Department of Marketing

Configurational Explanation of Marketing Outcomes

A Fuzzy-Set Qualitative Comparative Analysis Approach

Antti Vassinen

Aalto University

DOCTORAL DISSERTATIONS

Antti Vassinen Configurational Explanation of Marketing Outcomes Aalto University

Aalto University publication series
DOCTORAL DISSERTATIONS 39/2012

Configurational Explanation of Marketing Outcomes: A Fuzzy-Set Qualitative Comparative Analysis Approach

Antti Vassinen

Aalto University
School of Economics
Department of Marketing

Aalto University publication series
DOCTORAL DISSERTATIONS 39/2012

© Antti Vassinen

ISBN 978-952-60-4574-0 (printed)
ISBN 978-952-60-4575-7 (pdf)
ISSN-L 1799-4934
ISSN 1799-4934 (printed)
ISSN 1799-4942 (pdf)

Unigrafia Oy
Helsinki 2012

Finland

Cover inset 'Empire' © 2010 Gio Black Peter.

441 697
Printed matter

Author
Antti Vassinen

Name of the doctoral dissertation
Configurational Explanation of Marketing Outcomes: A Fuzzy-Set Qualitative Comparative Analysis Approach

Publisher School of Economics

Unit Department of Marketing

Series Aalto University publication series DOCTORAL DISSERTATIONS 39/2012

Field of research Strategic marketing, marketing performance

Abstract

As marketing, as a function and a process, is required to explain itself with more transparency, new tools and comprehensive analysis processes must be created and adopted, so that marketing performance and its determinants can systematically be understood and developed.

In this dissertation, I present fuzzy-set qualitative comparative analysis ('FS/QCA'; Ragin, 2000; Fiss, 2008; Rihoux and Ragin, 2009; and others) as a novel approach to assessing marketing performance. My key argument is that the fuzzy-set qualitative comparative analysis research approach and methodology can be used to explain marketing outcomes as results of configurations of causal conditions in specific contexts, yielding managerially relevant knowledge that would otherwise be difficult to access and interpret.

The broad aim of this dissertation is to supplement the range of marketing management support systems, modeling approaches, and marketing performance assessment systems to provide better knowledge-driven decision support. The analytical premises of FS/QCA and its applications in fields of study related to marketing position it as a candidate to overcome some key challenges faced in marketing performance analysis: dealing with causal complexity, heterogeneity, asymmetry, configurationality, contextuality, and qualitative meaning.

To draw together the research approach, the methodology, and the marketing performance management perspective, I specify a synthetic research process, configurational explanation of marketing outcomes ('CEMO'), comprising the theoretical and empirical steps required for analysis. I demonstrate how the configurational explanation process was successfully carried out in two empirical contexts to generate results that are valid, reliable, and contribute knowledge that is directly relevant within the chosen context.

The key contribution of this study is intended to be methodological: a specification of an analysis process for accessing a new type of contextually relevant knowledge about causal mechanisms that shape marketing performance. New knowledge accessible with CEMO provides opportunities for staging more effective marketing actions and, ultimately, an opportunity for better marketing performance.

Keywords strategic marketing, marketing performance, fs/qca, configurations, marketing actions, rbv, marketing engineering, case-based reasoning

ISBN (printed) 978-952-60-4574-0 **ISBN (pdf)** 978-952-60-4575-7

ISSN-L 1799-4934 **ISSN (printed)** 1799-4934 **ISSN (pdf)** 1799-4942

Location of publisher Espoo **Location of printing** Helsinki **Year** 2012

Pages 270

Acknowledgements

This dissertation would never have come to be without the interested support of countless individuals and organizations. First among them stands my advisor, professor Henrikki Tikkanen, whose distinctive thinking and intellectual countenance have shaped my understanding of the social, the economic, and the managerial.

I was honored with honorary professor Ian Wilkinson (University of Sydney) and professor Kalle Pajunen (University of Turku) serving as the preliminary examiners of my work. Their fundamental contributions, however, far predate the manuscript you may next read. The former has been a consistent source and advocate for broader, nonconformist thinking in marketing research, and the latter – incidentally – the seminar presenter years ago from whom I first learned of the FS/QCA approach.

Support from faculty and staff at the Department of Marketing at Aalto University School of Economics has been invaluable. You are a very special group. In the scope of this particular study, I thank Jaakko Aspara and Jukka Luoma, whose commentary has improved each section. I also wish to thank my fellow researchers in the StratMark project; Pekka Mattila and Elina Koivisto for their supportive collaboration; Kristian Möller and Petri Parvinen for their comments throughout my doctoral studies; Ilona Mikkonen for needed help with the graduation process; and Pirjo-Liisa Johansson for her administrative efforts. In addition to the encouragement at our department, I was supported by the business strategy community around the Department of Industrial Engineering and Management at Aalto, Rami Olkkonen at the University of Turku, Barcelona's artificial intelligence in management decision-making community at ESADE, and diverse interaction with colleagues at conferences and seminars on five continents.

I owe thanks to Juha Järvinen and Janne Hattula at Blue1 for providing me with the material for my first case study. At Valio, I am deeply indebted to Pekka Laaksonen, Tiina Mattila-Sandholm, Rauno Hiltunen, Keijo Huomo and many others for their time and efforts in helping me understand their business and operations. The dozens of other companies,

executives, and professionals, who assisted my research, both directly in my empirical research and as members of the StratMark marketing advancement initiative, are not forgotten.

My research received funding from the Finnish Funding Agency for Technology and Innovation (Tekes) as a part of the StratMark research initiative. Grants from the Finnish Foundation for Economic Education (LSR) and the Helsinki School of Economics Foundation are acknowledged with gratitude. Likewise, I thank the Metropolitan Ambrosius and the Sofia Cultural Center for facilities and encouragement during the writing process.

I'm pleased to realize that he most important outcome of my dissertation process is not this monograph, but my transformed self. Exploration on countless levels, together with inspiring people, has truly been worth our while. I offer my full gratitude to all collaborators, family, friends, and night people of the world, who have provided form and force for my opportunity.

Contents

Figures

Tables

1 Introduction

Despite concentrated research effort, a lack of practicable knowledge on how to evaluate marketing performance persists. Academics and managers alike voice continued calls to action "for marketing to become more accountable and to demonstrate what marketing contributes to the firm and to the larger society" (Stewart, 2009, p. 636). Among the Marketing Science Institute's 2008-2010 Research Priorities (2008), 'Accountability and ROI of Marketing Expenditures' is number one; 'Allocat[ing] Resources to Marketing Activities' remains a priority topic in the most recent edition (Marketing Science Institute, 2010). In the academic literature, marketing's comparatively low stature in many firms is seen to link with "Marketers' inability to account for the function's contribution to firm performance" (O'Sullivan and Abela, 2007 p. 79; O'Sullivan and Butler, 2010). The basic questions remain, perhaps even more pertinently in the recent economic downturn than before: *What in marketing works, when, where, and how?*

Justified concern for what actions and decisions by marketers will bring about what responses in the marketplace is shared by business managers and marketing researchers alike. Practitioners in the field are faced with increasing demands for accountability (Stewart, 2006; Rao and Bharadwaj, 2008). As marketing, as a function and a process, is required to explain itself with more transparency, new tools and comprehensive analysis processes must be created and adopted so that marketing performance and its determinants can systematically be understood and developed (Lilien and Rangaswamy, 1998). However, for these new approaches to performance to be managerially meaningful and practicable, they must be contextually relevant (Morgan, Clark, and Gooner, 2002).

In this dissertation, I present *fuzzy-set qualitative comparative analysis* ('FS/QCA'; Ragin, 2000; Kogut, MacDuffie, and Ragin, 2004; Greckhamer, Misangyi, Elms, and Lacey, 2008; Fiss, 2008; Ragin, 2008a; Rihoux and Ragin, 2009; and others) as a novel approach to assessing marketing performance. My key argument is that the fuzzy-set qualitative comparative analysis research approach and methodology can be used to explain marketing outcomes as results of configurations of causal conditions in

specific contexts, yielding managerially relevant knowledge that would otherwise be difficult to access and interpret.

To draw together the research approach, the methodology, and the marketing performance management perspective, I specify a synthetic research process I call *configurational explanation of marketing outcomes* ('CEMO'), comprising the theoretical and empirical steps required for analysis. Subsequently, I demonstrate how the configurational explanation process was successfully carried out in two empirical contexts to generate results that are valid, reliable, and contribute managerially relevant knowledge that would otherwise be difficult to access and interpret.

The key contribution of this study is intended to be methodological: a specification of an analysis process for accessing a new type of contextually relevant knowledge about causal mechanisms that shape marketing performance. In this dissertation, I demonstrate how using fuzzy-set qualitative comparative analysis to study configurational causal mechanisms can provide new knowledge that refines our practical understanding of marketing performance. This new knowledge provides opportunities for staging more effective marketing actions and, ultimately, an opportunity for better marketing performance.

This introductory chapter begins with discussion of the context for my research in the broader domain of strategic marketing and marketing performance assessment. Next, I reflect on the role of configurations, context, and causality from a marketing performance perspective to draw attention to some gaps in knowledge and methodology which researchers and practitioners currently face. These gaps prompt the question of what new approaches might be developed to address them. To respond, I describe what new knowledge fuzzy-set qualitative comparative analysis can contribute. To conclude, I outline the research strategy carried out in this dissertation for adapting FS/QCA to a marketing performance assessment context.

1.1 Research context

The strategic role of marketing can be expressed as "the primary generator and integrator of market or customer inputs in core business processes" (Srivastava, Shervani, and Fahey, 1999, p. 168). This perspective, based on a resource-based view of the firm ('RBV'; Barney, 1991; Barney, Wright, and Ketchen, 2001; Srivastava, Fahey, and Christiansen, 2001), holds that attracting and retaining customers requires the organization to produce superior value. Srivastava, Shervani, and Fahey (1999) list three central

tasks that must be carried out by organizations at a macro level to accomplish customer value creation:

1. The development of new customer solutions and/or the reinvigoration of existing solutions;
2. Continual enhancement of the acquisition of inputs and their transformation into desired customer outputs; and
3. The creation and leveraging of linkages and relationships to external marketplace entities, especially channels and end users. (p. 169)

These interrelated and interacting tasks are fundamental and common antecedents to business performance. Executing them requires an organization to design, foster, and leverage three respective core business processes (Srivastava, Shervani, and Fahey, 1999): product development management, supply chain management, and customer relationship management.

The core business process perspective provides a platform for "developing new marketing theory that expressly responds to emerging change in both organizational and competitive contexts, with the intent of explaining success and failure" (ibid., p. 177). To explain performance, marketing theories must consider a comprehensive range of intraorganizational conditions, marketplace factors, and marketing outcomes. Furthermore, marketing's contribution needs to be communicated effectively to top management (Srivastava, Shervani, and Fahey, 1999; O'Sullivan and Abela, 2007). Thus, explaining and communicating marketing performance can be seen as central to the creation of customer value and shareholder value in the long run. Srivastava, Shervani, and Fahey (1999) conclude that "marketing investments and commitments must be assessed for their impact on efficiency and effectiveness of business processes, financial outcomes, and shareholder value" (p. 177). My study shares this fundamental premise; the resource-based view and the integrative role of marketing in value creation in the three core business processes serve as the underlying conceptual frameworks of this dissertation.

In a review of the key literature pertaining to marketing performance measurement, O'Sullivan and Abela (2007) identify three research streams: 'measurement of marketing productivity', 'identification of metrics in use', and 'measurement of brand equity'. Of these three, the measurement of marketing productivity is of the most immediate concern to this study. In this research stream, Morgan, Clark, and Gooner's 'Marketing Performance Assessment' framework ('MPA'; 2002) and the 'Chain of Marketing Productivity' by Rust, Ambler, Carpenter, Kumar, and Srivastava (2004) are seen to comprise the seminal theoretical contributions concerning

marketing productivity measurement. Both pieces reflect Srivastava, Shervani, and Fahey's (1999) perspective on the broad, strategic role of marketing and build on the same authors' earlier framework, which connects market-based assets and shareholder value with analysis of cash flows (Srivastava, Shervani, and Fahey, 1998). The MPA framework (Morgan, Clark, and Gooner, 2002) integrates multiple perspectives to develop conceptual models for 'normative' and 'contextual MPA systems' that are able to capture the multidimensional nature of marketing performance, determined by the organization's efficiency, effectiveness, and adaptiveness. The 'Chain of Marketing Productivity' (Rust el al., 2004) connects marketing activities conceptually with financial outcomes and shareholder value by linking actions with contextual factors and intermediate outcomes, such as brand equity and customer behavior (Rust el al., 2004; O'Sullivan and Abela, 2007). The MPA framework and the 'Chain of Marketing Productivity' provide a conceptual basis for considering tools to explain marketing performance in specific contexts and for practical approaches to prying open the 'black box' of marketing (Rust et al., 2004).

1.2 Causal mechanisms and marketing contexts

Marketers manage configurations of resources and contingencies, in which idiosyncratic contextual factors and complex interactions are often instrumental for determining the outcome (Morgan, Clark, and Gooner, 2002). Consequently, the marketing management decision-making process is rarely supported by general microeconomic observations or by general models of consumer behavior and marketing response (Vorhies and Morgan, 2003). 'Other things', as they are called, are rarely equal.

Managerial understanding of causality in a specific operating context is an antecedent to business performance (cf. Morgan, Clark, and Gooner, 2002; Vorhies and Morgan, 2003). Contingency theory (Lawrence and Lorsch, 1967; cf. Olson, Slater, and Hult, 2005; Homburg, Workman, and Krohmer, 1999; Ruekert, Walker, and Roering, 1985) suggests that the mechanisms that bring about outcomes for marketing actions are specific to organizations, businesses, operating environments, and situations. This perspective views causality as contextual as opposed to universal. The better organizations are able to understand complex interaction of specific real-world factors they face, the more effectively they can allocate resources and fit their actions to customers, competition, and the operating environment.

In this study, I refer to an organization's specific combination of resources and organizational and environmental factors that enable and constrain actions and shape their outcomes as its *marketing context*. The marketing context is temporally dynamic and unique to an organization and its activities. However, a necessary analytical premise is that shared structures and logics (Morgan, Clark, and Gooner, 2002) can be identified within marketing contexts over time and, potentially, across contexts. Evidence of regularities and insights on determinants of marketing performance may provide new, empirically grounded platforms for benchmarks, audits, or even broader analytical generalizations about causal mechanisms in marketing.

Empirical knowledge of causal mechanisms may be an important antecedent to better marketing metrics (Clark, 1999; Ambler, Kokkinaki, and Puntoni, 2004), which enable focusing organizational efforts with more objective justification. Furthermore, shared standards and definitions would be conducive for comparisons across settings within and outside an organization, taking advantage of common metrics and standard assessment processes (Morgan, Clark, and Gooner, 2002). However, the metrics and marketing analytics that are the most valid for a specific context are unlikely to be the same in others.

The assessment of marketing performance, in both practice and theory, suffers from a lack of contextual insight into patterns (Morgan, Clark, and Gooner, 2002; Wierenga, 2010, p. 7). Managers are required to reconcile multiple, at times conflicting elements comprising a broad range of interconnected marketing activities and performance outcomes (Walker and Ruekert, 1987; Day, 1999; Homburg, Jensen, and Krohmer, 2008). Despite strong potential for relevant discoveries, little research exists concerning the use of configurational approaches specifically in marketing. Vorhies and Morgan (2003) attribute this to the lack of adequate methodologies.

Commonly observable statements such as "customers of such-and-such types are no longer selecting our product, because some retailers expanded their assortments," "the price promotion seemed to work until the competitor launched a new flavor," and "customers prefer different service channels, but price discrimination can rapidly shift preference for some segments" reflect a fundamental notion of configurationality. Such statements are causal narratives (Smith and Lux, 1993) that reflect understandings of contextual regularities and complex configurational links between antecedents and consequences. The more valid and reliable these narratives are, the better they inform decision-making. Compounding on academic interest, analysis processes to systematically generate knowledge

on causality in a given context can be viewed as managerial tools of great potential value.

Marketing, by its nature, has a strongly multidimensional character. Configurationality is strongly evident in how similar marketing actions can result in substantially different outcomes, depending on the exact mix of tangible and intangible assets employed, and the prevailing environmental conditions (Homburg, Jensen, and Krohmer, 2008). Conversely, explanations for a similar outcome can be very different from each other when multiple *causal mechanisms* – defined as patterns of interactions of actors, actions and their properties in some context, linked by their role in combining to produce some outcome – operate concurrently. Furthermore, different degrees of performance are often caused by mechanisms that are fundamentally different in composition, as opposed to degree of intensity or effort. The existence of multiple paths to an outcome (Vorhies and Morgan, 2003; Homburg, Jensen, and Krohmer, 2008) is referred to as *causal heterogeneity* (Ragin, 2000, p. 52). Configurational analysis supposes that system outcomes, especially in complex contexts involving social actors, may depend more on the arrangement of causal factors, rather than on individual factors or variables (Fiss, 2007).

Marketing management support systems ('MMSS'; Wierenga, van Bruggen, and Staelin, 1999), parallelly conceptualized as *marketing engineering* (Lilien and Rangaswamy, 1998; Lilien et al., 2002), integrate diverse practical dimensions of marketing performance management into a single problem-solving framework. The systematic process is specified as linking theory with practice to integrate "marketing concepts, data, beliefs, analytical techniques, and software engineering to enhance both the process and outputs of decision making" (Lilien et al., 2002, p. 119). The marketing engineering process is a general managerial framework for implementing context-specific *marketing control* (Morgan, Clark, and Gooner, 2002). Wierenga, van Bruggen, and Staelin (1999) argue, that the development of MMSS that provide greater control and promote systematic understanding of specific marketing contexts calls for stronger empirical tools. In particular, *knowledge-driven MMSS* may be sought for reasoning where problems or data are complex and qualitatively structured, constraining the use of *data-driven* systems for mathematical modeling and optimization (Wierenga, van Bruggen, and Staelin, 1999).

1.3 Knowledge gap

Efforts to construct general theories of marketing have largely been unsuccessful in providing practically relevant and applicable solutions on

the same level as in disciplines such as finance and accounting (cf. e.g. Leone and Schultz, 1980; Anderson, 1983; Bonoma, 1985; Leeflang and Wittink, 2000; Hunt, 2002; Tadajewski, 2004). On one hand, qualitative single-case research designs offer considerable insight into individual market and customer processes. On the other hand, the direct relevance of these findings for other organizations and contexts is often meager (Hudson and Ozanne, 1988; Morgan, Clark, and Gooner, 2002). Large-scale econometric studies and marketing models allow statistical generalizations to be made, but largely fail to address the causal complexity of interacting conditions in typical marketing contexts. Furthermore, in practical applications, the majority of organizations do not have the resources, know-how, or contextual possibility to comprehensively model their marketing contexts and study their customers in detail. 'Middle road strategies' (Ragin, 1987) that provide systematic, context-specific, valid real-world answers and analytical generalizations – without the need for uneconomic quantitative data gathering – are lacking (Lilien and Rangaswamy, 1998).

Our understanding causal complexity in marketing contexts is held back by the unavailability of methods to deal with complex, idiosyncratic interactions (Wierenga, 2010, p. 7). Statistical sales response models can approximate the effects of promotions and price (Stewart, 2009). However, complex interactions in marketing contexts, where conditions from within the organization and its environment combine nonlinearly, are largely beyond their analytical scope (Drazin and van de Ven, 1985). The prevalent approaches to modeling the performance effects of marketing are unable to account for situations where variables combine *asymmetrically***,** where the causes of an outcome might be distinctly different than the causes of its negation. Furthermore, when considering interaction effects, the interpretation of results typically becomes onerous or impossible when modeled interactions expand beyond three-way effects (Fiss, 2007). The applicability of statistical tools is, in many instances, further restricted by the size of the available populations of observations.

I argue that by relaxing certain unstated assumptions found in *variable-oriented research approaches* (Ragin, 2000) and methodologies, and analyzing data with a qualitative comparative approach, researchers can generate valid, reliable, and managerially relevant narratives of causality in marketing. In the process, it is possible to overcome several analytical challenges and restrictions inherent to many quantitative modeling approaches.

In contrast to variable-oriented approaches, *set-theoretic research approaches* (Ragin, 2000) treat cases as discrete wholes, as opposed to

collections of independent and dependent variable values. The set-theoretic approach is conducive to the use of comparative methods to discover *causal configurations* among the cases (Rihoux and Ragin, 2009; Berg-Schlosser and De Meur, 2009), not requiring researchers to assume that *causal conditions* (the set-theoretic equivalents of independent variables) are *linear-additive* in models, with 'net effects' (Mills, van de Bunt, and de Bruijn, 2006; Berg-Schlosser and De Meur, 2009). Furthermore, explicit connections as opposed to associational correlations should be focused on, either by observing shared conditions among instances of the same outcome (representing *causal heterogeneity* and *equifinality*), or the range of outcomes resulting from similar combinations of causal conditions (*configurational causality*; Ragin, 2000; Mills, van de Bunt, and de Bruijn, 2006). The premise of different conditions combining rather than competing to create an outcome makes set-theoretic research approaches well-suited for studying complex interactions (Fiss, 2007).

The findings by Lilien and Rangaswamy (1998) and Vorhies and Morgan (2003) on the lack of suitable analytical tools for dealing with causal complexity and configurationality are echoed by our own data. In recent interviews with top managers across both industries and contexts (Tikkanen and Vassinen, 2009), demand for contextually relevant and qualitatively meaningful decision support systems emerges as a consistent theme. With regard to analysis processes and services, the contextual fit of analysis methods is a key concern. In addition, managers emphasize the importance of transparency and an uncertainty over the validity of proprietary, third party 'black box' systems.

I posit that the present range of research approaches and modeling methods in marketing performance is insufficient to effectively account for complex causation and configurationality in real-world marketing contexts. A broad range of conceptual and practical challenges presents itself:

1. Models are built with background assumptions of applicability to similar business situations, supposed to share an underlying mechanism for causation. In other words, causal universality is assumed (cf. Rihoux and Ragin, 2009; Berg-Schlosser and De Meur, 2009).

2. Causality is usually assumed to be uniform and linear-additive among populations, even though the complex interactions of the real world do not warrant this (Berg-Schlosser and De Meur, 2009). In other words, linearity is assumed for variables and their functions without consideration of their qualitative real-world effects (Bagozzi, 1980, p. 70). Models are unable to account for situations where variables combine asymmetrically to produce distinctly different results in different combinations, or deliver

interpretable results where modeled interactions go beyond three-way effects (Fiss, 2007).

3. The numerical analysis process is often divorced from qualitative understanding of the significance, relevance, and practical reality of the data, as well as from assumptions, conclusions, and predictions or prescriptions made as a result of analysis (Laurent, 2000).

4. Distinguishing incremental (short-term) and persistent (long-term, equity) effects of marketing activities is challenging (Stewart, 2009). Even more difficult to quantify are the effects of actions that reshape organizational contingencies or the operating environment.

5. Achieving validity and contextual relevance by identifying a sufficient and comprehensive series of meaningful variables and metrics (e.g. Punj and Stewart, 1983) is difficult to combine with analytical restrictions for model dimensionality.

6. Reliable marketing performance assessment systems require inputs and outputs to be measured in a consistent, replicable, and documented manner (Ambler, Kokkinaki, and Puntoni, 2004).

7. Research economics invariably constrain the scale and scope of data collection, impacting the range of data available for marketing performance assessment and marketing management support systems (Wierenga, van Bruggen, and Staelin, 1999; Morgan, Clark, and Gooner, 2002). In examining the context for past actions, many nonfinancial metrics (such as customer and brand attributes) are impossible to evaluate post hoc.

These challenges provide points of reference for evaluating how new research approaches and methodologies are able to incorporate complex causation and configurationality, ensuring reliability, validity, and real-world practicability. Overcoming some of these challenges with new methodological approaches has the potential to significantly advance our understanding and practical ability to understand and manage the determinants of marketing performance.

1.4 Research question and aims

I propose that marketing performance assessment tools currently in use are limited in their ability to capture complex, configurational causal mechanisms and their ability generate contingent explanations for performance in specific marketing contexts.

I approach the problem of causality in marketing performance by investigating fuzzy-set qualitative comparative analysis ('FS/QCA'; Ragin, 2000). It is my argument that an approach building on FS/QCA will be able

to expose valid causally complex marketing performance phenomena in a marketing context, with distinct advantages in attending to causal complexity. A growing pool of research using the approach in social sciences, including some forays into business studies described in Chapter 3, encourages formulating a research question of "*how fuzzy-set qualitative comparative analysis of marketing actions can be used to explain causal mechanisms behind marketing outcomes*?"

Consequently, I hold as the aim of this dissertation to introduce fuzzy-set qualitative comparative analysis to studying configurational causality in marketing performance. In the light of the challenges in accounting for complex causation and configurationality in real-world marketing contexts, discussed above, I wish to examine how FS/QCA can be adapted and adopted for the said task.

Greater insight into how and in what combinations marketing actions produce results can ultimately improve business performance by enhancing organizational learning (Morgan, Clark, and Gooner, 2002) and the quality of decision support (Wierenga, van Bruggen, and Staelin, 1999). FS/QCA is a potential answer to concerns voiced over understanding the determinants of marketing performance. Complex causation in marketing contexts is studied by considering cases as set-theoretic structures. This allows inferences to be made on configurations of causal conditions required to bring about an outcome (*necessity*), and configurations of cases that are sufficient to bring about an outcome (*sufficiency*; Ragin, 1987), and causal narratives to be crafted to describe the phenomena. *Fuzzy logic* (Zadeh, 1965), a form of many-valued logic, is used to integrate qualitative understanding and consideration into the process, particularly in calibrating fuzzy systems for logical analysis. Through empirical demonstrations of FS/QCA and subsequent discussion, I intend to show that the approach is a contribution to marketing performance assessment.

1.4.1 Contribution

The broad aim of this dissertation is to supplement the range of marketing management support systems, modeling approaches, and marketing performance assessment systems to provide better knowledge-driven decision support. The analytical premises of FS/QCA and its applications in fields of study related to marketing position it as a candidate to overcome some key challenges faced in marketing performance analysis: dealing with causal complexity, configurations, contextuality, and qualitative meaning.

With this dissertation, I contribute to marketing performance assessement in two respects. Analytically, FS/QCA is a case-based

reasoning system (Kolodner, 1992), which can be used to expose causal mechanisms in marketing contexts and explain marketing outcomes. In addition to the analytical contribution, I propose a practical process named 'configurational explanation of marketing outcomes' ('CEMO'). In it, I specify how and under which circumstances FS/QCA can provide knowledge on complex configurational causality as a marketing management support system ('MMSS'; Lilien et al., 2002).

The managerial implications of being able to systematically learn about contextual causal configurations are substantial, as they provide direct empirical evidence and suggestions to enhance the efficiency, effectiveness, and adaptiveness of marketing processes. Besides responding to pleas for contextual and configurational approaches in marketing performance (Morgan, Clark, and Gooner 2002; Vorhies and Morgan, 2003), FS/QCA has potential to improve the external validity of marketing models with qualitative input (Laurent, 2000), resulting in increased decision support value (Wierenga, 2010, pp. 7–8).

