------|-----------|-----------|---------|-----------|----------|--------|---------|--------------|--------------|
| 1          | 1         | 0         | 0       | 0         | 1        | 6      | 1       | 0.877        | 0.563        |
| 1          | 0         | 1         | 0       | 0         | 1        | 2      | 1       | 0.860        | 0.469        |
| 1          | 1         | 0         | 1       | 0         | 1        | 5      | 1       | 0.842        | 0.449        |
| 0          | 0         | 1         | 0       | 0         | 0        | 4      | 1       | 0.820        | 0.436        |
| 0          | 1         | 0         | 1       | 0         | 0        | 2      | 1       | 0.815        | 0.421        |
| 0          | 1         | 0         | 0       | 0         | 1        | 2      | 1       | 0.809        | 0.423        |
| 0          | 1         | 0         | 0       | 1         | 0        | 2      | 1       | 0.809        | 0.000        |
| 1          | 1         | 0         | 1       | 0         | 0        | 2      | 1       | 0.807        | 0.114        |
| 1          | 0         | 0         | 0       | 0         | 1        | 4      | 0       | 0.797        | 0.369        |
| 1          | 0         | 1         | 1       | 0         | 0        | 2      | 0       | 0.795        | 0.101        |
| 0          | 1         | 0         | 1       | 0         | 1        | 3      | 0       | 0.786        | 0.373        |
| 0          | 1         | 1         | 0       | 1         | 1        | 2      | 0       | 0.784        | 0.063        |
| 0          | 1         | 0         | 0       | 0         | 0        | 2      | 0       | 0.780        | 0.287        |
| 0          | 0         | 1         | 1       | 1         | 0        | 2      | 0       | 0.776        | 0.000        |
| 0          | 0         | 1         | 0       | 1         | 1        | 4      | 0       | 0.769        | 0.376        |
| 0          | 0         | 0         | 0       | 1         | 1        | 2      | 0       | 0.761        | 0.103        |
| 0          | 0         | 1         | 1       | 1         | 1        | 2      | 0       | 0.751        | 0.100        |
| 0          | 0         | 0         | 0       | 0         | 1        | 4      | 0       | 0.741        | 0.376        |
| 0          | 0         | 0         | 1       | 0         | 1        | 2      | 0       | 0.732        | 0.291        |
| 0          | 0         | 0         | 0       | 0         | 0        | 7      | 0       | 0.730        | 0.345        |
| 1          | 1         | 1         | 1       | 0         | 1        | 4      | 0       | 0.720        | 0.116        |
| 0          | 0         | 1         | 1       | 0         | 0        | 2      | 0       | 0.708        | 0.135        |
| 0          | 1         | 1         | 1       | 0         | 0        | 4      | 0       | 0.687        | 0.204        |
| 0          | 0         | 1         | 0       | 0         | 1        | 6      | 0       | 0.672        | 0.286        |
| 0          | 1         | 1         | 0       | 0         | 1        | 5      | 0       | 0.671        | 0.245        |
| 0          | 1         | 1         | 1       | 1         | 1        | 6      | 0       | 0.634        | 0.032        |
| 0          | 0         | 1         | 1       | 0         | 1        | 10     | 0       | 0.622        | 0.260        |
| 0          | 1         | 1         | 1       | 0         | 1        | 8      | 0       | 0.573        | 0.152        |

Table 18: Truth table for the presence of the presence of the outcome 'declining long-term revenue' (REVDCL)

**Limited diversity:** 19 out of 64 configurations are logical remainders (29.7%). Directional expectations see Table 2.

**Raw consistency threshold:** 0.8 (gap between 0.807 and 0.797)

**Frequency threshold:** 2

| Complex solution   | raw coverage | unique coverage | consistency |
|--|--------------|-----------------|-------------|
| sevattack*~gorelview*servsup*~strundbid*~strcompl              | 0.256        | 0.048           | 0.786       |
| sevattack*~gorelview*~servsup*~strundbid*strcompl              | 0.281        | 0.035           | 0.785       |
| ~compfinbad*~sevattack*gorelview*~servsup*~strundbid*~strcompl | 0.249        | 0.065           | 0.820       |
| ~compfinbad*sevattack*~gorelview*~servsup*strundbid*~strcompl  | 0.143        | 0.001           | 0.809       |
| compfinbad*~sevattack*gorelview*~servsup*~strundbid*strcompl   | 0.202        | 0.034           | 0.860       |
| compfinbad*sevattack*~gorelview*~strundbid*strcompl            | 0.276        | 0.035           | 0.826       |
| <b>solution coverage: 0.544</b>                                |              |                 |             |
| <b>solution consistency: 0.712</b>                             |              |                 |             |