1.4.2 Limitations

The focus of this study is on methodological development, and not on providing generalizable substantive evidence about the phenomena presented in the empirical studies. Their role is to serve as demonstrations of the analytical approach and the managerial relevance of potential findings. I neither claim nor pretend that the proposed analysis process, CEMO, would overcome all practical and conceptual challenges outlined in the previous section – or completely do away with any single one. The greatest potential of CEMO is in how it can be integrated to triangulating analytical efforts and used to achieve a broad, valid, and contextually relevant understanding of marketing performance.

1.5 Dissertation structure

Table 1-1 summarizes the structure of this dissertation. In Chapter 2, I first expand on the general strategic marketing and marketing performance literature background discussed above to position 'configurational explanation of marketing outcomes' ('CEMO') as a knowledge-driven approach to MMSS and learning about causal complexity and configurations in marketing contexts.

In Chapter 3, I return to the ontological and epistemological issues that are pertinent for an understanding of real-world causality as a

configurational, asymmetric, and heterogeneous phenomenon. I introduce the reader to fuzzy-set qualitative comparative analysis ('FS/QCA') both as a research approach and a methodology for examining causal configurations.

Next, in Chapter 4, I relate the generic FS/QCA process to the particular theoretical background of marketing performance to specify a synthetic analysis process. The CEMO process is structured and presented as a series of analytical stages, forming an iterative framework for generating contextual knowledge about causal mechanisms.

In the two chapters that follow (Chapters 5–6), I make use the CEMO framework to examine causal configurations in two different marketing contexts, using original empirical data. In both studies, I detail the stages of the analysis process and arrive at causal narratives that explain the various configurations of conditions discovered in the data. I reflect both on process insights of practical CEMO application, the analytical aspects of CEMO and FS/QCA that can provide access to new, managerially relevant knowledge.

The final chapter (Chapter 7) summarizes the methodological findings from the empirical studies, and discusses the merits and limitations of the CEMO approach, both in terms of representing a rigorous, valid, and reliable method for marketing performance assessment, and as a practicable analytical approach to knowledge-driven MMSS.

Table 1-1. Towards configurational explanation of marketing outcomes: dissertation structure and chapter contents.

Chapter		Content
2	Theoretical Background	*Review of the pertinent marketing performance literature that configurational explanation of marketing outcomes builds on*
3	Investigating Configurational Causality	*Review of the ontological and epistemological background to fuzzy-set qualitative comparative analysis*
4	Configurational Explanation of Marketing Outcomes	*Stepwise specification of CEMO as an analytical process for investigating configurational causality behind marketing outcomes* *Review of the analytical aspects providing new knowledge about marketing contexts*
5	Empirical Study 1: Email Promotions for Air Tickets	*Practical demonstrations of how CEMO analysis can extract configurational information from empirical data*
6	Empirical Study 2: Sales Response of Functional Dairy Product	
7	Discussion and Conclusions	*On the validity and reliability of CEMO as a method for understanding marketing performance, and its relevance and practicability as a managerial tool*

2 Theoretical Background

The purpose of this chapter is to review the theoretical antecedents of this dissertation in marketing literature. The background context is that of strategic marketing and marketing performance, discussed in the introduction to this dissertation. In this chapter, I consider *marketing performance measurement* (O'Sullivan and Abela, 2007), marketing activities, (Clark and Ambler, 2001; O'Sullivan and Abela, 2007; Stewart, 2009) and the resource-based view in marketing (Srivastava, Fahey, and Christensen, 2001), and 'The Chain of Marketing Productivity' (Rust et al., 2004) as the conceptual points of departure for assessing the performance effects of marketing actions. Together with *contextual marketing performance assessment* ('MPA') *systems* (Morgan, Clark, and Gooner, 2002), discussed next, they are the fundamental frameworks underlying this study. The third section, I present the *theoretical framework* of my perspective on the relationship between marketing resources, actions, and outcomes. In later chapters, this framework is adopted as the platform for considering causal conditions and configurations in marketing contexts. To conclude the chapter, I move to *marketing management support systems* ('MMSS'; Wierenga, van Bruggen, and Staelin, 1999) and marketing engineering (Lilien and Rangaswamy, 1998; Lilien, Rangaswamy, van Bruggen, and Wierenga, 2002) to provide a managerial framework for a contextual MPA.

2.1 Marketing performance measurement

In the literature, marketing performance measurement is defined as the assessment of "the relationship between marketing activities and business performance" (Clark and Ambler, 2001, p. 231). O'Sullivan and Abela (2007) find that the goal of this task is "to demonstrate the value of the marketing activities," (p. 80) and the focus of the process not on "the 'underlying products, pricing, or customer relationships' (Rust et al., 2004,

p. 76) but rather as the 'marketing activities' themselves," (O'Sullivan and Abela, 2007, p. 80) which the authors define as the marketing communication, promotion, and other activities forming the bulk of typical marketing budgets. Customer value creation in core business processes (Srivastava, Shervani, and Fahey, 1999) provides the fundamental conceptual link between marketing activities and performance.

Srivastava, Shervani, and Fahey (1999) see customer value creation in the interlinked core business processes of product development management ('PDM'), supply chain management ('SCM'), and customer relationship management ('CRM') as the antecedents to business performance. According to the resource-based view ('RBV', Wernerfelt, 1984; Day and Wensley, 1988; Barney, 1991; Srivastava, Shervani, and Fahey, 1998), activities in the core business processes create value by combining assets with market information, marketing expertise, and customer and distributor networks. In other words, the interaction of marketing assets and organizational capabilities contributes to generating and sustaining specific forms customer value in the core business processes. Resources are transformed from one form to another "through managerial guidance" (Srivastava, Fahey, and Christensen, 2001, p. 778). The fundamental logic of the process begins with managerial decision-making brings about activities in the core business processes. These influence intermediate outcomes, such as customer and brand attributes and perceptions, and ultimately behavior (O'Sullivan and Abela, 2007). These market-based assets, in turn, transform into further outcomes, such as sales and shareholder value. All the while, the state and nature of the assets provide the managerial contingency for decision-making. Marketing performance measurement research examines how relationships along the chain of marketing productivity can be measured, and which metrics and contextual factors are relevant (O'Sullivan and Abela, 2007).

In their *chain of marketing productivity*, Rust et al. (2004; see **Figure 2-1**) describe marketing performance as consisting of 1) customer impact, 2) market impact, 3) financial impact, and, finally, 4) impact on firm value. Through these sequential impacts, marketing strategies and actions affect, in the short run, the firm's market-based assets (Srivastava, Shervani, and Fahey, 1998), market position, financial position and, in the long run, the value of the firm and its position in the financial markets (Rust et al., 2004).

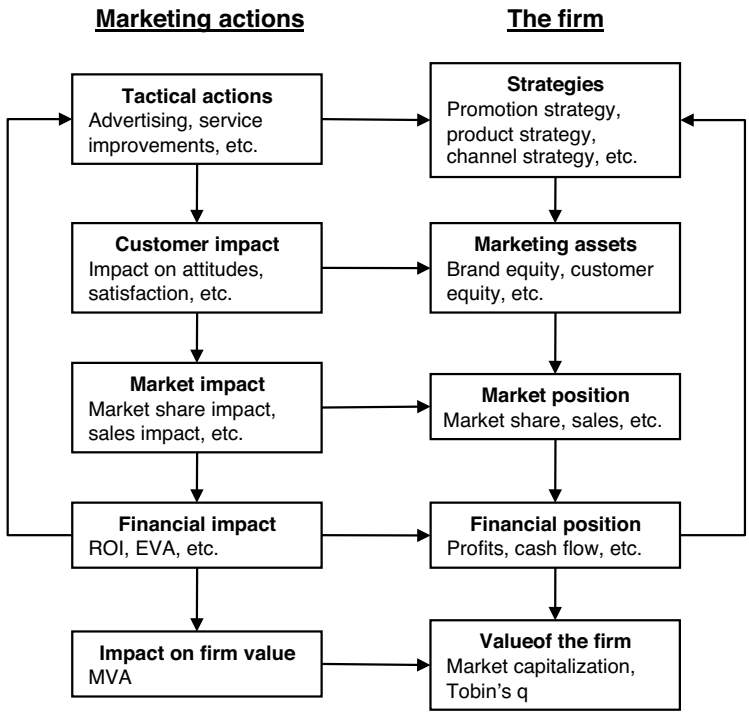

Figure 2-1. The Chain of Marketing Productivity. (Rust et al., 2004).

Despite work on linking marketing activities with intermediate marketing outcomes (Blattberg and Deighton, 1996; Rust, Zeithaml, and Lemon, 2000) and perceptual measures with financial results (see Gupta and Zeithaml, 2006 for a summary), the complete 'Chain of Marketing Productivity' (Rust et al., 2004) that links marketing expenditures, the creation of market assets, and eventual financial results together is complex (Grewal et al., 2009). Moreover, the links between actions, assets, and financial outcomes have rarely been empirically explicated in empirical contexts (Stewart, 2009).

The identification of customer value as an antecedent to shareholder value (Rust et al., 2004) suggests that cash flows can be used to analyze customer value creation in the core business processes (Srivastava, Shervani, and Fahey, 1998; 1999; Rao and Bharadwaj, 2008). Following Rappaport (1986), Srivastava, Shervani, and Fahey (1999) discuss four value drivers, which comprise the managerial tools for value creation: 1) acceleration of cash flows, as earlier cash flows are more valuable, 2) enhancing cash flows by increasing revenues and cutting costs, 3) reducing risk and volatility associated with cash flows, and 4) augmenting long-run value of the business with investments into tangible and intangible assets.

Stewart (2009), similarly, sees "cash flow is the ultimate marketing metric" (p. 639). He suggests two main types of driver of cash flow. The first covers cash from a source, such as customer acquisition and retention, and share of wallet within a category; and the second, the production of cash through a business model, including margins, velocity, and leverage (Young, Weiss, and Stewart, 2006). The contrast to Rappaport's drivers is in adding the sources of cash to the descriptions of their effects on assets. The sources of cash identify intermediate marketing outcomes (for example, brand equity), which drive cash flows. Stewart (2009) finds three kinds of performance effects resulting from marketing activities:

1. Short-term effects, including readily measured forms such as incremental sales, leads generated, brand preference and choice, new subscriptions, and store visits;
2. Long-term effects such as brand equity, which persist into the future; and
3. Real options, or idiosyncratic future opportunities created by marketing for the organization, such as brand extensions and information channels.

These types of intermediate marketing outcomes reflect the complex dynamic of marketing performance. Marketing activities have effects on a wide range of outcomes and over various time spans. Marketing as a discipline has been most successful in identifying, measuring, and modeling the short-term effects; valuing long-term effects and real options is more difficult (Stewart, 2009). Essentially, this classification of performance effects is another perspective to the 'chain of marketing productivity' (Rust et al., 2004). Short-term effects, long-term effects, and real options all affect the tangible and intangible assets available to the organization for future marketing activities.

2.1.1 Marketing actions

The chain of marketing productivity (Rust et al., 2004) and Stewart's framework for marketing accountability provide two practical perspectives to examining the role of marketing actions. In organizations, managers make decisions about resource use for customer value creation in a process, which aims at improving overall business performance. Subsequently, the actions taken by managers on using resources to bring about changes in marketing assets are considered *marketing actions* in this dissertation.

This definition of marketing actions is founded on the resource-based view, where assets refer to "organizational attributes that an organization can acquire, develop, nurture, and leverage for both internal

(organizational) and external (marketplace) purposes" (Srivastava, Fahey, and Christensen, 2001, p. 779). Assets can be tangible, such as balance sheet items and physical resources, or intangible, such as knowledge. Srivastava, Fahey, and Christensen (2001) distinguish two related types of intangible *market-based assets*, relational and intellectual. Relational market-based assets are associated with external actors not under the complete control of the organization, such as relationships and perceptions held by customers and channels and the supply chain. Intellectual market-based assets are internal to the organization and cover, for example, knowledge about the external and internal environment, know-how, and process capabilities.

Marketing actions operate contingent to internal and external, tangible and intangible assets. Broadly put, marketing actions consume and use resources to bring about intermediate marketing outcomes, which can include tangible and intangible asset changes both in the internal and the external environment of the organization. Thus, actions transform the marketing context in which the organization operates (Zeithaml and Zeithaml, 1984). The nature of a marketing action can be approximated by examining resource use or, in other words, a *marketing mix* (Borden, 1964) that "refers to variables that a marketing manager can control to influence a brand's sales or market share" (Tellis, 2006, p. 506).

2.2 Marketing performance assessment

Morgan, Clark, and Gooner (2002) carry out an integrative review of the merits and challenges of historical approaches to marketing performance assessment (MPA). Their findings serve as antecedents to a holistic conceptual model of a 'normative MPA system' explicating the authors' understanding of the general marketing performance process. The model builds on the antecedents of marketing productivity analysis (an 'efficiency approach'; Bonoma and Clark, 1988) and the marketing audit concept (an 'effectiveness approach'; Shuchman, 1959; Kotler, Gregor, and Rodgers, 1977). Morgan, Clark, and Gooner (2002) add contingency, response, and performance variables to the normative MPA system to form a conceptual model for 'contextual MPA systems', reflecting the design and use of MPA systems in specific operative contexts.

The normative marketing performance assessment process (Morgan, Clark, and Gooner, 2002) considers marketing performance to be both dynamic (Dickson, 1996) and multidimensional (Bonoma and Clark, 1988), and is a universal conceptual framework of characteristics shared by all

organizations. Building on work by Walker and Ruekert (1987), they define three dimensions to marketing performance:

1. Effectiveness in "doing the right things" (Drucker, 1974) with respect to organizational goals and objectives;
2. Efficiency in optimizing process productivity with respect to marketing costs (e.g. Sevin, 1965) and revenues (e.g. Feder, 1965); and
3. Adaptiveness in the firm's ability to respond to changes in its environment and ability to innovate (Walker and Ruekert, 1987).

Drawing on the resource-based view ('RBV', e.g. Day and Wensley, 1988; Barney, 1991; Srivastava, Shervani, and Fahey 1998), Morgan, Clark, and Gooner's normative marketing performance assessment system (2002) comprises five stages (**Figure 2-2**). Each of the five stages represents a type of marketing asset. Marketing actions by the organization transform (1) resources by employing (2) capabilities, resulting in (3) positional advantages that build market-based assets (intermediate marketing outcomes). These market-based assets can then be transformed into (5) financial performance. However, the process is subject to inherent tradeoffs between marketing performance dimensions of efficiency, effectiveness and adaptiveness throughout the process (Ostroff and Schmitt, 1993; Bhargava, Dubelaar, and Ramaswami, 1994; Morgan, Clark, and Gooner, 2002). That is, an action or practice will generally not improve performance across all dimensions. For example, measures to improve short-run efficiency by cutting sales force size or advertising expenditure can mean decreased customer knowledge (resulting in lower adaptiveness to changes) and reduced brand awareness (lower effectiveness over time).

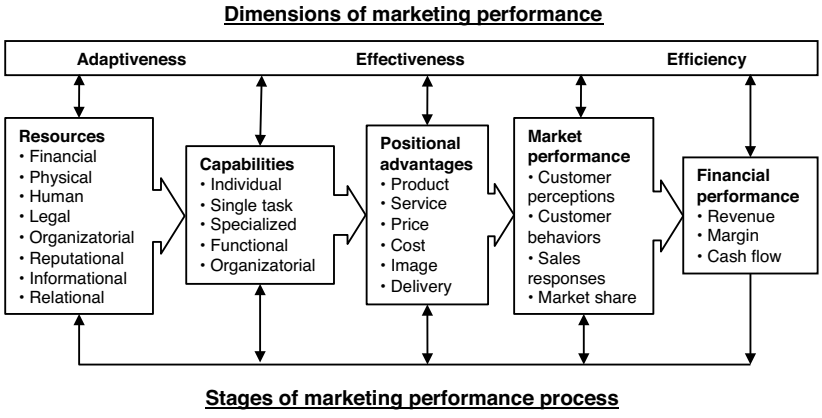

Figure 2-2. A normative MPA system (Morgan, Clark, and Gooner, 2002).

Morgan, Clark, and Gooner (2002) find that MPA requires an integrative perspective that not only covers the normative aspects of marketing performance, but also "is grounded in current theoretical frameworks explaining organizational performance; and is capable of producing MPA systems that are relevant to management needs and implementable in different corporate contexts" (p. 366). Following Blenkinsop and Burns (1992), they complement the normative perspective with a contextual model, which takes into account company or context-specific factors, such as the industry sector, target market or the type of offering, that affect the way in which marketing translates into business performance in practice (Morgan, Clark, and Gooner, 2002). For this, they draw on contingency theory (Lawrence and Lorsch, 1967; Olson, Slater, and Hult, 2005), reasoning that the most effective MPA system is the one that best fits the context-specific goals, strategy, structure and environment (Lewin and Minton, 1986; Govindarajan, 1988; Stathakopoulos, 1998). Contextual MPA models reflect the primary managerial goals and interests, as well as industry norms and traditions (Ambler, Kokkinaki, and Puntoni, 2004). Contextual MPA models are also more dynamic than normative, ideal-based models (Blenkinsop and Burns, 1992), in the sense that they adapt to changes in goals, structure and environment (Stathakopoulos, 1998). Morgan, Clark, and Gooner's framework for contextual MPA (2002) is illustrated in **Figure 2-3**.

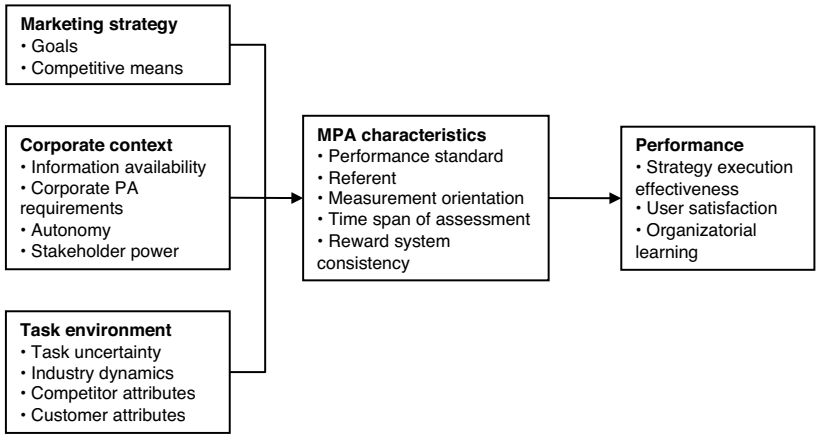

Figure 2-3. A contextual MPA system (Morgan, Clark, and Gooner, 2002).

The performance outcomes of contextual MPA are found in user satisfaction, strategy execution effectiveness, and organizational learning (Morgan, Clark, and Gooner, 2002). Focus on these outcomes positions comprehensive MPA systems as significant contributors to both forming

and evaluating assumptions about the operating environment (Slater and Narver, 1995):

> One of the biggest problems identified with productivity analyses in this context is that by treating the marketing process as a 'black box' it is difficult, if not impossible to discern why inputs and outputs are linked and in what ways. Unless marketing managers are able to diagnose what works and what does not in analyzing inputs, actions and decisions, and outputs, then by definition, no learning can take place. Since organizational learning is a fundamental source of capability upgrading, any failure to learn degrades future competitiveness. Effective MPA systems may therefore be important in generating future marketing performance, as well as monitoring current marketing performance. (Morgan, Clark, and Gooner, 2002, p. 371)

Despite the theoretical recognition of the importance of contextuality in MPA, empirical work in this field has remained scarce (Morgan, Clark, and Gooner, 2002). Systematical empirical insight into the mechanisms that impact performance in specific contexts is arguably an antecedent to distinguishing between 'investment' and 'expenditure'. Morgan, Clark, and Gooner (2002) posit that their normative MPA model identifies "theoretically anchored conceptualizations of marketing resources and marketing capabilities" (p. 372), but that empirical evidence from the perspective of the internal (managerial) expert is "urgently required" (ibid.). The contextual relevance of insights is critical for operative significance. The nature and significance of trade-off interactions between different dimensions of marketing performance have not been explored sufficiently, especially with regard to the role of adaptiveness (Ruekert and Walker, 1987; Morgan, Clark, and Gooner, 2002). Morgan, Clark, and Gooner (2002) also expect longitudinal studies to be "better suited to capture the temporal character of, and explore the cause-effect relationships involved in, the marketing performance process" (p. 372). With this dissertation, I intend to contribute an analytical approach for exploring these causal relationships, and specify a research process for carrying out such investigations in practical marketing contexts.

2.3 Conceptual framework

The marketing performance ability of an organization is determined by the ability make the most effective, efficient, and adaptiveness-minded (Morgan, Clark, and Gooner, 2002) use of the resources, assets and structures in its disposal (Srivastava, Shervani, and Fahey, 1998). This is achieved by fitting contingencies (Vorhies and Morgan, 2003) in the external operating environment with appropriate marketing actions. In

order to examine the linkages between resources and outcomes, the analysis process presented in this thesis rests on the following premises:

1. There are causal relationships between the state and nature of tangible and intangible resources, assets, and structures, enacted marketing actions, and resultant outcomes.
2. The state and nature of tangible and intangible resources, assets, and structures in the both the internal and external operating environments are shaped by the multidimensional outcomes of marketing actions.
3. Causal relationships may be complex, configurational, asymmetric, and context-specific.
4. Given relevant and accurate descriptors about the state and nature of tangible and intangible resources, assets, and structures, and of enacted marketing actions, causal relationships between them can be analytically deduced.

These premises entail that there are *organizational mechanisms* that exhibit understandable regularities within suitably delimited study contexts, and that studying these mechanisms as configurations is needed to gain access knowledge that is largely inaccessible with statistical methods. This is due to restrictive assumptions about the nature of reality, as well as analytical constraints such as population sizes and the difficulties in interpreting complex interaction effects (Fiss, 2007). However, the nature of these 'organizational mechanisms' is elusive, with a lack of systematic discussion that would attempt describe criteria for defining them (Pajunen, 2008b).

Following Bechtel and Abrahamsen (2005, p. 423), Pajunen (2008b) defines an organizatorial mechanism as a "structure performing a function in virtue of its component parts, component operations, and their organization, [the orchestrated functioning of which] is responsible for one or more phenomena" (p. 1451). Subsequently, Pajunen (2008b) argues that four main interrelated characteristics of mechanisms can be identified in the context of organization research:

1. Mechanisms consist of component parts and their activities and interactions.
2. Mechanisms produce something. In other words, a process must have some outcome.
3. The production activity of a mechanism depends essentially on 'the hierarchical (part–whole) structure of the mechanisms'. This entails that mechanisms are contingent to a context. The 'higher level' organizational

setting is a background for 'lower level causal relations', which can be enabled or otherwise affected by contextual conditions.

4. Accurate explanations of mechanisms are representations or model of mechanisms that describe relevant characteristics of the mechanisms operating in organizational processes.

Pajunen finds that these conceptualizations provide a coherent explanatory foundation for processual organization research. From the perspective of marketing, managers in organizations make decisions about resource use for customer value creation in a process, which aims at improving overall business performance. Subsequently, I consider the actions taken by managers on using resources to bring about changes in marketing assets to be *marketing actions*. Pajunen's (2008b) definition of organizatorial mechanisms translates directly to marketing performance concepts.

1. My definition of marketing actions is based on resource-based view, where assets refer to "organizational attributes that an organization can acquire, develop, nurture, and leverage for both internal (organizational) and external[1] (marketplace) purposes" (Srivastava, Fahey, and Christensen, 2001, p. 779).

2. Marketing actions consume and use resources to bring about intermediate marketing outcomes, which can include tangible and intangible asset changes both in the internal and the external environment of the organization. These changes in assets are outcomes of the marketing process and of intense managerial interest. Outcomes vary considerably, but understanding and explaining them is always the focus of considering actions and organizational mechanisms.

3. Marketing actions operate contingent to internal and external, tangible and intangible assets, corresponding to the 'higher level' and 'lower level' conditions observable with regard to organizatorial mechanisms. Additionally, marketing actions transform the marketing context in which the organization operates (Zeithaml and Zeithaml, 1984), which blurs to some extent Pajunen's (2008b) distinction between 'background enabler' conditions and causal conditions related directly to the causal process.

4. The nature of a marketing action can be approximated by examining resource use or, in other words, a marketing mix (Borden, 1964) that "refers to variables that a marketing manager can control to influence a brand's sales or market share" (Tellis, 2006, p. 506). Given relevant and accurate descriptors about the state and nature of tangible and intangible resources, assets, and structures, and of enacted marketing actions, causal

[1] i.e. 'higher level' conditions (Pajunen, 2008b)

> relationships between them can be analytically deduced. This attempt at forming accurate explanations of organizatorial processes, to serve as models for decision support, is the fundamental aim of my research.

The organizational mechanisms process perspective presented by Pajunen (2008b) offers a concrete conceptual basis for defining marketing actions in line with a preunderstanding of causal processes in organizational research, one which has been demonstrated (Pajunen, 2008a) to be directly compatible with FS/QCA as an analytical approach.

2.3.1 Marketing performance as configurational change

Chapters 3 and 4 take advantage of these premises to first examine complex configurational causation in marketing contexts, and then frame a research process for explaining outcomes of marketing actions through properties of actions, and configurations of assets and other contextual factors. For these purposes, I propose a conceptual model of marketing actions, assets, and outcomes, which builds on the above premises. The framework conceptualizes marketing performance phenomena in a manner that is analytically approachable with FS/QCA (Chapter 3), and provides the aspects that underlie the CEMO process specification introduced subsequently in Chapter 4.

Figure 2-4. Conceptual framework of marketing performance as complex configurational change in a marketing context.

Figure 2-4 illustrates the transformation of a marketing context brought on by a marketing action. The internal and external environments provide one basis for identifying resources and assets according to their type, nature, and location with respect to the marketing context. Previous literature identifies a range of tangible and intangible resources, assets, and structures in the internal and external operating environments of an organization. Assessing their state and nature is an antecedent to understanding their causal role in marketing performance. Depending on ownership and control, these resources, capabilities, structures, and assets

can further be characterized to belonging to an *organizatorial locus* or *customer locus* within the internal operating environment, or to an *industry locus* or *competitor locus* within the external operating environment. Furthermore, the contextual properties and attributes that define specific marketing actions are considered to exist in an *action locus* in the internal operating environment. In later chapters, these loci are examined as the sources of causal conditions for comparative analysis.

2.3.2 Internal environment

The internal environment consists of the elements of the marketing context that are directly or indirectly under an organization's control. From the normative marketing performance assessment system (Morgan, Clark, and Gooner, 2002; **Figure 2-2**), this includes the resource and capability stages. These consist of both tangible and intangible elements, including intellectual assets (Stewart, 2009) that guide managerial decision-making. Together, these resources, capabilities, and assets form the *organizatorial locus*, which is characterized by the relatively immediate availability of information and direct managerial control or influence over the state and nature of these elements. These are the factors that constrain, guide, and enable customer value creation in the core business processes (Srivastava, Shervani, and Fahey, 1999).

In addition to organizational assets, I consider the internal environment to include the intangible relational assets (Stewart, 2009) such as brand perceptions, arranged in the normative MPA system under 'positional advantages' (Morgan, Clark, and Gooner, 2002). Whilst they fall under the internal environment by their direct association with the organization and its services, information on their state and nature is less directly available, as they include perceptual components associated external actors such as customers. Relational assets in the *customer locus* are intermediate marketing outcomes (Stewart, 2009), which are influenced by marketing actions and provide the basis for market performance and financial performance outcomes (Morgan, Clark, and Gooner, 200).

Factors in the customer locus here describe the state, nature, and composition of current and potential customers. They are the contingency that is the primary target of value creation for the organization. Through marketing actions, value is both *created* –building potential for future financial gain as measured by perceptual measures (Stewart, 2009) such as brand metrics (Rust et al., 2004; Ambler et al., 2002), customer equity (Rust, Lemon, and Zeithaml, 2004), customer lifetime value (Berger and Nasr, 1999), and contractual obligations (Burnham, Frels, and Mahajan,

2003) – and *appropriated* in sources of incremental gains (Stewart, 2009) such as cash flows (Rao and Bharadwaj, 2008) and market share (Rust at al. 2004). Together, the value creating and value appropriating roles of positional assets lead to market performance outcomes and financial performance outcomes (Morgan, Clark, and Gooner, 2002).

2.3.3 External environment

Determinants of marketing performance in the external operating environment include factors pertaining to the operating industry and economic system in general and, on the other hand, to competitors and their actions. This external contingency is characterized by the lack of direct influence the organization has over the factors. Marketing actions do, however, have multidimensional effects that can alter industry structures and practices (providing *real options* [Stewart, 2009]) in addition to their effects on competitors' resources, capabilities, and assets.

The first locus in the external environment is the *industry* itself, comprising the business or industry level environment, as well as broader background factors such as the state, nature and developmental phase of the economy. Structures and aspects of the operating environment (Tikkanen, Lamberg, Parvinen, and Kallunki, 2005) include the institutions, structure, and operating logic of the chosen industry, business, and market, the forces and dynamics of competition, and degree and nature of turbulence (Jaworski and Kohli, 1988).

The second category of external factors is the *competitor locus*, comprising all tangible and intangible resources, assets, and structures that give rise to marketing actions by competitors, as well as the marketing actions themselves undertaken by competitors. In practice, the lack of information on the resources, capabilities, and structures of competitors means that organizations observing factors in the competitor locus will focus on externally measurable market-based assets and the attributes of marketing actions, such as the nature and scale of competitors' promotional efforts.

2.3.4 Marketing actions

In contrast to the other loci representing environmental contingencies, the *action locus* comprises the characteristics of an individual marketing action or, in other words, how the factors in the organizatorial locus are put to use in a given contingency of eternal factors. In contrast to the factors in the

organizational locus, these factors define *what* resources, assets, and structures are used to cause change and *how* they are to be used to bring about the intended outcomes in any of the other four loci, in conformance with the will of the marketing manager. These attributes define the configurational role of the marketing action.

Planning and executing marketing actions depends directly on the tangible and intangible resources, capabilities, assets, and structures the organization has at its disposal. The decision-making process includes, as a fundamental interpretive component, the perception held by the management about the internal and external reality. Together with performance goals associated with the action, this contextual information (cf. **Figure 2-3**) guides the value creation process by giving it direction, a form to the force.

A marketing action is considered to take place, when a discrete managerial decision is made about using the resources, assets, and structures at the organization's disposal, with intent of causing change in any marketing assets in the internal and external operating environments.[2] Within the incremental effects and real option effects of marketing performance outcomes, marketing actions can seek to affect *isolating mechanisms* (Mizik and Jacobson, 2003), which restrict competitors' ability to appropriate value from the market by taking advantage of, for example, established or fixed relationships, patents, access to rare resources, technological platforms or standards, and regulatory lobbying.

The definition of the marketing action can in many instances be framed as a decision on the use of the marketing mix (Borden, 1964; Constantinides, 2006; Möller, 2006). However, the level of analysis, in temporal scope or operative hierarchy, is not significant for the definition; an action can be a tactical decision about advertising copy or media mix balance, or the choice of strategic direction in a given market.

2.3.5 Observing performance outcomes

Marketing actions can affect the state and nature of tangible and intangible resources, assets, and structures in the internal and external operating reality of an organization. A marketing action can have effects in any locus, differing in their degree of intentionality, discoverability, persistence, scale, and significance. The total outcome of any marketing action is a changed

[2] Actions comprise not only the actions intended to bring about an outcome, but also actions whose role is to forbear to bring about, suppress, forbear to suppress, preserve, and forbear to preserve an outcome or trajectory that is underway (Nokelainen, 2008, p. 87).

reality, a new contingency which forms the basis for further marketing actions by the organization and other actors.

Intermediate outcomes in the relational assets of an organization and in competitors' relational assets are antecedents to market performance and financial performance (cf. Morgan, Clark, and Gooner, 2002; **Figure 2-2**). In addition to these changes in tangible firm assets, subjective evaluations of performance by managers form the basis for alterations in intellectual assets, completing the chain of marketing productivity (**Figure 2-1**).

Stewart's classification of marketing outcome types (2009) with respect to their degree of persistence is relevant. A marketing action can have *incremental effects* in the market that capitalize on value created in the past, for example in transforming perceptual brand equity in the customer locus to gain in financial assets in the organization locus. These cash flows are then available as resources to fund new marketing actions, such as product development to gain new intangible internal assets. Similarly, marketing actions that are able to create *persistent outcomes* in the market or among customers in the form of, for example, license contracts or changed brand positioning. These can have further outcomes in changed *real options* available for the organization in the future, apparent for example as possibilities for the organization to compete in new categories or markets.

Figure 2-4 is an abstraction of the transition between two states of the marketing context due to marketing actions, and a summary of the conceptual framework that is an outcome of the theoretical review in this chapter. The nature of a marketing action is shaped by the marketing context at time 't_0': the resources and assets available, managerial intent, and perceptions about the operative contingency. When a marketing action is carried out, it has an effect on the entire marketing context, transitioning it to a new system state, marked 't_1', the new operative contingency for carrying out new marketing actions. This conceptual transformation process and its components form the basis for considering causal conditions and outcomes in later chapters of this dissertation.

2.4 Marketing management support systems

'Marketing engineering' (Lilien and Rangaswamy, 1998; Lilien, Rangaswamy, van Bruggen, and Wierenga, 2002) integrates diverse practical dimensions of marketing performance management into a single problem-solving framework. It is presented as a systematic process to link theory with practice, integrating "marketing concepts, data, beliefs, analytical techniques, and software engineering to enhance both the

process and outputs of decision making" (Lilien, Rangaswamy, van Bruggen, and Wierenga, 2002, p. 119). The general marketing engineering process (**Figure 2-5**) involves gathering objective and subjective data about the marketing environment, carrying out analysis, and drawing judgments with managerial implications. Formally, Lilien, Rangaswamy, van Bruggen, and Wierenga (2002) define it as "the systematic process of putting marketing data and knowledge to practical use through the planning, design, and construction of decision aids and marketing management support systems" (Lilien, Rangaswamy, van Bruggen, and Wierenga, 2002, p. 111). The engineering mentality is reflected in the iterative nature of the process, on a view where progressively advanced understanding of the marketing environment brings about better performance.

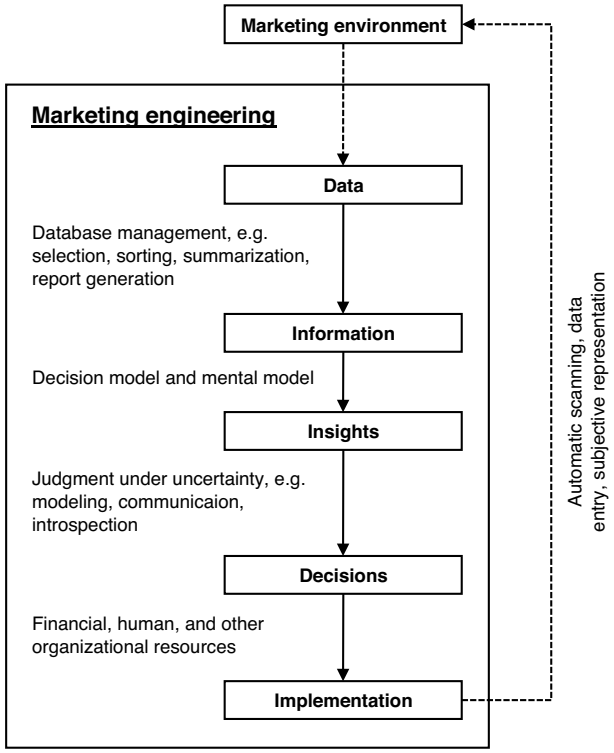

Figure 2-5. 'The marketing engineering approach' (Lilien, Rangaswamy, van Bruggen, and Wierenga, 2002).

The original authors and their collaborators have demonstrated the practical relevance and value of the marketing engineering approach with a broad range of case studies including airline fare structure using yield management, hotel chain concept development using conjoint analysis, and industrial marketing communications refocusing using choice modeling

(Lilien and Rangaswamy, 1998, pp. 3-4). The strength and versatility of marketing engineering lie in relating *decision-support demand* and *decision-support supply* factors to each other, and the consequent design and implementation of MMSS that fit the particular managerial problem setting. As such, the marketing engineering framework (**Figure 2-5**) is useful for positioning the present study with respect to the nature, goals, and proposed managerial use of the analysis process. Specifically, FS/QCA offers a new type of MMSS, which is knowledge-driven and responds to managerial demand for knowledge on complex configurational causation.

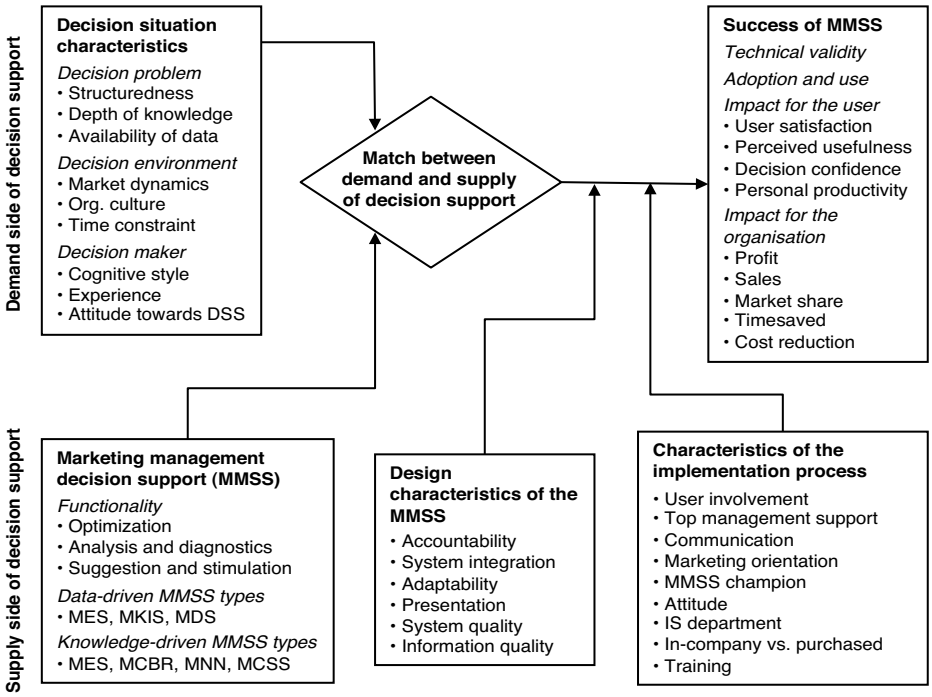

Figure 2-6. Factors determining the success of an MMSS (Wierenga, van Bruggen, and Staelin, 1999).

Wierenga, van Bruggen, and Staelin (1999) report "substantial proof that MMSS can increase firm profit and other measures of performance" (p. 197). They attribute the effect to a combination of five conditions determining the success of an MMSS, as measured against use adoption and performance impact metrics: supply of decision support, demand for decision support, the match between the two, and the design and implementation characteristics of the MMSS. More recently, O'Sullivan and Abela (2007) have used marketing performance measurement ability to explain business performance.

Of the five determinants, Lilien, Rangaswamy, van Bruggen, and Wierenga (2002) first consider the demand for decision support, covering the nature of the problem (including data availability), the decision environment, and the decision-maker. The supply of decision support covers functionality and analytical nature. MMSS are characterized as being data-driven (quantified market response models) or knowledge-driven (capturing qualitative knowledge about the domain). The nature and degree of match between supply and demand for decision support determine the potential success of an MMSS. The actual success of an MMSS depends on the design and implementation aspects of the MMSS. Technical validity, use adoption, and impact measures are observed as outcomes.

Four types of knowledge-driven MMSS are discussed by Wierenga, van Bruggen, and Staelin (1999), Wierenga (2010) and Lilien, Rangaswamy, van Bruggen, and Wierenga (2002). First, expert systems are computer programs that use rules to interact with human experts to competently solve problems in a narrowly specified domain (Rangaswamy, Eliashberg, Burke, and Wind, 1989). In earlier literature, 'expert systems' are synonymous with 'knowledge-based systems' when several input sources are used rather than a single human expert (Luconi, Malone, and Scott Morton, 1986). Neural networks and a broad range of other predictive modeling techniques, next, focus on modeling customer behavior based on background characteristics, interaction with the customer, and purchase history (Wierenga, 2010). Third, a case-based reasoning (analogical reasoning) system "comprises a set of previous cases from the domain under study and a set of search criteria for retrieving cases for situations that are similar (or analogous) to the target problem" (Wierenga, 2010, p. 7), corresponding precisely to the aims of this dissertation. The fourth type, creativity support systems (Abraham and Boone, 1994), takes advantage of software solutions to facilitate idea generation, but is yet to develop into a discourse in scale with the others.

Wierenga, van Bruggen, and Staelin (1999) discuss the research issues concerning MMSS in an introduction to a Marketing Science special issue on managerial decision-making. MMSS design and implementation characteristics' impact on success is not specific to marketing, and have been "discussed in numerous literatures" (p. 201), covering, among others, accessibility, adaptability, information quality, and top management support. Instead, to highlight the unique characteristics of marketing decision situations, the authors make several observations:

- Empirical studies from real-life managerial situations are called for to evaluate the success of MMSS over time, ideally with the use of controlled experimentation.

- Attention should shift from data-driven MMSS towards knowledge-driven systems, more complex (less well-structured) problem settings and less readily available quantitative data, which do need to provide explicit decision recommendations. Instead, they serve to identify poor alternatives, make suggestions, and stimulate managerial thought processes (Goldenberg, Mazursky, and Solomon, 1999).

- There is little knowledge about how managers make their decisions, including the role of experience, cognition, and affect on benefiting from MMSS. The effects of knowledge-based MMSS, in particular, have not been systematically studied. Since 1999, this has not changed substantially.

- Managers are generally unable to independently judge the positive objective performance impact of MMSS. Success evaluation cannot be carried out by subjective self-assessment. Technical validity can be irrelevant if organizational validity (i.e. positive impact on business performance) is not possible to demonstrate.

- In practice, MMSS success is further restricted by underresearched time pressure factors limiting information search and processing (e.g. Hogarth and Makridakis, 1981), changes in situation dynamics due to both supply and demand for decisions support evolving as knowledge accrues, and changes in the nature of decision support to an increasingly broad demand from different organizational functions.

Recently, Wierenga (2010) has drawn attention to a sluggish bridging of the gap between artificial intelligence (AI) system progress and marketing applications:

> [T]he two areas are almost completely disjoint. This is surprising and also a shame, because the nature of many marketing problems makes them very suitable for AI techniques. There is a real need for decision technologies that support the solution of weakly-structured marketing problems. [...] Marketing is a unique combination of quantitative and qualitative problems, which gives AI the opportunity to demonstrate its power in areas where operations research and econometrics cannot reach. (Pp. 7-8)

Wierenga sees knowledge-driven MMSS types as the key application fields of artificial intelligence in marketing, calling for new analytical developments to take advantage of the methodological advances in other fields.

3 Investigating Configurational Causality

Systematic comparison of qualitative and quantitative evidence has deep roots in scientific reasoning. I begin this chapter by reviewing the origins of *comparative research* and the role of configurational thinking in explaining causality. These provide an ontological background for the CEMO process. My aim here is to provide the necessary background for evaluating how *qualitative comparative analysis* (QCA, Ragin, 1987), as a specific research approach and a category of analytical tools, can be useful in approaching configurational problems in marketing performance.

QCA is an analytical implementation of configurational thinking. It is extended by incorporating fuzzy logic to *fuzzy-set qualitative comparative analysis* (FS/QCA, Ragin 2000) – the method and approach at the root of CEMO. FS/QCA differs from conventional statistical techniques and case research methods in significant respects. The nature, origin, significance, strengths, and weaknesses of these differences are a key concern in this chapter.

In this chapter, I examine the epistemological and ontological background of comparative research, case-oriented research, and configurational causality. Next, I review QCA itself as an analytical method and reserarch process, where a series of conventional assumptions about causality are relaxed to gain access to a new type of knowledge on conjectural and configurational causality. Building on these ideas, I discuss some of the distinguishing features and advantages of the QCA approach.

FS/QCA extends the core QCA methodology by integrating a powerful layer of qualitative distinction to the process. In the third section of this chapter, I discuss how fuzzy thinking and fuzzy sets are incorporated to QCA, and what additional opportunities for systematic comparison this presents on a practical and an empirical level. I also review some key applications in the literature to demonstrate the broad variety of contexts of application in social sciences, and more specifically in business research –

chiefly from the domain of organizational studies, where most FS/QCA work to date has been carried out.

The chapter concludes with consideration of how configurational thinking in the form of FS/QCA can be a novel and contextually relevant basis for knowledge generation in marketing performance assessement. This leads us, in the subsequent chapter, to consider the practical specifics of applying FS/QCA to marketing contexts.

3.1 Comparative research

Comparison is an integral part of our sense-making of the world and society surrounding us. The empirical application of comparison is key to all experimental and natural sciences. With adequate control over contextual parameters, rigorous causal inferences can be made about physical phenomena. However, such traction is neither possible nor always desirable in most social and behavioral sciences (Rihoux and Ragin, 2009, p. xviii). As such, methods for knowledge discovery must acknowledge the importance of deductive reasoning in observation and analysis of phenomena. Comparison has deep roots in the history and current practice of knowledge discovery in social science, especially so in case study research. This provides the background for a conjectural perspective on causality – where causation is viewed as contingent on a broad range of conditions, some unknowable – and the background for QCA as a general approach to study it in empirical contexts.

Single-case studies have a well-published history in marketing and business research, allowing for deep insight into individual situations. In the social sciences, multiple case studies have been increasingly chosen as a research strategy that allows complexity present in cases to be captured while also affording a degree of generalizability for findings. In comparative qualitative approaches, empirical phenomena are observed in analytical units of 'cases', which include the conditions of the focal context, and analysis processes are constructed for the discovery of contextually bound qualitative narratives that approximate the reality, as it is perceived.

3.1.1 Epistemological foundations

The antecedents of systematic comparative procedures are found in early natural sciences and in John Stuart Mill's (1967 [1843]) methods for examining causal relations. Berg-Schlosser, De Meur, Rihoux and Ragin (2009) cite Linnaeus' botanic taxonomies (1753) and Cuvier's

classifications of fauna (1798). John Stuart Mill's 1843 'A System of Logic' presented five methods of induction for systematically comparing and contrasting cases to discover causal relationships.

Of the five, the *method of agreement* and *method of difference* are the fundamental epistemological foundations for establishing causal links through systematic comparison. Mill's *direct method of agreement* postulates:

> If two or more instances of the phenomenon under investigation have only one circumstance in common, the circumstance in which alone all the instances agree, is the cause (or effect) of the given phenomenon. (Mill, 1967 [1843], p. 390)

Direct antecedents to the method of agreement can be found in Hume's 'An Enquiry Concerning Human Understanding' – "observation of constant conjunction of certain impressions across many instances" for discovering necessary conditions (Hume, 1974 [1748]), as well as Avicenna's (1025) medical encyclopedia 'The Canon of Medicine', one of the first known compositions in natural science after antiquity.

Mill's *joint method of agreement and disagreement* is less strong than the two fundamental methods (Berg-Schlosser, De Meur, Rihoux, and Ragin 2009, p. 2) as it does not require a single cause or its absence as the relating mechanism[1]. The combination of the two, however, makes an important approach towards real-world applicability and the practical methodological foundations of QCA:

> If two or more instances in which the phenomenon occurs have only one circumstance in common, while two or more instances in which it does not occur have nothing in common save the absence of that circumstance: the circumstance in which alone the two sets of instances differ, is the effect, or cause, or a necessary part of the cause, of the phenomenon. (Mill, 1967 [1843], p. 396)

To successfully apply these epistemological methods to generate new knowledge, the analysis must include factors that are *sufficient* to bring about the outcome. Mill's methods rest on an extremely positivist foundation, which is impossible to maintain in social sciences. As such, the methods cannot decisively prove a causal relationship, for lack of control

[1] Mill's method of residues, however, is in contrast with the logical foundations of multiple conjectural causality: "Deduct from any phenomenon such part as is known by previous inductions to be the effect of certain antecedents, and the residue of the phenomenon is the effect of the remaining antecedents" (1967 [1843], p. 437). The method of residues is based on a linear-additive view of causation and is as such rejected as a part of the foundations for QCA as discussed later in this chapter.

over other factors. Notwithstanding, they can provide a systematic basis for eliminating irrelevant (unnecessary) factors and approximating the actual, real-world causal factors.

3.1.2 Case study research

In QCA, empirical phenomena are observed in analytical units of *cases* (Rihoux and Ragin, 2009, p. xviii), where observations are construed as interconnected wholes characterized by qualitatively depth, as opposed to observed collections of variable values. This stance positions QCA techniques more strongly in the case research tradition than in statistics. Bonoma (1985) discusses how marketing has emphasized the role of empirical deduction and broad, generalizable theories in contrast to reasoning from "individual and naturally occurring but largely uncontrollable observations toward generalizable inductive principles" (p. 199). He advocates case research as a method for the former approach, leading to "(1) theoretical generalizations from the clinical observations, (2) clinical 'constraint testing' of these generalizations, and eventually (3) a clinically validated theory of some marketing phenomenon" (ibid.).

Case research is concerned with actions, that occurred in the past, that may affect current understanding, and ultimately affect future actions (Perry and Gummesson, 2004). Based on earlier work by Perry (1998) they define case research as

- studies of *contemporary, dynamic phenomena* and the corresponding emerging bodies of knowledge;
- carried out within *real-life contexts*, where the boundaries between the phenomena and their background are unclear;
- *explaining causal links* beyond the explanatory scope of survey or experimental methods, where single or clear outcomes are not feasible; and
- using interviews, observation and other multiple sources of data.

To these ends, the research process of a case study typically comprises a literature review that develops research issues or objectives, a well-justified description of the data collection and analysis processes, the objective-oriented data analysis itself, and ensuing theoretical contribution. Perry and Gummesson (2004) summarize their understanding of case research as a tool going beyond creating models, theories, and testing of theories:

> Case study research takes a systemic, holistic stance recognizing reality as it is, not just settling for descriptions but adding value through conceptualization. It

> does not assume away complexity, chaos, ambiguity, fuzziness, uncertainty and dynamic forces for the convenience of the researcher and his or her analysis. It is primarily qualitative and interpretive, although quantitative research can be part of it. An observation, which is both amusing and scary, is that quantitative research starts and ends with qualitative assumptions and subjective interpretation, and even its most regulated and systematic collection and processing of numbers, is dependent on judgment calls, and inter-subjective agreements. (p. 210)

This perspective resounds with the mixed method approach to knowledge associated with QCA, that emphasizes minimizing assumptions about system behavior. Analytical generalization (Yin, 2003, pp. 31-33), as opposed to statistical generalization, is not evaluated with respect to criteria such as the representative sampling of a population, but as a theory of the phenomenon being studied. This type of generalization forms the bound between practical knowledge and academic analysis. To afford generalization, key findings and conclusions need to have value outside the studied case in question. Explorative studies and methods, in turn, make way for more rigorous testing of theory.

Eisenhardt (1989) presents a 'process of inducting theory using case studies', based on grounded theory (Glaser and Strauss, 1967), on case study research design (Yin 1981; 1984), and on qualitative analysis techniques (Miles and Huberman, 1994). It is intended as a roadmap for researchers and as guidelines for evaluating case study research. The described process is iterative, encouraging the investigator to move freely from cross-case comparison to defining research questions and data collection, emphasizing divergent thinking that nevertheless aims at a converging understanding of the focal phenomenon.

Bonoma (1985) sees as the real benefits of qualitative 'clinical' research methods the ways in which they can expand the range of research problems that can be considered. In these situations, the risks to data integrity that accompany many 'high currency' approaches are overshadowed by the need for qualitative depth identifiable in some research situations. In particular, such situations exist where the phenomena under investigation are broad and complex, and where the existing body of knowledge is insufficient to propose testable causal questions, and when a phenomenon cannot be isolated and studied outside the context in which it occurs naturally. QCA fits this description, as it is primarily aimed at identifying causal patterns that are complex and highly context specific, the directly implied premise being that current (more general) theory cannot provide explanations of the observed phenomena on an adequately 'current' level.

For all their strength in building valid theory that "closely mirrors reality," Eisenhardt identifies a number of weaknesses with case studies. Parsimony may suffer from developing a theory that captures too much detail, and theories that are too narrow and idiosyncratic "are likely to be testable, novel, and empirically valid, but [...] lack the sweep of theories like resource dependence, population ecology, and transaction cost" (Eisenhardt, 1989, p. 547).

Arguably, there may well not be such "theories in any grand sense" (ibid.) about marketing phenomena, which would constitute relevant managerial understanding specific, dynamic practical settings. Instead, knowledge-production tools must be developed to tackle the mechanics of marketing performance on a contextual level, independent of any possible general theories of marketing (Anderson, 1986, p. 156).

For assessing the goodness of an emergent theory, Eisenhardt turns to Pfeffer's (1982) notions of parsimony, testability and logical coherence for evaluation the end result. A number of practical empirical criteria are also given, including following careful and well-documented data sampling, collection and analytical procedures, ruling out rival explanations, thorough reporting of information, a good fit of the theory with the data, and novelty of insight. Criteria put forth by Scheinder and Wagemann (2010) for evaluating QCA analysis are taken advantage of in this study. These criteria cover the research stages before, during, and after the analytical moment of data analysis, and focus on qualitative transparence and replicability.

3.1.3 Multiple case studies and theory generation

The comparative method can alleviate some limitations to knowledge accrual that are due to the lack of possibility for true experimentation or application of the scientific method of natural sciences. The extensions of the single case study method to contrast several cases are generally known as *multiple case study* methods. Single-case studies have a well-published history in marketing and business research (Dubois and Gadde, 2002). They allow deep insight into individual situations, but by their intrinsic nature they do not allow for much comparison. Indeed, it is not uncommon to dismiss multiple-case studies as lacking in depth without compensating in breadth (Yin, 1981).