Table 19: Complex solution for the presence of the outcome 'declining long-term revenue'; frequency cutoff: 2; consistency cutoff: 0.807

| Parsimonious solution                    | raw coverage | unique coverage | consistency |
|--|--------------|-----------------|-------------|
| gorelview*~servsup*~strcompl             | 0.342        | 0.077           | 0.720       |
| ~gorelview*servsup*~strcompl             | 0.327        | 0.039           | 0.726       |
| sevattack*~gorelview*~servsup*strcompl   | 0.282        | 0.076           | 0.773       |
| compfinbad*~gorelview*servsup            | 0.354        | 0.044           | 0.768       |
| sevattack*strundbid*~strcompl            | 0.152        | 0.000           | 0.648       |
| sevattack*~gorelview*strundbid           | 0.158        | 0.001           | 0.720       |
| compfinbad*~sevattack*gorelview*strcompl | 0.217        | 0.029           | 0.761       |
| <b>solution coverage: 0.633</b>          |              |                 |             |
| <b>solution consistency: 0.634</b>       |              |                 |             |

Table 20: Parsimonious solution for the presence of the outcome 'declining long-term revenue'; frequency cutoff: 2; consistency cutoff: 0.807

| Intermediate solution   | raw coverage | unique coverage | consistency |
|---|--------------|-----------------|-------------|
| ~strcompl*~strundbid*~servsup*gorelview*~compfinbad           | 0.314        | 0.070           | 0.732       |
| strcompl*~strundbid*~servsup*gorelview*sevattack              | 0.281        | 0.076           | 0.785       |
| ~strcompl*~strundbid*~servsup*gorelview*sevattack             | 0.256        | 0.031           | 0.786       |
| ~strcompl*~strundbid*~servsup*gorelview*sevattack*~compfinbad | 0.143        | 0.001           | 0.809       |
| strcompl*~strundbid*~servsup*gorelview*~sevattack*compfinbad  | 0.202        | 0.034           | 0.860       |
| ~strundbid*~servsup*gorelview*sevattack*compfinbad            | 0.260        | 0.035           | 0.786       |
| <b>solution coverage: 0.55</b>                                |              |                 |             |
| <b>solution consistency: 0.686</b>                            |              |                 |             |

Table 21: Intermediate solution for the presence of the outcome 'declining long-term revenue'; frequency cutoff: 2; consistency cutoff: 0.807

## 8.2 Appendix: Robustness tests

All Likert scaled conditions and the outcome were calibrated using the direct method, which is a logistic function to transfer the raw data between the qualitative anchors 0.95 (fully present), 0.5 (point of indifference), and 0.05 (fully absent) (Schneider & Wagemann, 2012). The most important anchor is the cross-over point: While the first and third anchor hardly affect the results (Skaaning, 2011), might the crossover assign a different qualitative membership to the set, which can affect the membership of cases in truth table rows and thereby the result of the analysis (Schneider & Wagemann, 2012). Therefore, the calibration and especially the point of indifference were extensively explained and justified. While the calibration tried to keep the true meaning of the original values as much as possible, the calibration can also be done using percentiles. Checking for the robustness of the results, a second calibration is conducted, using the 0.5 percentile as point of indifference. Furthermore, the robustness test is performed for the intermediate solution, utilizing a process, similar to the one proposed by Hinterleitner et al. (2016).

1. Does using the 0.5 percentile leads to a different crossover point, then used before?
2. If yes, is the alternative threshold conceptually meaningful (Skaaning, 2011)?
3. Are any cases placed in the delta between these two possible thresholds and how many?
4. If yes, does applying this new threshold in the calibration, ceteris paribus result in either:
  - a. If no, how substantial are the results in the analysis of necessity (are new necessary conditions appearing or the previous vanishing)?
  - b. Does the setting of the raw consistency threshold imply a changed coding of truth table rows as (not) sufficient?
5. If yes, how are the results of the logical minimization affected?
  - a. Does this results in a different intermediate solution? For simplicity reasons the robustness of the complex and parsimonious solution are not assessed, following the study by Hinterleitner et al. (2016).
  - b. Finally, which calibration is preferred? Refer to the criteria reasoned in the legend of table B1.