With regard to the methodological differentiation by some authors to single and multiple case studies, Dubois and Gadde (2002, p. 557) demur attitudes where "multiple cases and replication provides better explanations than single cases," and where situation specificity is considered a weakness, citing Eisenhardt (1989), Yin (1994), and Miles and

Huberman (1994) as examples. Dubois and Gadde quote Easton's critique of the pitfalls*:* "They seek to do a number of case studies as if greater numbers, by and of themselves, increased the explanatory power of what they have been doing. Researching greater numbers of cases, with the same resources, means more breadth, but less depth*"* (Easton, 1995, p. 382).

Recently, multiple case studies have been under a consistently rising amount of research attention. In the social sciences, multiple case studies has been increasingly chosen as a research strategy that allows complexity present in cases to be captured while also affording a degree of generalizability for findings (Rihoux and Ragin, 2009, p. xviii). Multiple case studies can be seen as a step towards analytical generalization. They can incorporate empirical heterogeneity and diversity, necessary tools for developing more complete, nonuniform models that only fit a part of a broader population (Maxwell, 1992; 2005).

Systematic combining. Drawing on applications of multiple case study research in industrial networks, Dubois and Gadde (2002, p. 554) describe a theory-building case study approach they term 'systematic combining', a process of a "continuous movement between an empirical world and a model world, [...] grounded in an 'abductive' logic [...] where theoretical framework, empirical fieldwork, and case analysis evolve simultaneously." They propose that situation-specificity may be considered a strength of the approach, as opposed to a previously perceived weakness (Weick 1969, p. 18, in Dubois and Gadde, 2002). This stance is reflected in QCA as a research approach, where grounded understanding of the case context progresses in analytical iterations.

Dubois and Gadde (2002) stress the role of the analytical framework as a major difference to both conventional deductive and inductive studies. Theory development, where sampling and data analysis are "overlapping and interwoven tasks with mutual impact" (Brito, 1997, p. 18) is emphasized in contrast to theory generation, where confirmation is sought at a later stage. Compared to grounded theory approaches, the interplay between theory and empirical observation is seen as more significant. In addition to induction, there is also a deductive element present in the process – as with QCA. In further contrast to conventional case study research approaches, Dubois and Gadde (2002) posit *that "relationships and patterns in complex structures and processes cannot be tested,"* and that their credibility "has to be determined by other means," namely Pfeffer's (1982) 'logical coherence'. Logical coherence, in turn, derives from "the adequacy of the research process and the empirical grounding of theory" (Dubois and Gadde, 2002, p. 559; Strauss and Corbin, 1990).

The abductive approach described by Dubois and Gadde (2002) complements Eisenhardt's (1989) case study research strategy by offering a further degree of practical flexibility for taking advantage of multiple case studies. While the approaches agree for the most part on the empirical process and criteria for evaluating its goodness, the additional emphasis on theoretical guidance in systematic combining encourages investigators to be more explicit about their constructs. From the perspective of comparative analysis, both offer valuable insight on practical case research in management science. This allows for better anchoring and evaluation of the analysis process based on established empirical and epistemological criteria.

3.2 Qualitative Comparative Analysis (QCA)

Qualitative comparative analysis (QCA) makes significant borrowings from case study research to construct analytical generalizations based on empirical data. The process emphasizes qualitative understanding, transparency, and replicability in systematic comparison of case data, and relies on formal logical analysis to build causal propositions. These causal propositions are logically true within the empirical context, and offer heterogeneous data-driven descriptions of linkages to explain causal mechanisms. The distinguishing elements of QCA are a holistic view of cases as more than incidental combinations of variate values, the causally heterogenous perpective taken on causality, and a continuous qualitative dialogue with data.

QCA has its origins in the late 1980s and early 1990s, having been developed as a 'macro-comparative' approach for studying questions in political science and historical sociology (Ragin, 2009, p. 3; Berg-Schlosser and Quenter, 1996). Empirical research taking entire societies, economies, states, and other complex social and cultural formations as units of analysis is naturally associated with a limited number of relevant cases – for example, the countries of Europe. For this reason, QCA has often been viewed as a 'small-N' approach, specifically tackling many of the analytical challenges inherent to small populations. Cooper (2004) notes that the advantages of the case-based approach are beginning to be applied to larger datasets, such as populations followed in education research (Abbott, 1992; Ragin, 2003; Williams and Dyer, 2004). In addition to the empirically driven research process, and the range of specifically relaxed assumptions about the symmetry, linear-additivety, homogeneity, and universality causality, discussed earlier, the small-N aspect is one of the most significant

points of contrast between QCA and conventional quantitative statistical methods.

More than two thirds of all existing applications of QCA are found in political science and sociology, and a growing remainder in, for example, criminology, political economy and management studies (Rihoux and Ragin, 2009, p. 174). The number of applications in other disciplines is growing, and the potential for application in many others is arguably broad. Rihoux and Ragin see potential for further applications "even in the natural and biological sciences" (ibid.), for example in situations where strict criteria of experimental procedure cannot be fulfilled due to limited populations, the empirical reality of observation, and other reasons.

With QCA, investigating causality is approached with parsimony: Given some theoretical understanding of potentially relevant causal factors, adequate data of sufficient quality, and a requisite assumption that some regularities in causal processes exist in the first place, the simplest explanations that can account for the variance in outcomes present a strong candidate for a causal theory in the particular context. Whereas the method (obviously) does not assert to prove causality beyond scientific falsification, it arguably presents a stronger case than conventional statistics in the sense that complexity in the data does not need to be assumed to fit a model – idiosyncratic interactions are incorporated. Explanations are based on empirically observed combinations of causal factors, not hypothesized combinations of variable values that would maximize the likelihood of an outcome from a statistical model.

The motivation for using QCA is the search for causal regularities. In theory testing, QCA can easily disqualify propositions that do not discriminate correctly between empirical cases. The parsimonious explanations linking conditions and empirical cases are an attempt to express an approximation of causality that is simple enough to be meaningful in practice.

In contrast to comparative methods such as QCA, 'pure' statistical methods operate with a large number of cases, which are selected randomly, if possible, from a still larger population (Ragin, 2009, p. 4). The two general approaches to populations and sampling differ on a number of fundamental points. As mentioned, the QCA methodology (and its variants) has been applied to a variety of investigations in political science and social science. The documented majority of these applications have been 'macro-comparative' studies of entire societies, economies, states, and other comparable formations (Berg-Schlosser, 1996 in Ragin, 2009, p. 3). The 'small-N' nature is also a theme shared by much of the previous research, owning to QCA strategies being partly developed to deal with the

methodological problems in addressing small-N problems, for example, in comparing aspects of European nations.[2]

The suitability of QCA for small-N contexts is associated with three aspects of the research strategy. First, a (1) *holistic approach* maintains the case data as integral wholes whose components relate to each other. Thus, the components are not seen as independent variable values, but combinations that evidence (2) *configurational causality*. The configurational perspective on causality entails that multiple paths may lead to the same outcome (equifinality) and that conditions interact in complex, contextually idiosyncratic, and causally heterogenous ways. A final deparure from conventional statistical methods is the extensive (3) *dialogue with data*, most pointedly in the use of qualitative interpretation to calibrate fuzzy set membership scores (in FS/QCA) and the production of causal narratives to express the configurational findings of the analysis.

3.2.1 Holistic approach

Ragin's 1987 original introduction to qualitative comparative methods sought to present a "synthetic strategy [to] provide a way to test alternative arguments and at the same time encourage the use of theory as a basis for interpretation," ideally integrating "the best features of the case-oriented approach with the best features of the variable-oriented approach" (p. 84). To this specific end, QCA techniques combine features from both approaches to "allow the systematic comparison of cases, with the help of formal tools and with a specific conception of cases" (Berg-Schlosser, De Meur, Rihoux, and Ragin, 2009, p. 6).

QCA techniques are specifically designed to deal with cases, not variables. That is, each case is treated as an integral whole as opposed to an anonymous source of values for potentially independent variables. Thus, each case is a configuration, a complex combination of properties (ibid.). A distinguishing feature of this holistic approach is that cases should be known well on a specific level. Thus, researchers can continuously refer back to sources and experts for additional information, as requirements for the range and qualitative depth of relevant conditions are revised and clarified during the analytical process.

[2] Ragin (2009, p. 174) makes not of the successful applications of QCA with as few as three cases, by Häge (2007). Most intermediate-N range applications are found in the 10 to 50 case range. Despite being seen as a small-N approach, QCA is nevertheless applicable to larger-N studies. Populations with more than 100 (Drass and Spencer, 1987; Ishida, Yonetani, and Kosaka, 2006), or even 1000 cases have also been successfully demonstrated (Amoroso and Ragin, 1999; Miethe and Drass, 1999).

Phenomena of the social and human sphere are not easily reduced to independent variables with numerical values. However, certain assumptions have to be made to create settings that can be approached with conventional multivariate techniques, and these assumptions force investigators to compromise on representing reality. Error terms and similar tools are not need added to account for noise, diversity, and variation in a model. Variable-oriented techniques of statistical control make a series of assumptions that often lead them in the practical research process to construct universal models, "adding and subtracting control variables, or reconceptualizing key concepts of the theoretical model that is being tested, or devising new measures, or redefining control variables as theoretical variables" (Ragin, 1987, pp. 67-8; Berg-Schlosser, De Meur, Rihoux, and Ragin, 2009, p. 8).

A monolithic deterministic model to explain all empirical variation is not an aim in QCA, but instead finding out the key characteristics of the different causal configurations distinguishable in interactions among the final population of cases. With QCA, the population is a flexible construct, determined only by the intersection of collected data with causal explanations for their behavior (Ragin, 2000, pp. 58-9). The final population ("Cases of what?") is itself a product of the analysis process, defined by the set-theoretic extent of the discovered interactions among the data. That is, only the cases that match one or more of the discovered 'causal recipies' are members of the final population.

3.2.2 Configurational causality

The major ambition of the approach presented by Ragin and colleagues is "to allow systematic cross-case comparisons, while at the same time giving justice to within-case complexity, particularly in small- and intermediate-N research designs" (Rihoux and Ragin, 2009, p. xviii). In the configurational approach – the shared foundation for all varieties of QCA – cases and their conditions are studied from a perspective grounded on set theory (Ragin, 1987; Rihoux and Ragin, 2009). The individual cases are seen as being members of one or more *sets*, or groups, defined by the investigator. Sets and set memberships are easily manipulated and logically reasoned with using established mathematical tools, allowing reliable and systematic analysis procedures.

Differences among data would be considered as differences in *kind,* and cases "as configurations of aspects and features [...], replacing the conventional view of difference as variation (i.e. as deviation from the mean)" (Ragin, 2000, p. 5).

A key contrast with correlation, and many other measures of association, is that set relations are fundamentally asymmetrical (Ragin 2008, p. 7). Membership in one set does not imply membership or nonmembership in another. Set-theoretic analysis, like qualitative research in general, does not focus on general patterns of association, but uniformities or near-uniformities. These relationships are not symmetrical with respect to the general level. For this purpose, cases are viewed as configurations, or specific combinations of explanatory factors such as stimuli, causal variables, triggers and contingencies. In configurational analysis terminology, these are referred to as conditions that produce outcomes that the investigator is interested in (Rihoux and Ragin, 2009, p. xxi).

Ragin argues that 'diversity-oriented' techniques like QCA, taking advantage of the configurational approach, can bypass problems presented by demonstrating causality and dealing with causal heterogeneity. Different, heterogenous causal mechanisms may operate concurrently, and can lead to the same, or equifinal outocmes. These are key observations in configurational causality: a given outcome may result from several different combinations of conditions (Ragin 2008, p. 54). In order to leave room for equifinality, complexity, and conjectural explanations that recognize the impossibility of understanding all causally relevant characteristics, the conventional frame of analysis is broadened in several respects by relaxing some common assumptions, which are in direct contrast against key assumptions of conventional statistical techniques (Berg-Schlosser and DeMeur p. 8-9):

Additivity, or the assumption that a change in the level of a condition (cf. the value of an independent variable) will have the same incremental effect on the outcome across all cases regardless of the values of other conditions is not adopted in QCA (Berg-Schlosser and DeMeur, 2009, p. 9). Every condition is a factor to the outcome only as a part of a combination, or a conjecture, with an effect that may be unique to that combination. These conditions are not analytically separable attributes, and may well operate in radically different ways in different contexts and in different cases (Ragin, 2000, pp. 40, 71).

Causality is not assumed to be permanent, but transient by being linked to a specific context, conjecture, and contingency. Correlations and regressions that are computed across time and cases are seen as irrelevant for understanding the specific and distinct patterns of real-world causality, as they may easily lead to probabilistic oversimplifications (Berg-Schlosser and De Meur, 2009, p. 9).

Unit homogeneity is not assumed as causal effects are not assumed to be uniform: the concept of equifinality prescribes that multiple parallel routes

may lead to the same outcome. Depending on the specific constellation of causal conditions it is combined with, the presence or absence a single condition may work for or against an outcome. Investigating causality in line with J. S. Mill's methods of comparison (Mill, 1967 [1843], see section 3.1.1) concentrates on finding the differences in causal conditions that may explain variation in outcomes (Berg-Schlosser and De Meur, 2009, p. 9). The researcher cannot assume or estimate an outcome for a hypothetical, empirically unobserved combination of conditions. Strictly, analytical generalization into another instance requires a specific empirical relation linking an observed outcome to an observed conjecture.

In QCA, explanations are sought on a level that welcomes heterogeneity: individual outliers are as important as more frequent observations. Each causal configuration is a valid explanation of a regularity among the cases that leads to a given outcome. However, direct generalizations are explicilty claimed to apply only to the population and property space at hand. Moving from logic-based descriptive configurations is, however, encouraged to drive theory-building. According to Berg-Schlosser and De Meur,

> a well-executed QCA should go beyond plain description and consider 'modest generalizations': [...] from a systematic comparison of comparable cases, it is possible to formulate propositions that we can apply, with appropriate caution, to other similar cases – that is, cases that share a reasonable number of characteristics with those that were the subject of the QCA. (2009, p. 12)

In contrast to statistical sampling and generalization, this approach is, thus, more reserved.

Causality is not assumed to be symmetrical. The presence and absence of an outcome represent two different conjectures, requiring different, independent explanations that cannot be derived from one another (Berg-Schlosser and De Meur, 2009, p. 9). In practice, data patterns are often triangular as opposed to conforming to a diagonal relationship, as elaborated on in Section 3.3.2 (p. 55). In the SAGE Handbook on Case-Centered Methods (2008), Kent points out, that high levels of multicollinearity are common with regard to social phenomena, making it difficult to evaluate the relative contribution of independent variables, and continues:

> If these assumptions are unjustified or unexamined then, in the words of Berk (2004, p. 38), the researcher has 'has started down the slippery slope toward statistical ritual'. Coefficients that are relevant may turn out to be individually statistically insignificant, while the effects of outliers or anomalous subpopulations may be amplified. Linear regression results are, consequently, notoriously unstable: even the most minor changes in model specifications can

> result in estimates 'that bounce around like a box full of gerbils on methamphetamines' (Schrodt, 2006). (Kent, 2004, p. 187)

The conjectural view on causality is a methodological assumption that is difficult to include in many analytical approaches. The joint effects of the presence and absence of conditions (Ragin, 2008a, p. 175) are difficult if not practically impossible to tackle with conventional techniques such as logistic regression. A saturated interaction model with five independent variables, for example, would require the estimation of 32 coefficients in a single equation - infeasible due to collinearity and virtually impossible to interpret if achieved (Ragin and Fiss, 2008, p. 207). Logistic regression analysis also disregards whether it is, in reality, possible for empirical cases to be found in all 32 corners of the same vector space. This allows outcome probabilities to be calculated for hypothetical cases that do not or cannot exist in the physical and social reality. The problem of limited diversity is ignored by making a net-effects assumption of linearity and additivity "in an indirect and covert manner by assuming that the effect of a given variable is the same regardless of the values if the other variables and that a linear relationship can be extrapolated beyond an observed range of variables" (ibid.). Configurational analysis, in contrast, makes no such assumptions. The problem of limited diversity, thus, persists in QCA as an aknowledged practial issue that constrains generalizations beyond empirically observed configurations.

According to Feyerabend (1993), interesting theories are never compatible with all the relevant facts – implicit assumptions of factors associated with phenomena will need to be changed to make assumptions agree with observations. Feyerabend attacks the consistency criterion used for evaluating scientific theories, noting that compatibility with older theory gives an inherent advantage to the older theory (ibid., p. 24-26). A pluralistic approach such as this is argued to improve the criticality of science. Feyerabend's approach resonates particularly well when it comes to social science: the value of results derives from the social and physical value of the results, not the methodology used. The multiple conjectural view of causation of QCA can be seen as a reaction to Feyerabend's critique of consistency with established approaches. Ultimately, it can be argued that the goodness of a methodology such as QCA should be judged on the results that their application has on practical insight, admittedly possible only in retrospective.

3.2.3 Configurational approaches in marketing research

Configurational analysis supposes that system outcomes, especially in a complex context involving numerous social actors, may depend more on the arrangement of causal factors, rather than on any individual factors or variables (Fiss, 2007). Multiple causal factors acting in configurations of varying complexity can readily be found to be a relevant concern on all levels of marketing organization and marketing management, from broad strategic and organizational choices to the tactical use of marketing mix elements.

The broad range of interconnected activities and outcomes (Walker and Ruekert, 1987; Homburg, Jensen, and Kromer, 2008) under consideration gives marketing performance a strongly multidimensional character (Morgan, Clark, and Gooner, 2002). Day (1999) similarly finds that successful performance outcomes require managers to reconcile multiple, at times conflicting elements. However, as discussed previously in Chapter 1, little research exists concerning the use of configurational approaches specifically in marketing. Vorhies and Morgan (2003) attribute this to the lack of adequate methodologies.

Present approaches to configurationality in marketing are found in investigating interaction terms in (typically quantitative) models. Statistical sales response models can approximate the effects of promotions and price (Stewart, 2009), given a sufficient homogenous sample. However, the dimensionality of these models is, in practice, restricted by interpretability and hypothesis development ability, which become impracticable beyond three-way interactions (Drazin and Van de Ven, 1985). Deviation scores (Vorhies and Morgan, 2003) have been used to study the fit between a company's marketing organization and its business strategy. This approach cannot, however, shed light on the roles of component elements in bringing about the performance outcome. Cluster analysis, in many forms, is a common tool for case analysis in marketing. Clustering methods can be used to characterize cases along a broad range of interrelated dimensions, but they offer limited tools to connect specific outcomes with cases (Fiss, 2007).

3.2.4 Necessary and sufficient conditions

From the perspective of demonstrating causality, the question of interest is to discover which conditions or combinations of conditions are *necessary* for a given outcome, and which on their own are *sufficient* to bring it about. The multiple conjectural view of causation (Rihoux and Ragin, 2009, p. 10)

adopted in this study, comprising equifinality and causal complexity, implies that any path to a given outcome comprises one or more sufficient conditions. If a condition is always present in any path to a given outcome, it is deemed necessary. Both sufficient and necessary conditions can (and in the real world usually do) manifest as combinations, or set-theoretic intersections of conditions. For example, considering an outcome O and conditions A, B and C, if

$$\begin{cases} A \wedge B & \rightarrow & O \\ A \wedge C & \rightarrow & O, \end{cases}$$

then the first path, the combination of conditions A and B, is the first sufficient combination of conditions leading to outcome O, and the combination of A and C the second sufficient combination of conditions leading to outcome O. Neither combination, if considered separately, is both necessary and sufficient. If these two paths represent the entire universe of paths to outcome O, we can further deduce that condition A is necessary for outcome O to occur. Condition A, however, is not sufficient on its own but needs to be combined with either B or C to bring about outcome O. Combined with the lack of a symmetrical assumption to causality, this notion can further be expanded to observing complex combinations of conditions A, B, and C leading to an outcome O such as

$$\begin{cases} A \wedge B & \rightarrow & O \\ \sim A \wedge C & \rightarrow & O \\ A \wedge C & \rightarrow & \sim O, \end{cases}$$

where A and B together lead to O, the absence of A (signified in notation with a tilde, '~') combined with condition C also leads to O, but A and C together do not. Empirical observations of this kind are fully plausible.

This combinatoria approach allows us to operate directly and with formal logic on a broad range of, for examole, behaviorally complex marketing mix interactions. If we imagine a product positioned to portray some type of exclusivity (whether through price or function), the combination of sales and promotion channels might exhibit this type of causal mechanism. If A is read as product presence in a general retail channel, and B as supporting advertising, the two might combine to produce a favorable sales outcome. However, the same sales outcome can be reached by selling the product through a direct channel (e.g. specialist premium retailers or television shopping, depending on the product). The third configuration, however, reflects that the outcome from combining presence in a general retail context deesn't need to combine favorably with a narrower channel

selection, which may create conflicts as consumers observe incoherent positioning signals.

Truth tables are synthetic tabular displays constructed in QCA to tally all configurations of conditions that produce the focal outcome in a given data set (Ragin, 2009, p. 184). A *frequency treshold* may be applied to establish a criterion for how many observations of a causal mechanism warrant inclusion in the findings, depending on perceived data reliability. However, if a case is deemed fully reliable, then a single instance is sufficient evidence for a causal mechanism. Conditions present after applying the frequency threshold are *necessary conditions* as a part of some configuration. *Sufficient configurations* are configurations that in themselves are sufficient to bring about an outcome – single sufficient conditions are empirically rare. However, empirically rare conditions can still be centrally relevant to developing theory (Ragin, 2008, p. 55). A thorough analysis of causality would entail examining all logically possible combinations of causal conditions (Ragin, 2008, p. 9), but the limits of data availability usually limit the diversity of combinations that are empirically available for study.[3] Counterfactual cases and outliers are, thus, therefore a valuable part of practical empirical investigation to study configurational causality, as they typically represent configurations with less access.

3.2.5 Dialogue with data

There is both a deductive and an inductive dimension to QCA. The analytical approach is one of theory-building, founded on constructing and evaluating theorized relationships among cases and factors, in other words deducing patterns of interaction between conditions and outcomes. For this to happen, the choice of conditions and outcomes must be theoretically informed (Ragin, 2008, p. 6). The inductive aspect is apparent in how QCA can be use to examine the relevance of conditions on a more general level.

The dialogue of data with theory is a fundamental feature of QCA (ibid., p. 7). It contributes to analysis in three distinct stages. Firstly, in building a configurational model, theoretical knowledge guides the selection of conditions to be included in the model, and operationalizing them in how they are measured, encoded and calibrated. Outliers and exceptional cases are not dismissed in QCA, but instead treated as valid sources of novel understanding concerning the focal phenomenon (ibid.). The heterogeneity of causation within a researcher-defined area of homogeneity is the theory-driven platform for studying the focal phenomenon, requiring at least some

[3] In QCA, this challenge is refered to as the problem of *limited diversity* (Ragin, 1987, pp. 81-87).

implicit hypotheses about the causal mechanism (Berg-Schlosser and De Meur, 2009, p. 20).

> The selection of cases requires a clear definition of the outcome, and researchers should strive for "a maximum of heterogeneity over a minimum number of cases" for maximum diversity for theoretical consideration (Berg-Schlosser and De Meur, 2009, p. 21).

Secondly, many practical operations that are a part of the QCA process benefit from or require extensive theoretical knowledge. Firstly, resolving questions in the operationalization of conditions in calibrating the model needs to be supported with contextually relevant qualitative preunderstanding or justified additional theoretical background material. Furthermore, the treatment of contradictory configurations, where configuration outcomes are inconsistent, reflecting the influence on unknown causal factors (Rihoux and De ,009, p. 44), needs to be resolved with qualitative reflection. Finally, theoretical knowledge is used to determine the inclusion of *logical remainders,* or hypothetical configurations that are not represented by empirical observations due to limited diversity, but which can help during analysis in producing a more parsimonious logical expression when supported by theoretical understanding of the theoretical linkages between conditions.

Thirdly, after analysis, interpretation of solutions to the research problem is guided by theory to understand, explain and justify preferences from among equivalent logical expressions of causal conjecture (Ragin, 2008a, p. 9). The resulting causal narratives (Smith and Lux, 1993) directly integrate configurational empirical findings to an existing understanding of the (marketing) context under investigation.

The use of formal set theory gives a distinct advantage to QCA. The language of set memberships translates well into theoretical discourse to allow findings to be presented concisely and accurately. Theoretical discourse about causal relations translates as easily to the language of sets and memberships, enabling a rich dialogue with data with effective control over information loss (Ragin, 2008a, p. 3; Befani, Ledermann, and Sager, 2007). By taking advantage of the *partial degrees of membership* that the conditions comprising an empirical case have in sets, *fuzzy sets* further augment the configurational approach and the integration of qualitative understanding and interpretation to analysis. This extension to the basic QCA approach is examined next.

3.3 Fuzzy-Set Qualitative Comparative Analysis (FS/QCA)

FS/QCA is only one of the variants of QCA found in literature. In addition to the basic 'crisp-set' QCA ('csQCA'; Rihoux and Ragin, 2009) dealing with dichotomized condition and outcome values, the other variants include 'multi-value QCA' ('mvQCA'; Rihoux and Ragin, 2009) for analyzing data in multichotomies and 'most similar, different outcome' and 'most different, similar outcome' ('MSDO'/'MDSO'; Berg-Schlosser and De Meur, 2009) for processing explanatory factors based on maximum similarity and dissimilarity between conditions and maximally similar and dissimilar outcomes (Rihoux and Ragin, 2009, pp. xix–xx).

The qualitative power of membership calibration and fuzzy logic gives the fuzzy-set variant arguably the greatest potential in application to marketing performance. Marketing phenomena in managerial decision-making often involve degrees of difference, as opposed to categorical ones such as 'high brand recall' and 'bad sales performance'. However, for certain contexts where the alternatives are challenging to view as membership degrees, and are mutually exclusive, crisp set QCA or multi-value QCA may provide a better tool. Such contexts may be found, for example, in comparing different marketing or positioning strategies where clear dichotomous or multichotomous distinctions can be made.

This section develops the concept of QCA as a process for knowledge discovery, and highlights the features of the fuzzy extension that allow powerful analytical features to be incorporated into the process. Calibration of data to fuzzy membership scores is the single feature that sets the approach apart the most from conventional qualitative and quantitative methods. Furthermore, the practical adjustments that fuzzy sets require to the analysis process are reviewed. Consequently, I outline the process of arriving at configurational evidence of causality using truth tables. The section concludes with an overview of FS/QCA applications in business research.

A brief introduction to fuzzy logic and fuzzy sets is included as Appendix A. It is intended as additional background material regarding the concepts introduced in this section, including the minimum and maximum operators used to manipulate fuzzy sets.

3.3.1 Fuzzy sets and membership degrees

Diversity has two main facets: qualitative *diversity in kind*, apparent in the many categorical distinctions made in research as well as in everyday life (e.g. 'apples and oranges'), and quantitative diversity, or differences of

degree in membership (e.g. 'large apples and even larger apples'; Ragin, 2000, p. 149-50). Fuzzy sets capture both types of variation simultaneously, and are, thus, especially suited for studying diversity. Furthermore, fuzzy sets themselves stem from the development of fuzzy logic as a formal mathematical system with the specific goal of joining crisp and precise formal logic with pliable verbal concepts conveying the degree of membership (Ragin, 2000, p. 160). Fuzzy sets are useful for operationalizing any social science concepts that address differences across cases or instances, and where qualitative distinction and relevance enables a more effective model specification or implementation.

Conventional crisp sets establish categorical distinctions that are wholly qualitative – an element is either fully included or fully excluded for a set (Ragin, 2000, p. 153-4). It is customary to denote inclusion as a member with a Boolean value of 1 (or 'true'), and nonmembership with a 0 ('false'). Broadening the logic to deal with more than two categories, form a binary dichotomy to a multichotomy, only means that membership in one category implies nonmembership in more than one category.

Fuzzy sets extend the expressiveness of crisp sets by allowing for membership scores between 0.0 and 1.0. In QCA terminology, each case to be compared has a distinct vector position in the property space determined by its fuzzy set memberships – for example, (1.0, 0.45, 0.15) for three *property space* dimensions. The degree of membership signifies the extent to which the case is a part of a given group defined by a condition. In the preceding example, a product promotion action case might be a full member (μ=1.0) of a group of actions characterized with 'low price argument', only just included as member (μ=0.45, where μ=0.5 would represent maximal ambiguity over membership) of a group of actions characterized as 'value-in-use emphasis', and mostly a non-member rather than a member (μ=0.15) of a group of actions characterized with 'in-store promotion'.

A case with a fuzzy membership score of 1.0 with respect to a causal condition is a full member of the corresponding fuzzy set, and situated in a corner of the property space. A case with a membership score of 0.0 is a complete nonmember of the set. A membership score of 0.5 would be ascribed to a case that is exactly on the border, as much a member of the fuzzy set as a nonmember. In the vector space, such cases would occupy a position exactly as far from the origin as from the corner with respect to the given condition. A case with a membership score of 0.5 in all causal conditions would rest exactly in the middle of the property space, representing maximum ambiguity.

Ragin (2000, p. 154-5) points out how the idea of crisp-set versus fuzzy-set membership could appear to be merely a solution to the information loss problem that occurs when observed shades of gray are forced into a black and white dichotomy. Fuzzy membership, however, is not a restatement of the mistake of using categorical variables to represent phenomena that would be better represented with ordinal, interval, or ratio scale measures.[4] The difference is that fuzzy sets do not measure how cases (observations) differ from one another on quantifiable dimensions of open-ended variation. Instead, they pinpoint qualitative states of belonging to a group, with a fixed and meaningful minimum, maximum, and at least one further *qualitative anchor* calibrated at the crossover point of 0.5. An example of a qualitative anchor could be sales that match the predicted figure, with results above the estimate being members in 'high sales results', with varying degrees of membership, and results below the estimate being nonmembers to various degrees of the same fuzzy set. A fuzzy membership value has a meaning beyond a multichohtomy or a numerical value, as it internally incorporates its own qualitative interpretation by virtue of its relationship to the qualitatively established minimum, maximum, and middle points.

3.3.2 The combinatorial logic of fuzzy sets

Fuzzy sets allow necessity and sufficiency to be studied as set-theoretic relationships. This particular aspect of the FS/QCA approach makes it possible to effectively deal with causality exhibiting nonlinear behavior. The *subset principle* of fuzzy sets argues that "a causally relevant condition is necessary but not sufficient only if it can be demonstrated that instances of the outcome are a subset of the instances of the cause" (Ragin, 2000, p. 213). With fuzzy sets, set X is a subset of Y if the membership scores of cases in X are less than or equal to the membership scores in Y. The *lower triangular plot* in **Figure 3-1** is the basic pattern exhibited by such an asymmetric causal relationship: high membership in Y is associated with a high membership in X, but high membership in X does not ensure high membership in Y (Kent, 2008).

[4] On ordinal scales, observations are affixed to a category from among several, which have a fixed, logical or ordered relationship with each other (Velleman and Wilkinson, 1993). Interval scales add information on the distance between ordered items, allowing some statistical handling. Ratio scales add a meaningful zero point to interval scales, enabling a broad range of quantitative analysis of the data.

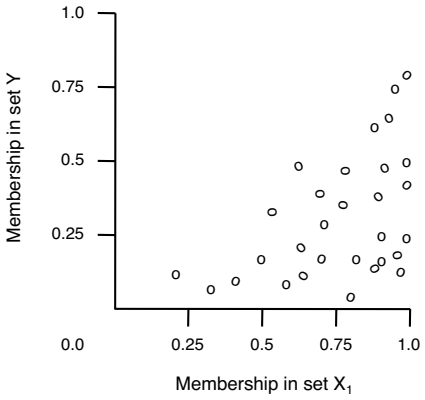

Figure 3-1. A necessary but not sufficient fuzzy subset relationship.

In contrast, fuzzy sub-set relationships where a cause is found to be sufficient, but not necessary to bring about an outcome, we observe an *upper triangular plot* (**Figure 3-2**). Again, the arithmetic relationship between membership scores in the two sets can be used to assess subset sufficiency without demanding necessity. The membership scores for Y must be greater than or equal to memberships scores for X. In other words, a high score on X ensures a high score on Y, but does not represent the only path to the outcome – other conditions can lead to a high outcome despite low membership in X.

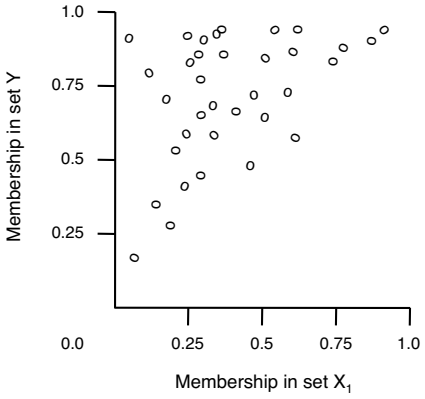

Figure 3-2. A sufficient but not necessary fuzzy subset relationship.

The analysis of necessity and sufficiency using fuzzy subset relationships is carried out in exactly the same manner whatever the sets are – drawn from single condition membership or complex combinations of sets created by set-theoretic intersection (logical OR) and union (logical AND). The

logical OR and AND operators are implemeted in FS/QCA as the *maximum* and *minimum* operators on fuzzy set membership, respectively (see Appendix A).

3.3.3 Calibration and measurement practices

The process of and requirement for calibration sets the use of fuzzy sets requires explicit qualitative consideration in the analysis process. To reflect this dual nature, Ragin (2008, p. 71) posits that, rather than being a compromise, fuzzy sets offer a 'middle path' that transcends many of the limitations of both qualitative and quantitative measurement practices, discussed next.

The process of calibration, carried out to represent empirical data as fuzzy membership scores, is perhaps the single stage of FS/QCA with the highest demand for transparence. As such it, is a key determinant of both the reliability and validity of the resulting model. If the calibration is not documented well enough to be replicable by another investigator working with the same data, the process outcome cannot be relied on. Correspondingly, if the theoretical and practical justifications for calibrating data as fuzzy set memberships are not adequate, the model may suffer from invalidity.

The purpose of calibration is to produce measures that match or conform to dependably known scales, making measurements directly interpretable (Ragin 2008, p. 72-3). The process is routine practice in many physical sciences, from calibrating the freezing point and boiling point of water under standard conditions to 0° and 100° respectively on the Celsius scale, to a broad range of standards in physics, chemistry, and other fields. Shared standards are less common in social sciences, where uncalibrated ordinal and relative measures dominate. From the perspective of interpretability, uncalibrated scales are clearly inferior, as the values or indices are not tied to any meaningful qualitative anchor. The relevance and usefulness of calibration becomes even more pronounced, when we consider the qualitative level of a condition as setting the context for interpreting the nature or causal effects of other conditions. A physical parallel is in the phase shifts that H_20 undergoes in transforming from solid to liquid to gas. These qualitative breakpoints along a shared temperature axis have significant consequences for how water interacts with its environment. The Celsius scale is specifically designed to not only indicate these shifts but also be defined by them. Ragin (2008) parallels physical phase shifts to context-setting conditions in social science, such as defining the scope of variables or a model, so that they are only stated to hold under certain

conditions (e.g. 'for SMEs in a technologically turbulent environment'), or for a certain empirical population.

In many widely used methods for modeling the relationships between variables, such as multiple regression and related linear multivariate techniques, continuous indicators are valuable because they offer fine gradations and linearly equal distances between observation regardless of their absolute value (Ragin, 2008, p. 75). Many models integrate multiple indicators as indices to improve the balance and reliability of variables, ideally combinations of indicators that correlate strongly with each other. Techniques in this 'indicator family' – including structural equation modeling (SEM) for simultaneously assessing the coherence of constructed indices and the coherence of the model as a whole – rely on observed variation that is nearly always sample-specific. The definition of 'high' and 'low' scores is based on deviation from central tendency, resulting in "a very crude but passive form of calibration" (Ragin, 2008, p. 77). In this view, all variation is considered equally relevant in revealing something about the underlying concept. External standards to calibration, in contrast, provide a context for interpreting the scores using qualitative anchors established in previous academic research or managerial practice.

In qualitative research, measurement practices are generally grounded in empirical evidence. The iterative, or abductive (Dubois and Gadde, 2002), process involves progressive refinement of empirical indications and measures, interpreted in the light of knowledge that the investigators have about the relevance of distinctions. The age of a company, for example, might be an relevant condition for explaining some type of organizational behavior, but age beyond a certain point, say around 50 years, no longer makes a difference. According to Ragin, truncating variation in this manner is "usually viewed with great suspicion by quantitative researchers" as it tends to attenuate correlations (Ragin, 2008, p. 78).

Furthermore, whereas in qualitative research the focus is on dimensions of variation, quantitative research must typically involve external standards to assess how cases meet the requirements for being considered of some specific kind. Cases can be studied as individual entities as opposed to sites for taking measurements. This aspect makes the case-oriented view intrinsically more compatible with the idea of calibration. Ragin (2008, p. 81) quotes the qualitative sociologist Aaron Cicourel to underline the need to evaluate measures and their properties in the context of both theoretical and substantive knowledge:

> Viewing variables as quantitative because available data are expressed in numerical form or because it is considered more 'scientific' does not provide a solution to the problems of measurement but avoids them in favor of

> measurement by fiat. Measurement by fiat is not a substitute for examining and re-examining the structure of our theories so that our observations, descriptions, and measures of the properties of social objects and events have a literal correspondence with what we believe to be he structure of social reality. (Cicourel, 1964, p. 24)

3.3.4 Calibrating fuzzy sets

Qualitative anchoring is used to link fuzzy membership degrees to qualitative data on conditions to distinguish between relevant and irrelevant variation. Q*ualitative anchors* are verbal expressions that describe set degrees of set membership. For each condition that does not take on continuous values (typical of qualitative data), the researcher must decide on the number of bins corresponding to identifiable and verbalizable qualitative categories. A fuzzy set with two categories is generall equated to using *crisp sets* (Boolean logic; csQCA; Ragin, 2000). Examples of qualitative anchoring and simple verbalizations are shown in **Table 3-1**. In practice the researcher must arrive at a theoretically and substantively justified qualitative hierarchy to sort case material. This approach to linking verbal descriptors with fuzzy membership scores applies to all calibration, and also forms the basis for mathematical calibration of interval-scale data, described later.

Table 3-1. Fuzzy set calibration and qualitative anchors (Ragin, 2009, p. 10).

Crisp set	Three-value fuzzy set	Four-value fuzzy set	Six-value fuzzy set	"Continuous" fuzzy set
1 = fully in 0 = fully out	1 = fully in 0.5 = neither fully in nor fully out 0 = fully out	1 = fully in 0.67=more in than out 0.33 = more out than in 0 = fully out	1 = fully in 0.9 = mostly but not fully in 0.6 = more or less in 0.4 = more or less out 0.1 = mostly but not fully out 0 = fully out	1 = fully in Degree of membership is more "in" than "out": $0.5 < X_i < 1$ 0.5 = cross-over: neither in nor out Degree of membership is more "out" than "in": $0 < X_i < 0.5$ 0 = fully out

In contrast to fuzzy sets, conventional variables are either uncalibrated or implicitly calibrated using sample-specific standards. Two main strategies exist to calibrate interval-scale to fuzzy sets using external criteria (Ragin, 2008, p. 85). The *direct method* involves the researcher specifying the value

of an interval scale that corresponds to the three fundamental qualitative breakpoints structuring a fuzzy set (full membership at 1.0, full nonmembership at 0.0, and the crossover point at 0.5, indicating maximum ambiguity with regard to whether the case should be included in the set or not). The calibration of values using the direct method, described next, uses estimates of the log of the odds in set membership as an intermediate step to calibration. The second, or *indirect method* involves using an external qualitative assessment standard to score cases on membership to a defined number of verbally defined categories, each corresponding to a fuzzy score, and deriving a continuous transformation function to estimate values[5].

Ascribing fuzzy membership scores to conditions is the fundamental stage in FS/QCA: data on conditions must be translated to membership scores in a careful, well-documented and qualitatively justified manner. The calibration cannot entail, by default, for example, a mechanistic linear transformation of ordinal (e.g. Likert) scale scores to a [0.0, 1.0] fuzzy membership value range. When quantitative values are re-encoded as fuzzy membership scores, the researcher must be acutely aware of what the numbers represent and what variation is or may be relevant for explaining variation in an outcome (Ragin, 2009, p. 92). For example, at one end of the observed range of variation a small difference might be critical for and outcome to come about. For some condition, any variation beyond a given point may be completely extraneous. Quantitative data are usually encoded into membership scores using a qualitatively justified, surjective *transfer functions* so that continuous quantitative values are represented by continuous ranges of fuzzy membership scores.

The direct method of calibrating interval-scale data. Like other methods of calibration – fully manual sorting of qualitative material and indirect estimates – the direct method rests on defining the limits for full membership and nonmembership, and defining the crossover point. The first column of **Table 3-2** shows a range of verbal labels that can be associated with degrees of fuzzy set membership in the second column. The third column lists corresponding values of odds of full membership such that

$$\text{odds of membership} = \frac{\text{degree of membership}}{1 - \text{degree of membership}}.$$

[5] Ragin (2008, p. 96) recommends using a fractional (polynomial) logit procedure to develop a model that uses the manually set rough qualitative codings for each case to generate a uniform function that estimates predicted qualitative coding for each case. This approach is not adopted or demostrated in this study.

The fourth column – obviously the fundamental source of these demonstration values – lists the natural logarithm of the odds in the third column. The three final columns are, thus, representations of the same numerical clues, but using different metrics. The value of the log odds approach is in that it offers a standard and robust method for calibrating data. It suffers from neither floor nor ceiling effects (values beyond which the values of a variable are no longer distinguished from each other; Cramer and Howitt, 2005, p. 21), and is completely symmetric around 0.0 (Ragin, 2008, p. 87). Log odds of full membership can readily be associated with verbal descriptors, as in **Table 3-2**. It should be noted that the fuzzy membership scores represent truth-values as opposed to probabilities – an important distinction. The classification is not based on likelihood of membership in a category, but the known qualitative nature of a case.

Table 3-2. Mathematical translations of verbal labels (Ragin, 2009).

Verbal label	Degree of membership	Associated odds	Log odds of full membership
Full membership	0.993	148.41	5.0
Threshold of full membership	0.953	20.9	3.0
Mostly in	0.881	7.39	2.0
More in than out	0.622	1.65	0.5
Cross-over point	0.500	1.00	0.0
More out than in	0.378	0.61	-0.5
Mostly out	0.119	0.14	-2.0
Threshold of full nonmembership	0.047	0.05	-3.0
Full nonmembership	0.007	0.01	-5.0

Calibrating the degrees of membership is done in two parts: for values above the crossover point, and those below. For empirical observations diverging to either direction from the qualitatively justified crossing point value, we can associate the observation with a log odds value $p_{\text{observation}}$, such that

$$p_{\text{observation}} = \Delta_{\text{observation}} \cdot \frac{p_{\text{threshold}}}{\Delta_{\text{threshold}}},$$

for all empirical instances, where $\Delta_{\text{observation}}$ signifies deviation from the observation value associated with the crossing point, and the second term the log odds of the threshold level for either full inclusion or exclusion

($p_{threshold}$; ±3.0 in **Table 3-2**), divided by the deviation $\Delta_{threshold}$ of the threshold value for full membership (nonmembership) from the crossing point with 0.0 log odds (Ragin, 2008, p. 90–1). This product log odds can be converted into a value in the range [0.0, 1.0] to represent a calibrated fuzzy membership score

$$\mu_x = \frac{e^p}{1+e^p},$$

where e is the mathematical constant and p represents the log likelihood of full membership of the observation (case) in the fuzzy set.

3.3.5 Configurational analysis using fuzzy sets and truth tables

To arrive, in practice, at a depiction of causal complexity, a truth table (Ragin, 1987; 2000; 2008) is used as the key tool for the systematic analysis of possible causal configurations. A truth table lists all logically possible combinations of conditions, and fits the empirical cases into rows according to which 'causal recipe' they best match. Thinking in terms of a vector space, the range of conditions in the analysis defines a *property space* with k dimensions, where k equals the number of individual conditions. Consequently, the property pace is a vector space with 2^k corners corresponding to crisply defined locations. The *truth table* "summarizes statements about the characteristics of the causal combination represented by each corner" (Ragin, 2008, p. 129), including information on the number of cases with strong membership in each corner supplemented with the information on the consistency of the empirical evidence for each corner as a subset of the focal outcome.

The fuzzy membership scores determine the position of each case in the property space it has along the dimensions. A case will always be closer to one corner of the space than other.[6] Typically, cases will be partial members, to a varying degree, in many corners of the property space. This greatly extends the potential for finding sufficient conditions to explain causal complexity. Finally, the classification of fuzzy cases according to which crisp location they are closest to returns us to the question of qualitative classification: in FS/QCA, cases are considered to be of the same

[6] The exception to this is a single empirically unlikely point of maximum overall ambiguity, where a case has exactly 0.5 membership in every condition. All other cases can be shown to be more members than nonmembers in *one and only one* corner of the property space. It should be noted that this unequivocality does not apply to empirical causal configurations examined later. A case can have above 0.5 membership in more than one configuration, as they do not represent discrete corners of the broader property space, merely a subset of it.

kind when their maximum membership scores place them closest to the same vector space corner and crisp location (Ragin, 2000 p. 188).

Calculating the membership degree of a case with respect to any corner of the property space is based on fuzzy set intersection. In other words, membership in a group of conditions joined together using logical AND is determined by the minimum degree of membership in any of the conditions (Ragin, 2000, p.189; Ragin, 2008, p. 129). In other words, a case is considered to have strong membership in a corner when its membership degree in the corresponding combination of conditions exceeds 0.5. As a direct consequence of the 'minimum rule' used with the intersection operator, it is only possible for a case to be a strong member in one corner of the property space (Ragin, 2008, p. 131).

If the total number of cases included in the analysis is in the hundreds or above, establishing a *frequency threshold* becomes important (Ragin, 2008, p. 133). Due to the possibility of coding errors and lack of corroborated empirical evidence from multiple cases, low-frequency causal combinations (termed *reminder rows*) may be disregarded in favor of combinations with stronger empirical support for warranting an assessment of subset relation with the outcome. With a smaller number of cases, the threshold should be set at a level where empirical diversity is maximized with a reliable level of trust in the data.

3.3.6 Degree of membership in configurations

When empirically relevant causal combinations have been identified, the *consistency* of each configuration as a subset of the outcome is evaluated to judge the degree of empirical support for the configuration as a whole (Ragin, 2009, p. 107-8). Set-theoretic consistency describes the degree to which cases sharing a given combination of conditions agree in displaying the outcome in question (Ragin 2008 p. 44). If the consistency of a configuration is low, it is not strongly supported by empirical evidence, and should warrant less attention with regards to theory-building.

Ragin (2006; 2009, p. 108) presents a formula for where

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

so that the consistency of condition X as a subset of an outcome Y is calculated as the sum of the minimums of each value of the condition X_i and the associated level of the outcome Y_i, divided by the sum of all values of the causal condition X_i. If all values of X_i are less than the corresponding

outcome, the consistency score is 1.0, signifying full consistency, such that in every instance of Y in the focal set, there is also a membership in that is of equal or lesser strength. This approach for assessing consistency prescribes substantial penalties when large inconsistencies are found, but small ones for lesser deviations (Ragin, 2009, p. 108).

The definition of consistency can directly be extended to combinations of cases, with X_i defined as the minimum value for each condition across all empirical instances in the group of cases. This is equivalent to the fuzzy set intersection of the causal conditions (Ragin, 2008, p. 114–5). On the triangle plots presented in section 3.3.2 above, consistency refers to the degree to which the relationship conforms to the triangular pattern. Points lying on the 'wrong' or 'empty' side on the diagonal decrease the consistency of the subset relationship between the two conditions or configurations of conditions.

Set-theoretic coverage, in contrast to consistency, assesses the degree to which a given combination accounts for all instances of the outcome (Ragin, 2008, p. 44-5). If there are multiple paths to the same outcome, the coverage of a single configuration may be low. A configuration that is low in coverage, but high in consistency, can nevertheless be theoretically significant in explaining a distinct causal mechnisms or relevant counterfactual combination.

3.3.7 Analyzing and minimizing the truth table

Once a truth table has been formed, and causal combinations without cases in their name (or not enough cases with regard to the frequency threshold) disregarded, a consistency threshold must be set to determine the minimum requirement that cases in a combination must meet to be considered a consistent subset of the outcome. According to Ragin (2009, p. 118), consistency thresholds below 0.75 (or preferably 0.85 for macro level data; Ragin, 2008, p. 136) should be avoided in practice, and a level as close to 1.0 as possible chosen. Ragin enocurage the use of empirically observed large gaps in consistency between ranked configurations as cutoffs. Parsimony when interpreting the resultant causal configurations will also provide feedback for adjusting the threshold to a suitable level. Furthermore, the nature of QCA as an analytical approach suggests that theoretical knowledge should inform the choice.

Trimming remainder combinations that do not meet the consistency threshold results in a truth table that can now be subjected to a minimization procedure to simplify the combination of causal combinations into a shorter, more parsimonious form (Rihoux and

DeMeur, 2009, pp. 33-5). A number of algorithms exist for carrying out logical minimization. With FS/QCA, the most common choice is versions of the Quine-McCluskey algorithm (Quine, 1952; Quine, 1955; McCluskey, 1956; Dusa, 2007a), implemented in Ragin and collegue's fsQCA software (Ragin, Drass, and Davey, 2006) as well as QCA packages that have been created for the open-source statistical software package R (Dusa, 2007c; Dusa, 2010; Huang, 2011).

Applying a minimization procedure results in a minimal solution of combinations of conditions that explain the outcome to a selected degree of consistency. Each term of the solution has a *unique coverage*, or proportion of the cases leading to the outcome that is explained only by that combination, and a *raw coverage*, or proportion of the outcome explained by the combination, but which can also be explained by a related combination. Finally, an overall *solution coverage* can be calculated as the proportion of the total population if cases covered by the solutions together (Rihoux and De Meur, 2009, p. 64).

The final step in the analysis process is interpreting the *minimal formulae,* or formal expressions of conditions linked with logical operators (i.e. 'AND' and 'OR'), representing causal configurations. The explanation takes a narrative form: the researcher must return to the cases themselves, now arranged into causally linked groups using the minimal formulae (Rihoux and De Meur, 2009, p. 65). The minimal formulae can be directly verbalized as nrratives, or in other words, qualitative statements about configurational causality, the causal mechanisms involving the presence or absence of specific conditions to produce an outcome.

The goal of the interpretation is to relate the analytical insight gained in the FS/QCA process to previous theoretical and substantive knowledge about the phenomenon, provoke new and better-focused questions about causality within the context of interest. The richness of the analytical approach is in the insight it offers into the combinations of causes emerging in cross-case patterns. Researchers are advised to refrain from interpreting relations between outcomes and individual conditions, unless they can be singled out as clearly necessary on their own, or coming close to being both necessary and sufficient (Rihoux and DeMeur, 2009, p. 66).

3.3.8 FS/QCA in business research

Whereas the majority of FS/QCA applications in research to date have been in sociology, political studies, and related fields, it has also emerged as an approach in its own right in organizational studies. A recent annual meeting of the Academy of Management (Montreal, August 2010) included a special

session on QCA as well as a separate session on configurational and comparative approaches, with five presentations dealing specifically with FS/QCA applied to studying corporate governance (Academy of Management, 2010). In the previous meeting of the Academy, a piece applying FS/QCA to studying organizational ecology (Järvinen, Lamberg, Murmann, and Ojala, 2009) was recognized as the best international paper.

Table 3-3 summarizes the main corpus of research in business studies that has used FS/QCA. The Journal of Business Research stands out clearly as the main publication outlet of qualitative comparative studies, including the R statistics package QCA add-on manual by Ardian Dusa (2007JBR). The majority of authors are from European business schools in the Netherlands, the UK, and Finland.

The key methodological contributor on FS/QC in organizational studies is undoubtedly Peer Fiss (2007; 2010). His two prolific articles have largely introduced the FS/QCA methodology to organization studies, doing much to popularize it as an approach to building causal theories within a business context. The 2007 Academy of Management Review article "A Set-Theoretic Approach to Organizational Configurations" points out some of the limitations of organizational research methods and demonstrates the relevance of FS/QCA for dealing with causal complexity. A second article in the Academy of Management Journal (Fiss, 2011) contributed to the methodology itself by proposing a novel theoretical perspective of 'causal core' and 'periphery', based on how strongly elements of a configuration are connected to outcomes.

Organizational mechnisms (Pajunen, 2008b), in their many guises, are the dominant theme throughout most of the published FS/QCA based research to date in the field. FS/QCA has been used in particular to analyze the role of complex causation in bringing out organizational performance outcomes. The units of analysis are typically individual businesses (corresponding typically to a meso level of analysis) or economies (a macro level of analysis). The number of conditions and cases included in the analyses fit well within the typical ranges discussed earlier in section 3.2, with Häge's 'very small-N' study (2007) constituting the interesting exception. Overall, the published studies affirm the usefulness of FS/QCA for deducing causal configurations in business contexts.

At the time of writing, no applications of the QCA or FS/QCA approaches to marketing have emerged in the literature, with the exception of Kent and Argouslidis' (2005) 'service elimination' piece (essentially a study in an organizational context, with some practical guidance but less than rigorous calibration, and inconclusive results for explaining causality) and Ordanini and Magio (2009), who examine luxury hotels, listed below. Some

unpublished working papers can be found on the internet, including one in which Frambach, Fiss and Ingenbleek (undated) analyzed the performance effects of configurations of orientations, strategies and market conditions from the perspective of strategic management, coming close to marketing as a discourse. The specific topic of marketing response is not directly dealt with in any publication to date.

Fiss's chapter on QCA methods in the SAGE Handbook on Case-Oriented Methods (Fiss, 2009) sees broad promise for the approach as "one of the most attractive research strategies for understanding life in and around organizations" (p. 427). The growing volume of various applications of QCA and related methods to business research in distinctly different ways gives confidence that it may eventually be inducted to the mainstream of research, and even practice.