Choosing even numbers as threshold of maximal ambiguity could result in the exclusion of all cases that fall exactly on this threshold. For example if the 0.5 percentile of a certain question is 3 and the cases are calibrated, using 3 as point of indifference, all cases with this value would be excluded from the analysis. To prevent the possible exclusion of a considerable number of

cases, thresholds are rounded to the next .5 value, considering a rather equal distribution of cases, e.g. 3.0 is rounded to 3.5.

**Severe attack:** For the calibration of this condition, percentiles were used, because the values were reported in Euros. Therefore, no reasonable alternative midpoint can be found. While the thresholds of fully in and fully out could be adapted, however according to (Skaaning, 2011) this will hardly have any effect at all, and is neither recommended by (Schneider & Wagemann, 2012). Therefore, this condition is changed in the robustness test.

**Strongly underbidding the price of the competitor:** This condition was calibrated using 0.5 as threshold of indifference. The 0.5 percentile results in a threshold at 0.0, where 96 cases would be excluded. Therefore, the threshold is set at 0.5 (96 out, 32 in).

**Strongly complaining at the supplier:** For the calibration of this condition, the threshold was set at 0.5. Using the 0.5 percentile results in a threshold of 3, excluding 19 cases. Therefore, the threshold is rounded to 2.5 (56 out, 72 in).

**Competitor in a bad economic situation:** For the calibration of this condition, the threshold was set at 2.5. Using the 0.5 percentile leads to the threshold of 2.0, which is rounded to 1.5 to ensure the inclusion of 42 cases (47 out, 81 in). Therefore, using the 0.5 percentile results in a different calibration.

**Good relationships with customers:** This condition is calibrated with 3.5 as point of indifference. The 0.5 percentile results in the threshold of 5.0. This would imply disregarding 37 cases. Therefore, the threshold is set at 5.5 (78 out, 50 in).

Calibrating this condition with the 0.5 percentile results in a highly skewed set after the creation of the condition 'good relationships with partners. Therefore, the former threshold is preferred.

**Good relationships with suppliers:** This condition is calibrated with 3.5 as point of indifference. The 0.5 percentile results in the threshold of 4.0. This would imply disregarding 21 cases. Therefore, the threshold is set at 4.5 (69 out, 59 in).

The same argument applies, as to the former condition. Thus, also for the calibration of this condition the original threshold is preferred.

**Superior service-level compared to the competitor:** The crossover point was set at 3.5. Using the 0.5 percentile leads to the threshold 4.0. 27 would be excluded, using this threshold. Accounting for an even distribution, the threshold is set at 3.5 (62 out, 66 in).

**Declining long-term revenue (revdecl):** Finally, the outcome was calibrated applying 2.5 as threshold. The 0.5 percentile results in a threshold at 2, which would exclude 32 cases. Therefore, it is rounded to 1.5 (50 in, 78 out).

#### **Calibration commands for alternative thresholds, used in fs/QCA 2.5**

```
compute: compfinbad = calibrate(unccompfinbad,6,1.5,1)
```

```
compute: vhltpartgut = calibrate(uncvhltpartgut,6,4.5,1)
```

```
compute: verhltkundgu = calibrate(uncverhltkundgu,6,5.5,1)
```

```
compute: gorelview = fuzzyand(vhltpartgut,verhltkundgu)
```

```
compute: servsup = calibrate(uncservsup,6,3.5,1)
```

```
compute: strundbid = calibrate(uncstrundbid,6,0.5,0)
```

compute: strcompl = calibrate(uncstrcompl,6,2.5,0)

compute: revdecl = calibrate(uncrevdecl,6,1.5,1)