Table 3–1. FS/QCA-based studies published in business research journals.[1]

Reference	Study title	Research aim	# Conditions	Cases	Methodological observations
Romme, 1995 (Journal of Business Research)	*Self-Organizing Processes in Top Management Teams: a Boolean Comparative Approach*	(Crisp-set QCA) to identify complex and holistic organizational repertoires, allowing for broad contextual diversity	5	10 teams from diverse industries	Qualitative hypotheses on repertoires survived falsification; "an effective analytical technique, as long as it not used mechanically but as an aid to interpretive analysis"
Kogut, MacDuffie and Ragin, 2004 (European Management Review)	*Prototypes and Strategy: Assigning Causal Credit Using Fuzzy Sets*	Identifying high performance configurations of resources, capabilities, and positioning at auto plants	7	44/56 assembly plants	No single configuration of production characteristics sufficient for high performance but, rather, that there were three different configurations HRM system
Kent and Argouslidis, 2005 (Journal of Marketing Management)	*Shaping Business Decisions Using Fuzzy-Set Analysis: Service Elimination Decisions*	Identifying configurations of organizational and environmental factors to explain service elimination decisions	7	112 service eliminatio n decisions	Inconclusive results, possibly associated with problems in calibration; "Case-based configurational analyses can provide an alternative when there are problems with mainstream"

[1] The majority of the examples listed here are selected from a listing at the 'COMPASSS International Resource Site' at http://www.compasss.org/pages/resources/bibliography/biblappeco.html (accessed April 10, 2011).

Häge, 2007 (Journal of Business Research)	*Constructivism, Fuzzy Sets and (Very) Small-N: Revisiting the Conditions for Communicative Actions*	Reinterpreting a study on communicative actions in treaty negotiation*	6	3 negotiation stages	Conditions are jointly sufficient, and not independent as the original study suggests; "fuzzy set methods helps to achieve more informative, more precise and more valid conclusions"
Vis, Woldendorp and Keman, 2007 (Journal of Business Research)	*Do Miracles Exist? Analysing Economic Performance Comparatively*	Establishing shared standards for qualitative assessment; using FS/QCA to propose "ideal types"	3	19 OECD countries, 3 points in time	FS/QCA is preferable over factor analysis because it provides more information on individual cases
Pajunen, 2008a (Journal of International Business Studies)	*Institutions and Inflows of Foreign Direct Investment: a Fuzzy-Set Analysis*	Identifying causal complexity underlying FDI decisions by MNCs	7	47 countries	Demonstrates that there are typically are several possible paths to a specific outcome; explains why earlier research has provided conflicting conclusions related to institutional factors
Ordanini and Maglio, 2009 (Decision Sciences)	*Market Orientation, Internal Process, and External Network: A Qualitative Comparative Analysis of Key Decisional Alternatives in the New Service Development*	Identifying combinations of customer and market orientation, internal process organization, and external network that maximize likelihood of establishing a successful service innovation	5	39 luxury hotels	Demonstrates two distinct path to NSD outcome, that no single condition is sufficient, and that one condition is necessary

Järvinen, Lamberg, Murmann and Ojala, 2009 (Journal of Industry and Innovation)	*Alternative Paths to Competitive Advantage: A Fuzzy-Set Analysis of the Origins of Large Firms*	Identifying combinations of environmental factors to explain industry dominance; paired with longitudinal historical study.	7	6 countries at 4 points in time	Demonstrates historical variance in causal recipe, and several different causal pathways to success
Fiss, 2011 (Academy of Management Journal)	*Building better causal theories: A fuzzy set approach to typologies in organization research*	Investigating configurations based on the Miles&Snow typology with respect to 3 degrees of business performance	4	205 high-tech manufacturing firms	Contributes to methodology by developing the notion of equifinality to be shaped by peripheral factors around a causal core
Schneider, Schulze-Bentrop and Paunescu, 2010 (Journal of International Business Studies)	*Mapping the institutional capital of high-tech firms: A fuzzy-set analysis of capitalist variety and export performance*	Explaining export performance conjecturally with configurations of institutional features (training, regulation etc.)	6	19 OECD economies	Identifies three significant causal paths, and that no single condition is sufficient alone

3.4 Building research strategies for FS/QCA

In this section, I reflect on FS/QCA from the point of view of the requirements set by and possibilities offered to marketing performance research. I place special emphasis on the justifications for constructing an analytical process, juxtaposing the theory building goals with established criteria in qualitative business research. Here, the focus is on the general FS/QCA precepts for defining a research context, selecting cases and conditions, empirical fieldwork in collecting data, analyzing and comparing cases, evaluating the results of comparative analysis, concluding causal explanations, and reaching closure.

3.4.1 Research context and population

In order to begin QCA (Berg-Schlosser and De Meur, 2009, pp. 19-21), the investigator must specify an *area of homogeneity* that forms the tentative universe of investigation. Additionally, the subject matter and research problem must be specified, and articulated as the focal *outcome* of interest in QCA terminology (Ragin, 2008). Returning to the premises of this study, discussed in Chapter 1, outlining the area of homogeneity and the outcome of interest require empirical cases that are comparable on some assessable dimensions. Thus, this initial stage includes at least an implicit hypothesis that the cases selected are alike enough in some of their background characteristics to permit some meaningful comparison. Eisenhardt's ideal for excluding all theory and hypotheses (1989) is not practicable from the perspective of QCA or systematic combining (Dubois and Gadde, 2002). Some degree of theoretically informed practical understanding and inklings of causal interactions are an unavoidable and necessary part of moving to the case selection process. The significant issue is articulating preconceptions, not purporting or attempting to avoid them altogether.

Case selection for theory-building should not, according to Eisenhardt (1989), be carried out with random sampling, but with *theoretical sampling* (Glaser and Strauss, 1967) aiming "to replicate previous cases or extend emergent theory, or [...] fill theoretical categories and provide examples of polar types" (Eisenhardt, 1989, p. 537). Similarly, in QCA as in systematic combining, populations are viewed above all as flexible, manipulable constructions (Ragin, 2000, p. 39; Dubois and Gadde, 2002; see Halinen and Törnroos [2005] for a practical example regarding the search for population boundaries in systematic combining). The initial population of

cases is constrained by the existence of shared background characteristics, and delimited by the outcome of interest, which *"must be explicated at a very early stage of the QCA, because it is indispensable for the selection of the cases"* (Berg-Schlosser and De Meur 2009, p. 21).

The second consideration in QCA with respect to case selection is maximizing heterogeneity within the population, congruent with the idea of theoretical sampling in grounded theory (Glaser and Strauss, 1967). Maximal diversity should be aspired, both with regard to the degrees of the causal conditions and to the degree of the outcome. Negative cases, or cases that have low levels of the focal outcome, but which still "resemble positive cases in as many ways as possible, especially with respect to the commonalities exhibited by the positive cases," are valuable for the coevolution of populations and causal arguments (Ragin, 2000, pp. 60-1). Mechanical procedures like statistical random sampling cannot be used, as this could miss empirically rare configurations. Neither can the number of cases be fixed *a priori*. Specific pragmatic constraints, however, affect the kind and number of cases selected in practice – Berg-Schlosser and De Meur (2009, p. 24) mention the researcher's familiarity with the cases, access to data and sources, collaboration with experts, and available research resources.

3.4.2 Selecting conditions

To prepare for data collection for QCA, a degree of theoretical preunderstanding must guide the researcher to make informed guesses on what aspects and properties (termed *conditions* in QCA) of the individual cases – initially tentative and then more and more guided – might be causally relevant with respect to the focal outcome. The conditions must be meaningful as valuation criteria for all or nearly all cases forming the initial population, so that comparison along the dimensions formed by them will be possible. Berg-Schlosser and De Meur (2009, p. 25) suggest that "the researcher should try to narrow his or her perspective to only a few 'core' theories," but acknowledge that "even then, the sheer number of competing 'explanations' of the outcome of interest often remains too great." Consequently, Berg-Schlosser and De Meur (ibid.) discuss two strategies for limiting the number of conditions by hypothesizing, one based on theoretical understanding, and the other on conditions and combinations appearing together in outcomes. However, in practical business research, the reasoning must ultimately rely on practical preunderstandings of context-specific experts (often business managers) on what conditions are relevant for their marketing performance. These may be supplemented by

any other conditions a theoretically informed marketing researcher might be consider fit to include.

The addition of new literature as the need for it becomes apparent is encouraged throughout the process of systematic combining. According to Dubois and Gadde (2002, p. 559), "the need for theory is created in the process." The same holds for conditions selection, and later data calibration in QCA. Expert advice must be sought where needed and available. Both theoretical sources and, in the case of business research, practical understandings of managers, are invaluable material for developing the theoretical understanding.

On an analytical level, the investigator has to restrict the number of conditions comprising the analytical property space to reflect the diversity of case material and the number of cases selected or available for inclusion (Berg-Schlosser and De Meur 2009, p. 27). The number of logical combinations of causal conditions grows in a power series (2^number of conditions). As the number of conditions grows, dimensionality rapidly expands far beyond the number of empirically observed combinations of conditions.[7] Empirically observed case data always demonstrate the limited diversity problem to at least some degree.

Parsimony is needed to limit the number of potential conditions, to decrease the risk of the exercise turning into a descriptive study instead of an explanatory one, which distinguishes the causally relevant from the contextually co-occurrent. Berg-Schlosser, De Meur, Rihoux, and Ragin (2009) argue:

> The fewer the number of 'causes' we need to explain a phenomenon of interest, the closer we come to the 'core' elements of causal mechanisms. Moreover, the better we are able to identify fundamental causes, the easier it will be to produce results that may be tested on other cases, and eventually corroborated or falsified. It is exactly this 'falsifiability' that gives a method its scientific quality (Popper 1963). (Ibid., p. 27)

This theoretical linkage stresses building theory with a high explanatory power, as discussed by Eisenhardt (1989).

Berg-Schlosser, De Meur, Rihoux and Ragin (2009, pp. 27-28) suggest using discriminant analysis to identify bivariate relationships between conditions and groups of conditions to find "super conditions" that encompass strongly linked dimensions under a smaller number of theoretically justified propositions. They, furthermore, state that the ideal

[7] Another practical consideration is computing power. With a brute-force approach such as this, the required computing power is O^n. With the present desktop computing power, the time taken for constructing a truth table grows beyond seconds at around 16 conditions, and to several hours once beyond 20 conditions.

number of conditions for a specific case context is found usually by trial and error, with typical property space sizes of four to seven conditions in intermediate-N studies of 10 to 40 cases (ibid., p. 28). The investigator should attempt to formulate all conditions in terms of necessity and sufficiency to form clear hypotheses linking them to the focal outcome. The degree to which this is possible will increase with each successive iteration in the analysis process.

3.4.3 Data collection

In QCA, combining qualitative and quantitative techniques in data collection is seen as particularly synergistic: a deeper, qualitative understanding of theoretical rationale, suggested or corroborated by quantitative evidence. Both creative potential and confidence in interpretations are improved by involving multiple investigators and data sources in the research process.

With QCA, the replicability and transparency of the analytical process are guided by a set of rules that is considerably more formal and stable than that generally specified for case study research (Berg-Schlosser, De Meur, Rihoux, and Ragin, 2009, pp. 14-15). This means that another researcher working with the same final data set, and selecting the same options for calibration and parsimony in the process, will obtain the same results (King, Keohane, and Verba, 1994, p. 26). Thus for QCA, the solution to the problem of reliability is in systematic technique that openly and explicitly specifies the instruments used for data collection and subsequent analysis and is as independent as possible from undocumented interpretation. The 'quantitative' element is included in the guise of logical analysis used to derive coherent and valid propositions on the causal mechanisms.

Replicability and transparency add scientific clout to the analysis, decreasing the degree of vagueness and interpretation in applying the method, and by opening up the process and conclusions for corroboration or falsification (Berg-Schlosser, De Meur, Rihoux, and Ragin 2009, p. 15). The transparency of the analytical process includes full reporting of, for example, the selection of conditions, choosing analytical tools, use of data sources, calibrating the fuzzy system, and iterations in the analytical cycle. QCA requires full and detailed disclosure of and accountability for choices and assumptions made in the research process. A similar idea is, of course, stated habitually in instructions to any research method. The practical reality, however, is often found to disappoint, particularly with regard to software implementations of multivariate methods. Many assumptions about reality and the behavior of variables and models are not explicated or

often fully realized in taking advantage of "easy" tools. While QCA cannot remedy this in itself, the process always involves considerable introspection, in contrast to many "black box" (or "drag and drop") approaches of quantitative problem solving.

Like replicability and transparency, *free moving* between data collection and analysis features prominently in QCA literature. Berg-Schlosser, De Meur, Rihoux, and Ragin see this "back-and-forth 'dialogue with the cases', combined with the transparency of choices [...] unquestionably a virtue of QCA techniques" (2009, p. 15). The systematic combining approach of Dubois and Gadde (2002) consists of two processes, the first matching theory with reality and the second directing and redirecting the research effort. The 'matching' process is "about going back and forth between framework, data sources and analysis" (Dubois and Gadde, 2002, p. 556). In it, the fit between theory and reality should not be based on preconceptions, but linkages that emerge from the data themselves. This iterative approach shares much with both QCA and Eisenhardt's case research design. In the 'direction and redirection' process (Dubois and Gadde, 2002), data collection targeted at specific information is "complemented by efforts aiming at discovery" (ibid.) of new dimensions to the research problem. Overly predetermined data collection is seen to hinder knowledge discovery.

3.4.4 Data analysis and results

Eisenhardt (1989) sees the data analysis process as "both the most difficult and the least codified part of the [case study] process" (p. 539). Qualitative intimacy with cases on an individual level and as distinct wholes is one of the key themes throughout all QCA literature (Ragin, 1987; Ragin, 2000; Ragin, 2008a; Berg-Schlosser and De Meur, 2009, p. 24; Rihoux and Ragin, 2009). In the FS/QCA analysis process, this is codified in and systematically guided by the data calibration procedure. The logical analysis stage in itself requires relatively little input from the researcher, once the fuzzy system has been constructed. The actual qualitative comparison thus is carried out in a distinctly objective way, avoiding many difficulties that can be encountered in more manual qualitative case comparison.

In FS/QCA an explicitly-structured, iterative data collection and analysis process forms the technical core of the method. It comprises the selection of causal conditions, calibration of fuzzy set values for encoding the data using qualitative anchors, tabulating of cases with respect to their memberships in different combinations of conditions, and specifying frequency thresholds for assessing fuzzy subset relations. Causal propositions can be

built by examining the consistency of fuzzy subset relations, checking for necessary conditions or combinations of conditions, and drafting a truth table ready for logical minimization (Berg-Schlosser and De Meur 2009, p. 25; Ragin 2009, pp. 87-111).

The QCA data analysis process takes advantage of computational algorithms (Dusa, 2010) to carry out the logical minimization procedure and subsequently for a series of minimal solutions that represent the different combinations of outcomes that are sufficient to bring about the focal outcome. These minimal formulae are more than qualitative hypotheses; they are logically coherent analytical generalizations that approximate multiple conjectures of causal conditions within the case population. The measures of consistency and coverage are rich descriptors that, combined with identifying the cases corresponding to the causal configurations where possible, allow the results to be effectively judged and reinterpreted by others.

As for any theory-building work, the results of QCA must be contrasted with extant theoretical discussion. In the case of marketing performance, this would entail not only the research that is substantively relevant to the business issue or industrly, but more general matetril on the nature of value creation mechanims. The more generalizability is sought outside the immediate setting, the more support is needed from other sources of theoretical information. Creating practically relevant and managerially useful 'micro-theories', however, does not in itself require external backing.

3.4.5 Reaching closure

The end products of the research process may be concepts, conceptual frameworks, propositions, mid-range theories, or more disappointingly, replications of earlier theory or finding no patterns at all. The iterative process between theory and data should also stop when incremental improvements become minimal and theoretical saturation is reached (Eisenhardt, 1989). For QCA, closure is found in the same manner. Once no more new cases can be found to improve the configurational heterogeneity of the population or to improve the consistency of the minimal solutions, or when more improvements to fuzzy system calibration or parsimony in process choices are no longer possible, the investigation must stop, and move on to reporting any meaningful findings as causal explanations.

3.5 FS/QCA as an MMSS approach

I conclude this chapter by returning to the specific questing and challenges of marketing performance analysis, and the potential that FS/QCA has to offer. In particular, I hope to affirm my justifications for presenting an FS/QCA-based analysis process in the following chapter, specifically adapted to deducing causal configurations that explain marketing performance outcomes in different empirical contexts.

In the first chapters of this dissertation, I pointed out some particular challenges faced in marketing performance research. The introduction to QCA and FS/QCA in this chapter has detailed, how some key assumptions and weaknesses of quantitative modeling may be circumvented by taking a configurational approach to dealing with complex causality. The promise of contextual, configurational explanations for causality, deduced from empirical evidence without resorting to common assumptions about its nature, is particularly promising.

FS/QCA is a tool for discovering causal regularities that has potential to offer significant benefits for generating theory on marketing phenomena. Naturally, reliable solutions that aim at deductive reflection on observed phenomena have to rest on the premise that there are some regularities and that those some of those regularities can be comprehended. Arguably, the problems in marketing management are complex to such an extent, that they cannot be investigated with quantitative methods to a depth that allows cases to be understood as real-world configurations. The key question for marketing performance becomes determining the manner in which *manageable inputs bring about measurable outcomes*. Together, they define the challenge that interests us: a methodology that aims at drawing these linkages out in a managerially relevant and actionable way. I find FS/QCA to fit these criteria and have strong potential as a knowledge-driven approach to marketing management upport systems (‘MMSS’; Wierenga, van Bruggen, and Staelin, 1999).

With FS/QCA, data on conditions and outcomes are collected and analyzed in an iterative process to formulate set-theoretic structures approachable with formal multi-valued logic. This allows logically true (as opposed to statistically likely) inferences to be made on the necessity and sufficiency of configurations of conditions in bringing about different degrees of outcomes. Greater insight into how, and in what combinations aspects of actions available for marketers produce business outcomes can ultimately result in substantial improvements to decision-making and business performance.

The QCA approach is critical of the prevalent epistemology and methodology in marketing performance research in that it attempts to reconcile realist and interpretive perspectives (Anderson, 1986; Hunt, 2002; Tadajewski, 2004) in something new that is more valuable in practice. With QCA, one does not take a stance towards the existence of an objective reality. Rather, it offers tools to work within a given ontological reality and systematically assess the mechanics of causality in that context and situation. The ultimate aim of this study is to propose and demonstrate a contextual tool that allows better understanding of causality on a level that is practical enough to be relevant for managerial decision-making. The produced theory and generalizations are only applicable to the specific business context, contingency and operating environment. The wider applicability of results is left open to further interpretation. This fits in well with the reality of business management; QCA will never be a 'crystal ball' for accessing extraneous information. It does, however, offer the potential for new, empirically driven, theoretically guided, and methodologically specific steps for working within the same perspective, with the same data.

4 Configurational Explanation of Marketing Outcomes

This chapter is intended as the main thesis and contribution of this study. It builds on the ontological premises of multiple configurational causality and the methodological foundations of FS/QCA, described in the previous chapter, to posit an analytical process targeted specifically to practical needs in marketing management. I contend that with the CEMO process, managers and researchers can leverage the analytical power of FS/QCA in a marketing management support system ('MMSS'; Wierenga, van Bruggen, and Staelin, 1999) to build parsimonious models of causality in a broad variety of marketing contexts. If the previous chapter gave the ontological and epistemological justifications for the components of FS/QCA, this chapter reframes the analysis process as practical, implementable steps, and offers a relevant and practicable process for accruing contextual understanding of marketing performance determinants.

The specific thesis that I make in this study is that QCA has significant value as a knowledge-driven marketing performance assessment tool in practical business contexts, and offers a distinct complement to established qualitative and quantitative techniques. To provide an analytical structure for subsequent empirical studies, I present in this chapter a versatile, FS/QCA-based research framework for causal analysis of marketing outcomes. The analysis process, which I call *configurational explanation of marketing outcomes* ('CEMO') is an adaption of the general FS/QCA into a marketing context, designed and refined for the purposes of answering marketing performance questions on the level of an individual business. This chapter is a description of the stages of the CEMO process, and is intended to be the key contribution of this study to the marketing discourse.

The empirical case studies in the following chapters are illustrations and practical examples of applying the CEMO analysis process to investigate questions of causality in specific business contexts. The role of the case studies is to demonstrate the application of the framework of actual empirical data (applicability and practicability), highlight how FS/QCA and

CEMO can provide answers to questions that are not directly approachable or validly answerable with multivariate methods or conventional case studies, and show how CEMO can produce managerially relevant information that has immediate managerial relevance and implications for marketing analysis, planning, implementation, and control (Kotler, 1977). Conclusions on the goodness of the configurational approach in general and its implementation as CEMO for studying marketing performance in particular are drawn together in the final chapter, after the empirical studies have been discussed.

In this chapter, I first describe how I arrived at the CEMO process, through a process of empirical attempts at applying the configurational approach to causality and FS/QCA to study marketing phenomena. Then, I proceed to cover each stage of the CEMO process in turn, paying special attention to relating practical considerations for carrying out empirical analysis on a microcomparative level (Rihoux, Ragin, Yamasaki, and Bol, 2009, pp. 173-4), garnered during the adaption process. Discussion follows on how the goodness of the analysis process and the causal models produced thereby should be assessed, what type of information is produced, and to what extent these support the calls for new support to existing, conventional methodological approaches in marketing performance research. The chapter concludes with general discussion of the empirical application of CEMO as an introduction to the empirical studies in the subsequent chapters.

4.1 Adapting FS/QCA to marketing performance

As mentioned, 'configurational explanation of marketing outcomes' is an operationalization of FS/QCA to study the causal determinants of marketing performance in specific contexts. The steps of the CEMO process detailed here form the methodological framework and technical structure for the empirical studies reported in chapters 5 and 6.

Based on experience and insights gained during the development process, I also comment on the kinds of marketing contexts and operational contingencies that are the most accessible to a CEMO approach and analysis. My own practical successes, failures, and insights serve as the evidence. Some indication for practical recommendations can also be inferred from reviewing past applications of FS/QCA in business research, reviewed in section 3.3.8 in the preceding chapter.

4.1.1 Formative empirical studies

In my empirical fieldwork, I collected data and initiated analysis on 12 different marketing contexts in consumer goods, consumer services, and retail. The key aspects of these analyses are summarized in **Table 4-1**. Each context was selected (and gained initial access to) based on the criteria and suggestions for conducive contexts put forth in Section 4.2.2 later in this chapter. All are associated with a causal question with potential or demand for configurational answers, or other aspects that would make a QCA approach advantageous. They represent issues that the organizations in the given marketing contexts are not or would not be able to approach with the current analytical and statistical tools at our disposal. Explaining configurational causation is the dominant shared theme: interviewed managers consistently voice practical beliefs or understandings that there are nontrivial interactions at play.

The specific challenges faced in the analyses ranged from practical problems regarding the nature and availability of data to instances of well-known marketing performance dilemmas, such as estimating the temporal shape of the advertising response function. Challenges specific to FS/QCA are a distinct category, manifesting especially in the calibration procedures for both quantitative and qualitative conditions of the case observations. Methodological learnings from the empirical studies include both a practical empirical learning component as well as realizations of a more epistemological nature. Both have contributed to the CEMO specification presented in this chapter. Despite the lack of final results in the form of causal configurations on the majority of the empirical problem settings, all proved valuable contributions to developing and refining a practical understanding of the developed methodology.

Table 4-1. Initiated empirical fieldwork and completed analyses contributing to CEMO process formation.

Marketing context (background)	Causal interest	Key analytical challenges	Methodological learning	Research outcome or obstacle
Mobile telephone service provider (consumer market): impact of promotion actions on churn	Configurational effects of promotions on customer acquisition and retention (affect, cognition, and experience factors vs. response in different customer segments)	Unknown temporal form of the advertising response function	Abstracting continuous, temporally dynamic actions and outcomes as analysis conditions	Unable to complete data collection on property space (Managerial obstacle)
Promotion of market-leading chocolate brand	Incremental and persistent effects of promotion vs. financial cost	Monopolistically stable demand of "national classic" chocolate product brand; lack of POS data	Practical realization of the need for enough heterogeneity in outcomes vs. number of analysis cases	Unable to complete analysis with given data accuracy and diversity (Analytical obstacle)
Major brand soft drink sales	Sales effects of changes in marketing mix (price, packaging, retail, media mix); temporal form of advertising response function; persistent vs. incremental effects	Lack of POS data countered with third party research; lack of information on marketing action content and on in-store activities, placement etc.	Modeling qualitative input (nature of communications) and versatile combinations of marketing mix components	Unable to complete data collection on promotions (Managerial obstacle)
Market-dominant ready to drink alcoholic beverage	Sales effects of changes in the marketing mix (packaging, advertising, in-store promotion)	Restricted time window of available data; seasonality of demand; restricted distribution (government alcohol monopoly outlets)	Building property spaces that allow modeling substantial changes in the entire marketing mix	Unable to complete data collection on promotions (Managerial obstacle)

Popular music event promotion	Effect of difficult-to-quantify but unquestionably substantial qualitative aspects on event sales	Identifying and assessing elusive qualitative causal factors (e.g. goodwill towards artist)	Building a property space with a clear and explicit outcome but highly abstract inputs	Unable to complete property space (Managerial obstacle)
Direct mail promotion of weekly entertainment magazine	Highly nonlinear and causally elusive effects of marketing mix and communications design choices on subscription response	Abstracting visual cues and communication choices to form a practicable property space	Adapting the analysis process to a very tactical context	Property space incomplete (Analytical obstacle)
Night club event promotion	Broad and complex causality, environmental conditions, managing multiple outcomes	Data collection in practice (building trust and motivation, extracting information); multiple outcomes	Developing property space for branded discrete service experience; developing effective and managerially actionable points for qualitative differentiation between events	Data collection underway but incomplete
Flavored yoghurt	Configurational sales effects of price discounts, promotion and competitor promotion in different media	Base sales levels; selecting property space dimensions to match computational possibilities	Statistically transforming and calibrating continuously distributed data	Unable to complete analysis with given data accuracy and diversity (Analytical obstacle)
Functional dairy product	Configurational sales effects of price discounts, promotion, competitor promotion, cross promotion in different media, and pricing changes	Base sales levels; defining competition in property space formation	Including spillover effects of the promotion of adjacent brands in the analysis; impact of (price) positioning change on causal mechanism	*Reported as empirical study 2 (Chapter 6)*
Dairy cream products for cooking	Configurational sales effects of price discounts, promotion and competitor promotion in different media	Heavy, unmodeled seasonality of demand	Econometric modeling of base sales data to deal with seasonal variation	Base modeling and data calibration underway

Functional milk-based drink	Configurational sales effects of price discounts, promotion and competitor promotion in different media	Product novelty: modeling rapidly increasing demand in a new product category	Econometric modeling of base sales to focus explanation to change in rate of growth; including promotion-induced seasonality	Base modeling and data calibration underway
Air travel email promotions	Revenue impact of different combinations of promoted route, price, offer details, and offer communication	Calibrating data to impart nonlinear perceptual qualities of e.g. price points and time restrictions of offers (as opposed to scalar difference)	Perceptual categorization with qualitative anchoring; building confidence of analysis with small n	*Reported as empirical study 1 (Chapter 5)*

4.1.2 Demand and supply for decision support

The nature of demand for MMSS decision support emerged as a significant component in fieldwork. The three categories of decision situation characteristics (Figure 2-6), proposed by Wierenga et al. (1999) and further discussed by Lilien et al. (2002), are found to be an accurate portrayal of empirical challenges of the managerially actionable nature:

- *Decision problem characteristics*, including the structuredness of the problem, the depth of knowledge regarding the situation, and the amount of data available;
- *Decision environment characteristics*, including prevalent market dynamics, organizational culture, and time constraints;
- *Decision maker characteristics*, including cognitive style of the manager, experience, and attitude towards performance assessment and system development.

In fieldwork, encountering managerial challenges typically indicated that the decision-maker contact at the company did not have time or interest to give attention to the matter. Adopting a psychological perspective (Rosegrant, 1976), the mindset leading to the collaboration outcome comprises the manager's general attitude and approach to research, proclivity to assist, experienced self-interest, and assessment of relevance and importance. To a large extent, it is these aspects of the third characteristic category that form the basis for the first two.

In addition to managerial demand-side phenomena, a range of analytical challenges emerged in the course of my research. In these cases, some aspect of the marketing performance problem or nature of the data proved, at the time, to be practically or economically unsolvable with FS/QCA. I am confident that time and experience will allow broadening both the potential demand base and the practical analytical scope of CEMO to a great degree. As my understanding and practical competence in applying the process to empirical contexts has developed, many of the contexts left unexplained in incomplete will warrant new, better informed visits.

Only approximately a third of companies and managers contacted with a specific marketing-related research topic were able to participate. Most cited lack of time (i.e. interest) in the topic. Furthermore, only approximately a third of the data collection efforts at participating companies produced usable data. The 'lost' cases, however, provided useful learning experiences for understanding which types of problems are most readily approached with FS/QCA. Blue1 Ltd., the subject of Chapter 5, is an

example of a business, which was approached early on in the investigation, and declined by the company for lack of time. The company was brought back into the investigation at a late date, when many of the practical issues relating to case and property space composition had been refined, and the research process clarified and objectives concretized. Reflecting Wierenga, van Bruggen, and Staelin's (1999) MMSS framework, analytical supply now matched demand.

4.2 CEMO analysis process

My analytical framework for applying FS/QCA is illustrated in **Figure 4-1**. It consists of two interlinked, iterative paths. One is concerned with building a context specific theory of causality to explain the focal outcome; the other is the empirical field research process where new data is collected and analyzed to be fed into further theoretical development. As theoretical understanding develops, the empirical effort can be focused increasingly sharply to draw out qualitatively justified distinctions from among the cases to form a basis for conclusions on causality within the focal context. In this section, I illustrate the practical research process of applying CEMO in empirical contexts and on actual data.

4.2.1 Analysis stages

The analytical process presented here is a synthetic strategy that aims at developing context-specific theory of marketing interactions. The underlying FS/QCA technique allows for considerable qualitative distinction and infusion in an arguably transparent iterative process that is based on logical reasoning and larger case populations, bringing in quantitative ingredients. CEMO can be seen as systematic combining (Dubois and Gadde, 2002, cf. Section 3.1.3) as it connects two interlinked, iterative, co-evolving subcomponents, theoretical development and empirical application. These two paths and their connections are illustrated in **Figure 4-1**.

The CEMO process comprises five distinct stages, reviewed sequentially in this section. The CEMO analysis process will begin with defining and evaluating the analytical approachability of an empirical research context. This definition calls for some practical conundrum regarding causality within that context, an initial aim spurring the investigation.

In the *second stage*, theoretical preunderstanding and specifics on research-economically available data are joined into an initial property

space. This property space is used as the template for empirical data collection.

The *third stage* reflects on the qualitative and quantitative nature of the collected data. The required and justified classification, transformation, and calibration procedures are carried out on the data and documented, resulting in a first fuzzy system that now includes all input data encoded as calibrated fuzzy membership scores.

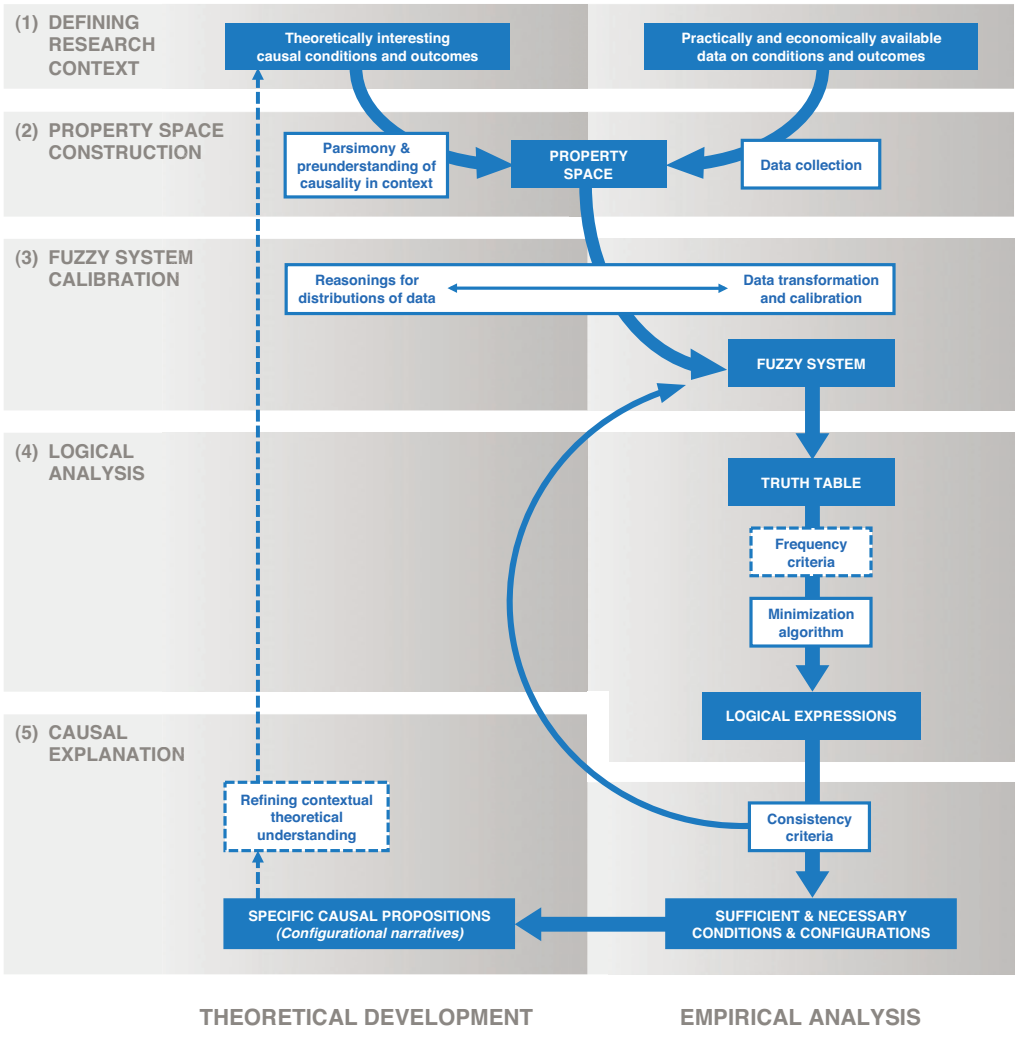

Figure 4-1. Stages of the analysis process for deducing configurational explanations for marketing outcomes in an empirical context.

The actual mathematical analysis of the fuzzy system is carried out in the *fourth stage* of CEMO. A truth table is compiled to sort cases with respect to their conditions. Depending on population size and data quality,

frequency criteria may be applied to establish a threshold for evidence of causal configurations. The truth table is reduced to minimal form to deduce a formal set-theoretic expression of causal relationships among the data.

The ultimate *fifth stage* in the empirical analysis column considers the necessity and sufficiency of the discovered causal conditions and configurations. The focus then returns again to theoretical development, where the causal links must be framed with respect to previous theoretical knowledge and substantive understanding on the business context. Then, they can prompt managerial implications in themselves, serve as input to another iteration of CEMO, or find use in testing theory using other analytical approaches, including multivariate methods.

In practice, of course, moving and iterating among the steps is an irregular process, and decisions taken impact and return to more than one step at the same time. The diagram proposed here represents an idealized version of the process, not a rigid, mechanistic frame. Notwithstanding that, the steps presented here form the core process; each requiring focused attention at a practically convenient stage of the analysis process. The CEMO process in the form presented here offers a systematic and ontologically warranted framework for analysis. The discussion in this chapter is concerned with how it can be applied empirically in a valid and reliable manner.

4.2.2 Step 1: Research context

The first stage of CEMO begins with the selection of a research context of interest and its evaluation as a candidate for successful and relevant analysis using FS/QCA. The problem setting should, thus, reflect the potential of the configurational approach to causality and contextual knowledge creation. An unexplained or partly unexplained phenomenon that has prompted an interest in or suspicion of complex causality – equifinality or multiple configurational causality – at play is a typical candidate. Other prompts include the desire or need to compare qualitative, qualitative, or mixed case data where a low N, especially with regard to the number of potential causal conditions and interaction effects, hinders the application of conventional statistical methods. Conversely, the focal context may involve a high number of qualitative cases, which are believed to benefit from systematic analytical comparison to draw out evidence of complex configurational causality. The research problem for the CEMO process must be defined and delineated with respect to specific goals in knowledge production or the generation of practicable managerial implications.

Context selection. It is clear that some marketing contexts lend better to analysis than others. Finding cases to adequately and clearly demonstrate the potential and power of an analytical approach is necessarily a learning process. The following criteria (none sufficient or necessary on their own) emerged as useful clues for discovering marketing contexts conducive to data solicitation during the process of adapting FS/QCA to a marketing performance context:

1. *Conducive characteristics of managerial context*

- A contact person who has time, or enough excitement, with regard to business development or supporting academic research, to make time for data collection and substantive reflection on causality.
- Local companies or ones with strong local presence provide better access for the most part, as the power distance required for access decisions is smaller.
- A managerial situation, where nothing extraordinary in the company is consuming management time and focus (e.g. layoffs, restructuring),
- Unlisted companies not restricted by market information availability regulations.
- Some challenge in systematic comparison of qualitative information, also resulting in investigative motivation at the organization.
- Marketing being established as a process or function in the company, with some independent power.
- Commitment and trust towards the researcher and the background institution.

2. *Conductive characteristics of the marketing context*

- The simplicity of the economic logic of the focal industry or business.
- Low turbulence: competitive stability (high industry concentration and maturity), combined with technological and environmental and economic stability reduces the impact of uncontrollable diversity.
- Cyclical stability of demand, or alternatively ability to econometrically model seasonal fluctuations in outcomes.
- Life cycle stage of product: products undergoing rapid growth or decline are more challenging to model than stable situations. However, product launches and kills as cases of their own can be appealing to compare.
- MMSS or other control systems in place, giving access to historical data, or alternatively, adequate resources and time to collect data.

- Diversity: Fluctuation in the sales of case product, but stable demand in competitor category (e.g. heavily branded domestic stuff with lots of competition and heavy branding, shared supply chain).
- Financial scale of the business: large businesses have better resources and motivation, and the data on
- Customer base scale of the business: with larger customer and purchase volumes, fluctuations if outcomes are less likely to be due to spurious events on the level of individual customers, or managers completely devoid of causal precognition of the marketing context.
- Intrinsic variety in marketing inputs and outcomes: if the same thing is always done, with similar results, analysis may be challenging due to low diversity.

Selection and typology of conditions. The practical stage of forming the research setting proceeds with a thorough assessment of theoretical knowledge and substantive (managerial) preconceptions about the nature of causality with respect to the identified research problem. These will form the range of potentially interesting conditions, and must include at least one outcome of interest.

As with the selection on case contexts, the selection of conditions must be iterative, theoretically informed and practically minded. If we assumed a completely clean theoretical slate as suggested by Eisenhardt (1989), and ignored the substantive and broad combined preunderstandings of business managers on their practical specialty, as well as marketing research specialists' theoretical background knowledge, data collection and analysis could rapidly be pushed beyond practicability. An aim and a stated limitation of the study are to produce an analytical process that is applicable in practice, as an MMSS. The process I present here is, thus, both guided and limited by managerial access to data and contextual knowledge, as it would be when applied in practice.

With CEMO, the investigation will typically begin with a practical research problem of better understanding the dynamics by which causal conditions under managerial control might be configured to maximize performance outcomes. This connects the process with the practical reality of business management: in order to not be left as a an academic exercise, a CEMO process must consider as its inputs the conditions that managers can economically gain information on, and conditions that managers can influence through their actions. The two categories overlap, but neither contains the other fully.

Considering the set of conditions for data collection is similar to the considerations managers and researchers are faced with in selecting marketing metrics. The categories (e.g. Ambler, Kokkinaki, and Puntoni 2004) that metrics can be drawn from, as well as the rationale for their selection, closely mirror the considerations prerequisite to QCA. Theoretical knowledge and intuition of potentially relevant conditions is equated with the search for meaningful drivers of performance. The metrics discourse connects equally well with the empirical development column (**Figure 4-1**): the discussion in marketing metrics on what is managerially feasible to measure dictates which of the theoretically interesting conditions it is actually possible to gain access to on the level of individual cases. The range of conditions can generally include any type of information or metrics with theoretically presumed, practically evident, or conventionally supposed roles in influencing the focal performance outcome. There is no need to limit their number hard-handedly at this stage.

As discussed in Chapter 2 regarding the internal and external determinants of marketing performance, causal conditions may be drawn from any *causal loci* not considered completely irrelevant. Depending on the marketing context, causal conditions and outcomes may include any tangible and intangible resources, capabilities, assets and structures (Morgan, Clark, and Gooner, 2002) in the internal and external environments of the marketing context. As elaborated on in Chapter 2, the internal environment comprises:

- The *organizatorial locus* comprising a broad range of knowable and directly manipulable resources, capabilities, and intellectual assets,
- The *customer locus* of relational assets, measured as intermediate marketing outcomes and serving as equity for performance outcomes and real options, and
- The *action locus*, where managers commit to the configurational use given of resources, capabilities, assets, and structures with the purpose transforming the marketing context.

Correspondingly, two loci are identified in the external environment of the marketing context:

- The *industry locus*, which comprises the business or industry level environment, as well as broader background factors such as the state, nature and developmental phase of the economy and
- The *competitor locus* of all tangible and intangible resources, capabilities, assets, and structures that give rise to marketing actions by competitors, as well as those actions themselves.

There are key two dimensions to selecting conditions in these different internal and external causal loci: the *degree of information availability* on the condition and the *degree of managerial manipulability* over the condition. In addition, causal conditions in the two internal loci can be classified with respect to their independence or dependence as variables from the perspective of a single analysis case.[8] For properties in the external loci, such a division exists, but is analytically irrelevant from the perspective of the internal managerial decision-maker. Outcomes for causal analysis will have to be found among such internal dependent conditions, where reliable information is economically available (e.g. sales). **Figure 4-2** arranges some generic conditions from different causal loci along the two axes.

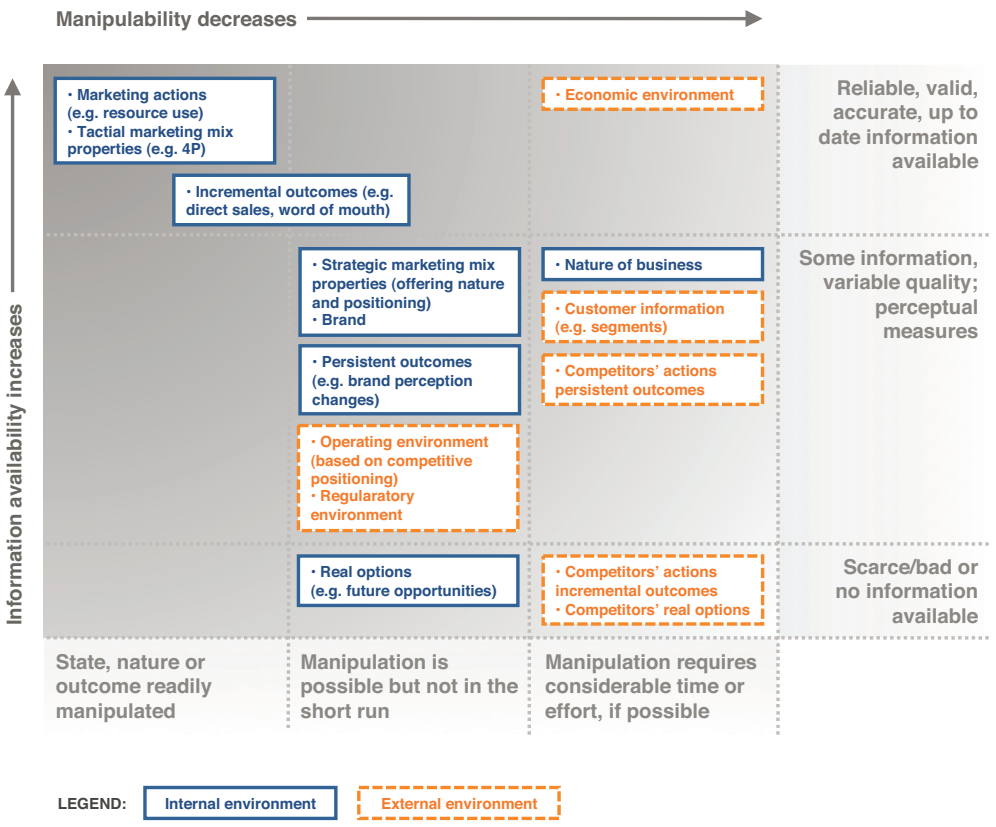

Figure 4-2. Classifying causal conditions and outcomes with respect to information availability and condition manipulability.

[8] Ultimately, of course, no condition will be fully independent, as the determinants and degrees of freedom for each are the consequence of past actions, as recognized and conceptualized in literature on historical path dependence (Arthur, 1994; Srivastava, Fahey, and Christensen, 2001).

Shading in **Figure 4-2** reflects the previously discussed classification of conditions and causal loci into the internal and external environments. The concept of manipulability does not, thus, depend on whether the condition is an ultimate performance outcome, intermediate outcome, or an 'independent' causal condition, but on the level of short run or long run control the organization has over it. The intrinsic nature of the business that the company operates in is, of course, rather freely decided, but not rapidly altered. Conversely, the outcome sales resulting from action can be affected rapidly, but are still dependent on other causal conditions as well.

Examples of condition types in **Figure 4-2** consider the following broad combinations of manipulability and information availability, case-level independence and causal relations, and causal locus:

- The resources and decisions that comprise a marketing action are generally easy to identify and manipulate, especially ex ante. The most straightforward dependent performance effects that can be identified are the incremental pecuniary ones. Depending on the level of analysis, they may be very easy to identify (e.g. weekly sales volume) or require more consideration (e.g. attributing sales to a specific action).

- Extensive and accurate information is often available on the external economic environment to serve as system level causal conditions. They can be seen as contextual moderators. Information availability decreases with increasing demands for detail and industry relevance.

- Persistent outcomes (Stewart, 2009) of marketing actions include brand position and other perceptual indicators. Concurrently, these serve as the qualitative platform and position that is available for the company to launch new actions. Brand perception and similar indicators are not straightforwardly assessed, and changing them takes time. Similarly, the choice and definition of the operating environment taken by the business is open to repositioning, but often remains abstract and open to further interpretation. Nevertheless, conditions relating to it, such as regulation and competitive positioning, can in many instances be seen to have significant consequences on the composition of causal configurations. Marketing actions can and are, however, often targeted specifically to change environmental conditions such as regulation (e.g. lobbying).

- Less manipulability and less accurate information is encountered on the nature and composition of customer segments, and to both the marketing actions taken by competitors, their resources, assets, and capabilities, and the outcome effects of their marketing actions (e.g. market share, changes in market definition, share of voice, comparative brand positioning, brand preference).

- In addition to incremental effects and persistent effects, the marketing actions undertaken by an organization shape the range of real options

available in the future (Stewart, 2009). These form via effects on intangibles such as organizational learning and network relationships, and more tangible, such as future resource availability. These are, to a large extent, 'known unknowns': notoriously difficult to assess, but manipulable, given time.

- Proprietary information on the incremental outcomes (Stewart, 2009) resulting from competitors' actions is usually inaccessible. Although an organization's own actions help shape the common competitive landscape, the nature and execution of competitors' actions, and the real options available to them can rarely be directly manipulated or assessed.

The degree of information available on conditions has direct implications for the choice of conditions for causal analysis, limiting their range by the combination of research economics with the availability of sufficiently valid and reliable data. The degree of manipulability does not limit the choice of conditions for analysis, but has its implications for empirical diversity and the choice of the level of analysis. An experimental approach can (and, in practice, should), in many situations, be used to increase diversity among case data. However, the less manipulable a condition is, the more the researcher is at the mercy of naturally manifesting diversity.

The conceptualization of marketing actions as organizatorial mechanisms (Pajunen, 2008) carries with it a structural division of the mechanism into a 'higher level' background contingency and a 'lower level' component that is active in affecting causation. This structure allows marketing action's conditions to be divided into ones that are independent in the sense that they can be directly manipulated my marketing managers and into ones that form the contingency in which the marketing action is carried out. In a given empirical context, conditions of a marketing context and, thus, an associated property space, can be characterized as being:

1. *Lower level conditions* representing the 'moving parts' that are generally available for managers to manipulate and create diversity as a consequence their own actions, located in the internal environment, and expressed as configurational choices made with regard to marketing actions;

2. *Outcome conditions,* or the conditions observing the effects of marketing actions, representing incremental and persistent marketing outcomes, both in the internal (organizatorial locus outcomes and relational assets in the customer locus) and external environments (competitor locus); or

3. *Higher level conditions* that reside in the external (background) environment and are associated with much less manipulability and information availability for the marketing managers, but which nevertheless form the contingency for a marketing action in the competitor locus and the industry locus.

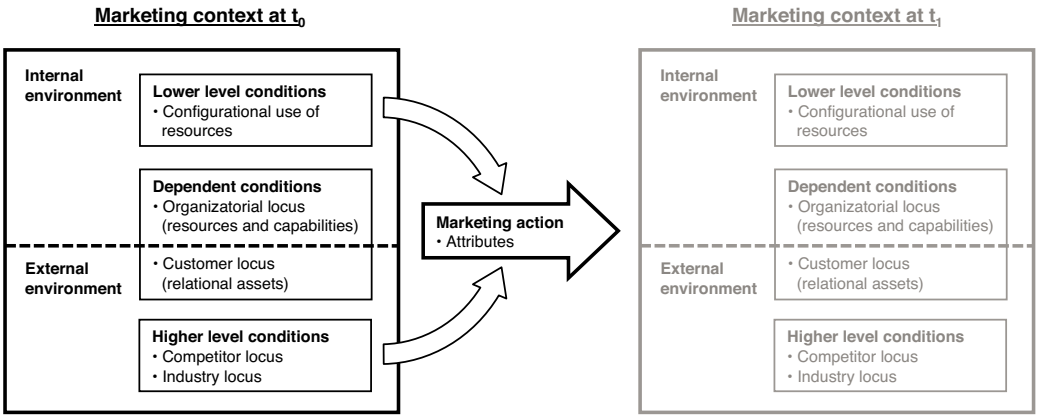

Figure 4-3. Typology of causal conditions of marketing actions and marketing outcomes.

The typing of conditions, with respect to independence, dependence, and perception in particular, has some implications for data calibration, discussed in Section 4.2.4. The relationship of these characterizations of conditions, the causal loci proposed in Chapter 2 is summarized in **Figure 4-3**.

Causal interest versus data availability. The primary limiting factor for the range of conditions included in the analysis comes from research economics. In practice, the range of economically available information can be extremely restricted. Many companies collect little, if any data on a continuous level, and the reliability and validity of information varies. Data collection regarding past events is usually futile in practice, as managerial memories can rarely be relied on for comprehensive and reliable impressions. The organizational memory is short, and the details of reasoning behind choices made, for example, in advertising planning and production, are forgotten even quicker than the justifications for a given media mix.

Quantitative data on standard financial metrics such as sales and deliveries can usually be reliably accessed, and more developed marketing control systems may be useful sources of data regarding some customer, competitive, or internal organizational metrics that have been established. However, their validity for the specific purpose the analysis carried out for may not be the best possible. Historical data on the economy, industry, and other factors relating to the operating environment is generally better available, but may require additional effort to collect or purchase from secondary sources. Data on specific marketing actions, beyond monetary cost, is often simply not available in practice.

These limitations on the availability of valid and reliable information constrain the selection of the initial set of conditions used to form the property space.

Selecting conditions in practice. Selecting conditions for forming the property space is constrained by the availability of information, the level of access granted and the support effort the company is willing to grant for the project in gathering or compiling additional data and in the form of interview hours. Many empirically relevant conditions outside of this practical scope will present themselves in any instance. Marketing metrics in use at companies are often deficient, and rarely balance indicators from different performance perspectives (Ambler, Kokkinaki, and Puntoni, 2004; Frösén, Jaakkola, and Vassinen, 2008).

Gaining access to potentially sensitive data can be an issue, as can the resources that the company is willing to grant toward the effort. Compiling information is always required to some degree in the process, usually in several iterations. Developing a comprehensive qualitative understanding of the setting and cases requires personal access to solicit information from key actors, depending on the business problem, but typically beginning with or including marketing managers. Ideally, at least the first meetings with informants and specific actors (managers, directors, gatekeepers, data experts) whose support is seen to be important should be conducted in person as often as possible.

Building the first joint platform for data collection in the field should be an interactive process between the investigator and the case company, a creative debate on what conditions to include in the initial property space. The interchange concerning what can be included, what might be possible with some effort, and what is presently impracticable determines the outer bounds of the property space. In practice, the initial discussion could include a run-through of the key components in the company's marketing effort around the problem associated with any particular issues that are believed to be crucial, in addition to resolving research-economic and temporal constraints to data collection. Conditions that can be relevant might be excluded from the analysis because there is no data available on them (e.g. historical records), or because there are not enough resources to solicit data for them (e.g. by consumer behavior studies and other qualitative methods).

Due to the practical constraints on the extent of the property space, many interesting and undoubtedly significant conditions, especially in the customer end and on the system level, are left unaccounted for. This is not a methodological deficiency as such – there is no difference in the calibration

process – but a practical one. The combination of relevant business process conditions, customer conditions on buying behavior, conditions on consumer behavior, and general economic indicators into the same model would be the starting point to creating a model with the greatest potential for configurational explanations.

At the completion of the first stage of a CEMO analysis, we have a definition for what comprises a case in this research context. The case unit is the level of analysis of the investigation; for example, a week of marketing activities and sales, an individual marketing action and the competitive response to it, a single advertising campaign, or new product launch process. In addition, we will have specified a research economically and data quality wise realizing range of conditions that are interesting as possible factors explaining configurational causality. Each condition can, additionally, be characterized in terms of a causal locus in the internal or external environments, and is terms of its causal role on a case level, in terms of managerial choice and decision-making power.