|                | 1. Different crossover point? | 2. Crossover point? | 3. Cases placed in the delta? | 4a: Differences in necessity? | 4b: Different raw consistency threshold? | 5a: Different intermediate solution? | 5b: Calibration is preferred? |
|----------------|-------------------------------|---------------------|-------------------------------|-------------------------------|--|--------------------------------------|-------------------------------|
| sevattack      | NO                            | 1.199               |                               |                               |  |                                      |                               |
| strundbid      | NO                            | 0.5                 |                               |                               |  |                                      |                               |
| strcompl       | YES                           | 0.5                 |                               |                               |  |                                      |                               |
| strcompl2      |                               | 2.5                 | 14                            | NO                            | YES                                      | YES                                  | NO <sup>1</sup>               |
| compfinbad     | YES                           | 2.5                 |                               |                               |  |                                      |                               |
| compfinbad2    |                               | 1.5                 | 42                            |                               |  |                                      |                               |
| vhltpartgut    | YES                           | 3.5                 |                               |                               |  |                                      |                               |
| vhltpartgut2   |                               | 4.5                 | 21                            | NO                            | YES                                      | YES                                  | NO <sup>2</sup>               |
| verhltkundgut  | YES                           | 3.5                 |                               |                               |  |                                      |                               |
| verhltkundgut2 |                               | 5.5                 | 49                            | NO                            | YES                                      | YES                                  | NO <sup>2</sup>               |
| servsup        | NO                            | 3.5                 |                               |                               |  |                                      |                               |
| revdecl        | YES                           | 2.5                 |                               |                               |  |                                      |                               |
| revdecl2       |                               | 1.5                 | 32                            | NO                            | YES                                      | YES                                  | NO <sup>3</sup>               |

Table 22: Step-wise robustness check

1. The non-preferred calibration makes it difficult to compare the reaction possibilities with each other, because the true meaning of the answer is lost. This makes the interpretation less meaningful.
2. The two conditions ‘good relationship with supplier’ (vhltpartgut) and ‘good relationship with customer’ (vhltkundgut) are being combined with the logical AND. Thereby, the non-preferred calibration method results in a skewed set.
3. The non-preferred calibration neglects the true meaning of the answers. Therefore, the former calibration method is preferred, accepting a skewed set but keeping the true meaning of the answer.

The intermediate solutions, created with the alternative calibration techniques, are displayed and discussed in the following. Bold factors indicate additional conditions, brackets that the condition is not part of the solution any more:

| Intermediate solution                                       | raw coverage | unique coverage | consistency |
|---|--------------|-----------------|-------------|
| servsup*gorelview* <b>compfinbad</b> *~strundbid*~sevattack | 0.214        | 0.092           | 0.865       |
| servsup*gorelview*(~)strcompl*(~)strundbid*(~)sevattack     | 0.237        | 0.013           | 0.872       |

Table 23: Robustness-test, results for absence of outcome ‘revenue decline’, additional conditions in bold, neglected conditions in brackets

The analysis of sufficient paths to the absence of the outcome ‘revenue declined’ shows that only two paths could be partly reproduced. While the first previously presented path is missing, the absence of the condition ‘severe attack was added to the second path. In the third path the



two conditions strong complaining at the supplier' and 'severe attack' changed their characteristics.

| Intermediate solution  | raw coverage | unique coverage | consistency |
|--|--------------|-----------------|-------------|
| $\sim$ servsup*( $\sim$ )gorelview* $\sim$ compfinbad* $\sim$ strcompl* $\sim$ strundbid* <b>sevattack</b> | 0.213        | 0.055           | 0.842       |
| $\sim$ servsup* $\sim$ gorelview* <b>compfinbad</b> *strcompl* $\sim$ strundbid*(sevattack)                | 0.272        | 0.045           | 0.884       |
| $\sim$ servsup* $\sim$ gorelview*compfinbad* $\sim$ strundbid*sevattack                                    | 0.239        | 0.032           | 0.869       |

Table 24: Robustness-test, results for presence of outcome 'revenue decline', additional conditions in bold, neglected conditions in brackets

The analysis of sufficient paths to the presence of the outcome 'revenue declined' shows adjustments in all three paths. Overall, the condition 'good relationships with partners was problematic due to skewed data after the combination of the two conditions, using the logical AND. IN the first path, the absence of the condition 'severe attack' was added and the condition 'good relationships with partners switched from absence to presence. In the second path, the condition 'competitor in financial bad situation' was added, and the condition 'severe attack' disappeared. In the third path, the condition 'superior service-level' changed from presence to absence.

Overall, all path did adapt to some extent. This is partly due to skewed sets after the combination of two questions with a logical AND. Partly, normal variation that arise form changing the threshold. The overall directional characteristics are consistent with the previous results, indicating a sufficient degree of robustness.