4.2.3 Step 2: Property space construction

The second stage of CEMO is concerned with the intersection of theoretical and substantive interest with practically available data. This forms the initial *property space,* which analysis considers – a *k*-dimensional vector space, where *k* represents the number of conditions against which each case (i.e. vector space element) can be evaluated. The second stage concentrates on the practical refinement of the intersection into a systematic structure, which will be used as the template for data collection. At the same time, the relationships and potential significance of the conditions are considered, for example, to reduce dimensionality by eliminating collinear conditions. This process includes soliciting data and making theoretically and research-economically informed decisions on what to focus on. The informational contribution of each condition must be considered with respect to others. The outcome does not need to be fixed at this time, but all outcomes of interest must be included in the property space. The process should, furthermore, give preliminary attention to subsequent CEMO iterations.

The initial intersection of availability and interest from stage 1 gives rise to the next steps in both theoretical development and empirical work. For advancing the empirical process, an attempt must be made to assess each case respect to each condition of the property space. Depending on the condition, the data may be quantitative, qualitative, or some combination of these, gathered from management information systems, reports, interviews, external or secondary sources, or any combination of these.

In theory building, the next step involves developing an initial understanding of what roles the conditions might play in bringing about the focal outcome. This should direct the empirical effort and property space refinement to focus on conditions with the greatest potential for causal relevance.

The first round of empirical data collection should be carried out at this stage, focusing on gathering rich information regarding all conditions in the initial property space, for as many cases as are seen to be relevant and research economically viable. The main concern should be for developing an in-depth qualitative understanding of the cases as wholes.

At the end of the second stage, the researcher should have on hand a ready property space with a broad variety of conditions, and collected data on those conditions for each case to be included in the initial population. The final case population may not yet be evident, as the causal evidence itself determines it later.

4.2.4 Step 3: Fuzzy set calibration

In the third stage of the analysis process, the collected data are studied closely to gain some understanding of the logic that determines how the values are distributed. This gives a starting point for qualitative anchoring and subsequent manual classification or mathematical transformation of the values to calibrate them into fuzzy membership scores. Theoretical consideration should inform examining the behavior of conditions. Distinguishing qualitatively relevant variation from the less relevant forms the basis for drawing out the significant differences from among the cases.

Data are generally evaluated as one of three main types: *categorical* (qualitative dummy-type differences 'in kind', e.g. physical product attributes), *discrete* (fixed but graduated points on ordinal, interval, and ratio scales, including e.g. defined price points and Likert-type qualitative categorizations), or *continuous* (free scalar variation on some numerical range). The typical calibration procedure for each data type is different, and determined in part by the causal loci discussed in the previous section.

Categorical data. The categorical data type includes dichotomous conditions taking on simple Boolean values (true/false) as well as multichotomies, comprising three or more discrete, non-ordinal, and mutually exclusive choices. In practice, any multichotomies must be coded as multiple dichotomies in FS/QCA. The calibration of Boolean values is straightforward: true values are encoded as ones and false values as zeros. The importance of qualitative depth remains: for the sake of transparency

and replicability, the researcher must verbalize an explicit criterion for qualifying case as true or false based on practical and theoretical understanding of the marketing context.

Among causal conditions if internal environment, examples of categorical variation include all qualitative differences in kind (e.g. type of content provided in a promotion). For conditions in the external environment categorical variation can be found e.g. in comparing causal conditions and outcomes in different time periods, countries, markets, and customer segments. Outcome conditions may include categorical outcomes such as company or product survival.

Discrete data. The discrete data type includes all non-continuous data that take on values that cluster around certain absolute values, such as price points or temporal cues (e.g. time periods identified or aggregated as whole weeks). These are typically the result of managerial decision-making: price points for single products are more or less fixed locally, and decisions about marketing expenditure are done using broad units, such as how many weeks to promote or maintain an offer.

Discrete data types may be less common in practice among lower level and outcome conditions, where stochastically behaving values are more common – as is, to an extent, categorical heterogeneity. This has to do with multiple decision-makers and the integration of multiple causal systems to produce a more chaotic combined system, as opposed to managerial decision-making patterns that produce discrete or near-discrete quantitative or qualitative marketing action attributes. Examples of discrete decision outcomes include price points, timing choices, discount levels, promotion patterns (e.g. pulsing), as well as perceptual metrics such as ordinal assessments of brand attributes.

The calibration of discrete data must take into account the process that has produced the data. The researcher must qualitatively understand the reasoning and possible systemic or institutional constraints behind it, which force the variable to conform to a discrete pattern.

In calibration, the perceptions and subjective interpretations of marketing mix elements and other action attributes have to also be understood from the perspective of the customer. Does the customer, for example, perceive discrete price points? For example, a single currency unit difference in pricing is typically thought to have a very different impact if it moves price from 49 to 50 than from 50 to 51. It is impossible to incorporate this effect without a complex mathematical model; however, translating the qualitative interpretations as they are understood can be performed rapidly with qualitative labels. Overall, the motivation behind calibration must be

to emphasize relevant variation and de-emphasize irrelevant variation. The researcher needs to specify and justify a qualitative sorting method that takes into account practical managerial degrees of freedom and perceptual, irregular effects of conditions (such as price) in a more manual calibration process.

The 'indirect method' of calibration, discussed by Ragin (2008), is a further possible alternative for calibrating discretely distributed data. The estimation procedure, however, is clearly inferior to more manual approaches when they can be backed with substantive qualitative knowledge, and cannot easily accommodate, for example, the periodic perceptual effects described with regard to pricing.

Qualitative anchoring of discretely varying data should be based primarily on the qualitative effects that the levels are perceived to have (cf. Tables 3-1 and 3-2). The fact that the data will generally be clustered in clear groups makes classification straightforward: drafting qualitative descriptors for the levels and associating them with fuzzy membership degrees. Associations of adjectives with fuzzy values (cf. Ragin, 2008 for a comprehensive discussion), and in broad base of literature on fuzzy logic verbal descriptors in general (cf. e.g. Kosko 1993) can be used to assist in the process. External standards and understandings such as past case studies, managerial accounting, and industry norms and benchmarks are valuable sources for qualitative anchoring.

The second priority for qualitative anchoring should be in substantive expert and managerial knowledge about the specific marketing context. If none of these are available, the only option might be to calibrate the data based on the distribution pattern itself, setting the bounds for full membership and full nonmembership at levels that include possible tight clusters of data in the high and low ends of the scale, and setting the crossover point at, ideally, a gap in the data corresponding to the median or qualitative middle. The points in between can then be assigned values manually, or by linear interpolation. The researcher should avoid creating a category (sorting bin) that corresponds to a 0.5 membership score, as these risk falling out in logical analysis as reminders, not being closest to any corner of the vector space. Transparency and replicability is, again, the key for valid and reliable calibration.

Continuous data. Data of the continuous type vary without clustering tightly around apparent points. The distribution may be curvilinear, with several peaks, or even linear, but the typical distribution is approaches a left-truncated normal distribution. By their nature, continuously varying conditions are usually stochastic. Even if they are the results of a clear

managerial decision-making process, the values are usually affected by a partly unknown variety of actors, contingencies, and other effects.

Typical examples of continuous variation among the higher level causal conditions include advertising expenditure and other resource use in the internal loci, lower level conditions of the economic system and industry in the external environment and, among the outcome conditions, quantitative intermediate and final outcome metrics such as attention, sales, and brand perceptions. It is extremely rare that purely qualitative data can be framed as being continuously varying.

The meet the calibration goal of emphasizing relevant variation and de-emphasizing irrelevant variation, Ragin (2008) presents a detailed and justified general scheme for calibrating continuous values by setting a log odds based upper and lower bound for full membership and nonmembership, and calibrating the values between these anchors using a logarithmic transformation. The purpose of the logarithmic transformation is to scale the part of the distribution that is considered relevant to an area that allows better distinctions to be made from among the data. This process was described in Section 3.3.4.

We are also taken back to thinking about probability: if the values of an outcome are distributed around a mean, we want to create a resulting fuzzy membership score distribution that is as normal as possible, i.e. that given a midpoint of e.g. "typical performance," values taper off similarly and normally to both extremes: the worst known level of performance and the best known level of performance. If the observed data the distribution is skewed due to e.g. outliers (in the higher end, usually), then these should not unduly impact the calibration of values occurring at typical levels. We want to include outliers in the model as significant observations, but not give them disproportional impact. For instance, difference between bad and average performance should correspond to difference between average and very good.

The distribution of the data on a continuous-valued condition can be examined using mathematical and visual tools to discover the extent to which it follows a normal distribution. Ideally, the researcher should inspect the data distribution first using visual tools such as histograms. A quartile-to-quartile plot will give a rapid visual indicator of the extent that the distribution conforms to a normal distribution. There are several mathematical tests of normalcy. The empirical distribution function test recommended above others by Stephens (1986) is the Anderson-Darling test (Anderson and Darling, 1952; Scholtz and Stephens, 1987), results of

which may be compared before and after transformation. [9] The logarithmic transform recommended by Ragin works to this effect, discounting purposeful truncation for inclusion in the full membership and nonmembership categories.

Additionally, the Box-Cox transformation procedure allows us to increase the degree of normality by correcting skew (Box and Cox, 1964; Venebles and Ripley, 2002) that is often encountered in continuously varying measures. Ragin sees correcting skew as a way to increase the robustness of the model (Ragin, 2008, p. 77). This approach may be an alternative or complementary calibration method for continuous data, which may be especially appropriate for situations where a normal distribution appears in a truncated and skewed form. In my empirical experience, the Box-Cox transformation has overall better results in normalizing data in many empirical instances than log transformations, as judged by better overall fits to a normal distribution in quartile-to-quartile plots.

Whichever method is selected to calibrate the data, the result is a continuous fuzzy membership score distribution, with qualitative anchors fixed at the qualitative minimum, maximum, and middle, taking advantage of the best substantive and theoretical knowledge available.

At the completion of the third stage of CEMO, the process yields a fully calibrated fuzzy system for logical analysis in the next stage of the process. Later, when the nature of the causal interactions (or problems in deducing them) become apparent, it is pertinent to revisit the calibration stage to review procedures and reasoning in light of experiences in developing contextual theory of causal mechanisms. Experimenting with different approaches to data calibration is in the spirit of the method, and is an integral part of the iterative process of theory building.

4.2.5 Step 4: Logical analysis

In the fourth stage of the CEMO process, the calibrated fuzzy system is manipulated algorithmically to produce causal propositions as configurations of conditions explaining behavior shared by cases.

Once all data have been transformed to fuzzy membership scores, the analysis proceeds to collation of the data into truth tables for analysis with

[9] A test statistic produced by the Anderson-Darling test relates the likelihood of the null hypothesis (that the data is normally distributed) being false. A generally accepted standard of p=0.05 in a typical situation where both the mean and the variance of the sample are unknown sets the minimum accepted test value at 0.787 for the data to be considered normally distributed (Stephen, 1974). Essentially, the smaller the test statistic, the less close the data is to a normal distribution.

the one of the FS/QCA software packages available (Ragin, Drass, and Davey, 2006; Dusa 2007c; Dusa, 2010; Huang, 2010). Next, the frequency threshold must be set in order to retain those causal combinations for which there are an adequate number of empirical observations, and discard others as logical remainders. In small-N and intermediate-N contexts, the limited number of cases will typically mean setting the frequency threshold to 1. However, if there is a large volume of cases available, or if a single instance cannot be relied on to be an accurate observation, a higher threshold may be selected.

Setting a consistency threshold follows: because we are dealing with fuzzy truth values, set-theoretic combinations of causal conditions vary in the degree to which they are consistent as combinations for producing the outcome. Ragin (2008) recommends that the consistency threshold be set to at least 0.8, and to a position in the ranking of configurations by consistency, where a natural gap can be identified. This will further cut the number of cases included in configurations. Consequently, these are passed on to the Quine-McCluskey algorithm (Quine, 1952; Quine, 1955; McCluskey, 1956) included in the software packages to carry out logical minimization of the truth table. Depending on the software implementation and the nature of the data, the process is capable of delivering up to three different solutions of varying degrees of parsimony and complexity.

At this stage of the analysis, the consideration of causality splits into separate consideration of the configurations explaining a low level (absence) of the outcome, and those explaining a high level of the outcome. For example, the mechanisms that bring about high customer satisfaction (e.g. matching different expectations) may be formatively very different from those that bring about low customer satisfaction (e.g. different types of service failures). Symmetry can never be assumed under the configurational approach to causality. Each analysis must be carried out separately, but the interpretation of the two perspectives must be carried out together, in order to gain the most from juxtaposition.

The software usually includes an option for outputting the identifiers of the specific cases in conjunction with the causal configuration that explains them. Unless dealing with very high numbers of cases, this is usually a good option to select, as this way the original cases can immediately be referred back to. It is a requisite for interpreting and understanding the qualitative narratives developed, in the next stage, from the result causal configurations.

The cases that are included in the causal combinations for producing a positive or negative outcome form the respective final case populations. In a significant and fundamental epistemological point of difference with

regard to most variable-oriented quantitative methods, the model does not explain causal behavior of cases that are left out as reminders. In variable-oriented approaches, the population is fixed in advance, and models are constructed to explain variation for all sampled observations. Consequently, the validity of the model cannot be improved by discarding outliers and observations that do not fit the model. However, in QCA, the empirical population for which the causal mechanisms are an explanation is defined only by the membership that cases have in the causal configurations, not by their membership in the set of positive or negative outcomes.

Successful logical minimization using the appropriate software produces a series of *logical expressions* that describe the causal patterns among the data. The expressions link conditions of the property space with the logical 'AND' and 'OR' operators, which are both associative and distributive. Conditions that occur together in a mechanism are connected with the AND operator ('•' in typical QCA notation), and conditions or combinations of conditions that are alternate paths are connected with the OR operator ('+' in typical QCA notation). For example, in the logical expression

$$A \bullet B + B \bullet C \bullet D + A \bullet C \rightarrow O,$$

'A • B' represents a pattern where conditions A and C co-occur, and a sufficient path to the outcome O. Linked with the AND operator, the two other combinations, 'B • C • D' and 'A • C' likewise represent sufficient paths to O. (In this example, no condition or configurations of conditions is necessary for the outcome to be brought about.) These logical expressions are directly refactorable and manipulable with Boolean rules. The previous example can equivalently be written as, for example,

$$B (A + C \bullet D) + A \bullet C \rightarrow O.$$

The iterative looping back to fuzzy set calibration (stage 3) is especially pronounced after logical expressions that link conditions have been formed. It is appropriate to return to previous stages to readjust thresholds (especially consistency) and resolve possible errors in fuzzy system construction. Such corrections may have to do with selecting conditions for the truth table, as well as considering possible errors in or fresh perspectives to calibration. After necessary iterations and adjustments, the output of the fourth stage of CEMO is a series of logical expressions of fuzzy subset relationships representing observed causal configurations among the data. Together, they summarize which configurations are observed to be sufficient to bring about the outcome, and which, if any, are necessary for it. The interpretation of these follows.

4.2.6 Step 5: Causal explanation

The final stage of the core CEMO process is hermeneutical, and concerned as such with producing new theory for describing causality in the focal marketing context. The configurations of necessary and sufficient conditions from the previous stage serve as the starting point.

From the perspective of demonstrating causality, the question of interest is to discover which conditions or combinations of conditions are necessary for a given outcome, and which on their own are sufficient to bring it about. The multiple conjectural view of causation adopted in CEMO implies that any path to a given outcome comprises one or more sufficient conditions. If a condition is always present in any path to a given outcome, it is deemed necessary. Both sufficient and necessary conditions can (and in the real world usually do), however, manifest as combinations, or set-theoretic intersections of conditions.

In most instances where CEMO is applied, the iterations over step 4 in carrying out the logical analysis with slightly altered parameters will serve to reinforce conclusions about what the core configurations bringing about the outcome are. Despite some differences in, for example, the inclusion of collinear alternatives to conditions, there are usually obvious structural correspondences between the versions.

The next step is to develop narratives linking the configurations to existing substantive and theoretical knowledge, and proceed with incorporating the new analytical evidence into understanding the nature of causality within the marketing context. Depending on the aims, scope, possibilities, and resources of the investigation, the causal narrative may help to support existing managerial cognitions or propose new, empirically qualified questions about the focal phenomena. These can be used to formulate further investigations either using CEMO or using other tools, such as theory-testing multivariate methods. Ideally, better explanations of causality can form a better justified basis for marketing metrics, if such conditions and configurations of conditions can be deduced that help explain complex causality behind marketing outcomes. Naturally, the refinement of the findings into an operative metric system and dynamic component of a marketing performance assessment system requires further work and verification.

Impact of outcome configurations. An extension to the core configurational analysis process of FS/QCA links the cases explained by the configurations back to the original data, allowing quantitative performance outcome indicators to be linked with the absolute values, e.g. in currency or

volume units, that are associated with them. In the same manner, resource use associated with the configurations can be juxtaposed with the outcome information, giving a more complete indication of the cumulative, both relative and absolute incremental/economic impacts of the configurations.

The need for a linkage such as this evidenced itself strongly in the course of CEMO development. Managers 'bought' the idea, but wanted it taken a step further. FS/QCA rests on the notion that single cases providing causal evidence are, in theory, equally strong evidence for relationships as are multiple instances of the same mechanism. This does not, however, preclude the fact that in observing empirical evidence, the absolute economic impact of some configurations is clearly stronger than others. Outliers can be interesting and valid data, especially if their individual impact is substantial. This agrees with the general understanding that the conditions causing exceptional performance can be wildly different from those causing moderately good performance. It is the cumulative economic impact of all the instances of a causal configuration, regardless of their number, that determines their interest for managers.

Assessing the impact of causal configurations can also serve as a highly practical criterion for setting the consistency criterion at an appropriate level. If, for example, the less consistent configurations also diverge from the most consistent ones (to fall below average performance or zero return) they may be discarded.

Reaching closure. To complete the analysis, focus in CEMO shifts from discussing empirical propositions and evidence of causality to contributions to a theoretical understanding of causal configurations in the research context. These are used as the basis for discovering implications that have managerial relevance for operative choices and further research and development.

Developing qualitative narratives to arrive at implications can be seen to proceed on five accounts:

- Building narratives to serve as causal explanations for each individual configuration forming a path to the outcome, in both its positive (presence) and negative (absence) manifestation. The narratives should strive for parsimony and relate the evidence not only to each other, but also to existing theoretical knowledge of the context through comparison and contrast. Consulting with business experts should be encouraged. The cases conforming to a single path to the outcome constitutes a population and can be viewed as being of the same *kind* of case.
- The second level of narration brings together the narrative for entire context to summarize the whole of the causal mechanisms discovered by

observing multiple configurations. Alternative analytical solutions (groups of configurations), if they exist, should be contrasted to assess common logic. The final population of the CEMO process becomes fixed at this point: it is the entire set of cases explained by all the configurations for the positive and negative outcomes put together.

- Thirdly, the attention turns to what new information the configuration level and context level narratives offer about causality. What affirms managerial cognitions about causality, what corresponds to established theory? What is in contrast or hitherto unexplained? A listing of findings on a theoretical and practice-oriented level summarizes the results of the CEMO process.

- As CEMO is, for the most part, theory-building research, its results will often only be a first step towards more comprehensive and tested answers. The causal findings will and should provoke new, more specific research questions about the nature, scope, scale, statistical nature and permanence of the observed causal linkages. These questions serve as the input to new iterations of the CEMO process, with better information for conditions selection and data collection. Potentially, they will influence the marketing control function to shape metrics and data collection to be better aligned with relevant conditions, and steer marketing performance assessment focus towards relevant but previously untracked conditions. The configurational findings provide direct input for theory testing, e.g. with the analytical separation of different kinds of cases for separate approaches conventional statistical methods and modeling.

- Finally, there may be direct managerial implications to be drawn from the results of a CEMO analysis. Depending on the context, it may be pertinent to immediately reassess the role of some configurations of marketing activities in the marketing mix. In most cases, limited empirical diversity will also feature as an issue of interest. Often, simple variation in the conditions related to a company's marketing actions will have the potential to expand empirical diversity among case data significantly. Better diversity will serve to improve the depth of CEMO results over subsequent iterations for a resource cost that is often negligible. The benefits to be gained from experimentation in marketing, of course, are nothing new.

4.3 Evaluating solution goodness

The value of a CEMO solution as a part of MMSS lies ultimately in its ability to drive performance. Analytically, the goodness of the solution must be assessed against external validity and internal reliability. In addition to examining the validity of the analytical method itself as a tool for producing

empirical explanations (Chapter 3), the key criteria for an individual CEMO application are its transparency and replicability.

Schneider and Wagemann (2007) examine QCA analysis goodness aiming "to emphasize the argument that QCA is not just another (computer-based) data analysis technique" (p. 16). They posit that stressing the role of QCA as an "approach in the broad sense" involves three notions:

- Focus must be on (qualitative) case characteristics before arriving at the 'analytic moment'.
- The plausibility of the results must be examined by linking configurations back to the original cases.
- Data analysis may have to be repeated with modified set of conditions or cases.

Six categories of specific criteria are discussed by Schneider and Wagemann (2007). These criteria are, for the most part, directly applicable to evaluating CEMO solution goodness and are discussed in detail for each of the two empirical studies. I draw on these criteria in evaluating the goodness of the empirical studies in Chapters 5 and 6:

- *Criteria concerning the purpose of QCA* — The QCA technique should be used for its original aims, as discussed by Ragin and Rihoux (2004, p. 6), including data description, hypothesis testing, and causal hypothesis development. Schneider and Wagemann (2007) also posit that QCA should not be used as the only technique, and methodological triangulation strongly encouraged to complement knowledge generation.
- *Criteria concerning the research strategy* — QCA should never be used mechanistically or superficially, without 'dialogue between (theoretical) ideas and (empirical) evidence', as this severely undermines the epistemological rationale of QCA as an iterative strategy (cf. systematic combining; Dubois and Gadde, 2002). Consistent effort should be expended before, during, and after the analysis to maximize qualitative familiarity with the cases on an individual case level or case type level.
- *Criteria concerning the representation of QCA* — The raw data matrix, truth table, solution formulae, and consistency/coverage statistics should always be reported (or actively made available) to ensure replicability and transparency. The results of QCA analyses should be presented in as many forms (e.g. graphical representations) as is needed for effective communication. Case-oriented QCA terminology should be consistently used throughout reporting to diminish "the risk of confusing the underlying logic of QCA with the one of other data analysis techniques, such as regression analyses, that might look similar on the surface, but which are based on different mathematical procedures and epistemologies" (Schneider and Wagemann, 2007, p. 20). Terminology to

be actively avoided includes expressions such as 'dependent variable' to visibly and consistently maintain the important distinction between variable-oriented approaches and case-oriented approaches.

- *Criteria for the selection of cases, conditions, set memberships, and truth table algorithm criteria* — The justifications for the inclusion and exclusion of cases should always be explicated. The choice and definition of outcome and conditions should be based on adequate theoretical and empirical prior knowledge. The number of conditions should be kept moderate to restrict the need for logical remainders (logically possible combinations of conditions without matching empirical cases), and to ease interpretation. Calibration of fuzzy set membership scores should be completely transparent.

- *Criteria for the 'analytic moment'* — The minimization of the truth table should not be done manually, but using software. The necessity and sufficiency of conditions should be examined separately, and both with and without the use of logical remainder rows. Schneider and Wagemann (2007) suggest reporting both the parsimonious and complex solutions. The need for transparency in treating logical remainders and inconsistent truth table rows is highlighted, as is the need for separate analyses for positive and negative outcomes.

- *Criteria for the interpretation of analytic results* — The interpretation of QCA results is cautioned against focusing on single condition terms in solutions, disregarding consistency and coverage statistics, and finally, against accepting a causal link to exist based on the solution formulas alone. The relative importance of causal mechanisms and interpretations needs explicit justification and, as in all instances, linking back to the original cases.

These six notions are examined in detail to evaluate the reliability and validity of QCA analyses in the empirical studies. Schneider and Wagemann's (2007) criteria have found acceptance in the QCA community, being referenced by scholars on the 'Compasss' mailing list as advice to practicing researchers. The authors, however, finally reflect to caution against the normative application of their criteria, finding that the "mindless application of 'standards of good practice' eliminates their positive contributions to an improved transparency and comparability of studies" (p. 30). Naturally, critical reflection on the epistemology of methods extends far beyond QCA.

4.4 Towards practical application

Given appropriate data and a conducive context of analysis, the CEMO analysis process I have presented in this chapter delivers explanations for the presence or absence of an outcome of interest in the form of a multiple configurations of internal and external outcome conditions. To conclude the chapter, I review the analytical aspects of the approach with respect to how the provide new knowledge about marketing contexts, and what the significance of these aspects is with regard to marketing management support systems.

The value and novelty of my approach derives from the particular analytical aspects of FS/QCA and CEMO that make it possible to access a new type of knowledge about marketing mechanisms operating in specific marketing contexts. As a summary of discussion in this chapter and the preceding one, my comparative approach differs from familiar modeling methods such as partial least squares (Reinartz, Krafft, and Hoyer, 2004; Henseler, Ringle, and Sinkovics, 2009), multivariate regression (Sheth, 1971), and VARX (Dekimpe and Hanssens, 2000) in several managerially relevant respects:

1. With QCA, analytical scope can be extended to **small-N populations**, without correspondingly severe restrictions on the dimensionality of the property space as there are for the number of independent variables in statistical models, such as produce sufficiently significant results or are possible at all.

   Managerial relevance: Systematic comparison and pattern discovery in very small populations may be possible manually, but when the number of marketing campaigns, customer relationships, operating markets, or other intercomparable artifacts grows, it turns impossible. Meaningful statistical analysis would typically require still greater numbers. The situation is confounded by equally typical inattention to qualitative metrics or challenges in their interpretation and inclusion as variables. Systematic, transparent and valid analytical solutions are presently lacking, and would likely find diverse applications in marketing performance assessment, alone and in combination with other methods, in a broad range of marketing contexts.

2. Qualitative reflection is demanded throughout the analysis process. All inputs must be calibrated into qualitatively justified measures; natural language can provide a direct membership degree calibration method for qualitative data. Frequency, cutoff, and threshold criteria need to be qualitatively meaningful. The solution generation process needs expert input on some analytical choices to arrive at logical expressions that are directly verbalizable as qualitative statements about configurational

causation. Rigor arises from transparency and replicability; relevance from context-specificity.

Managerial relevance: The use of practical knowledge, insights, and organizational learning in informing the analysis process increases analytical power over a numbers-only exercise. This allows existing understanding to be used to emphasize managerially significant variation in conditions and outcomes, and dampen less relevant features. The narratives generated with CEMO make immediate sense to an audience familiar with the business context and its conditions. The information is immediately actionable as logically valid parsimonious summaries of empirical data, giving managers the opportunity to refine marketing strategies and tactics according to configurational observations.

3. **Complex interactions** comprise our reality. With QCA, the number, degree, and nature of interactions and dependent conditions/variables that can be modeled significantly exceed those of conventional statistical tools. Instead of economizing on what natural complexity can be included, the compromise in QCA is on quantitative exactness: the process produces answers with real-world meaning, 'vaguely right' rather than 'precisely wrong', all the more when dealing with small-N populations.

   Managerial relevance: Marketing and media organizations are awash with assumptions about configurational interactions, some valid and reasoned over time, some only convention and ingrained practice, and rarely specific to a context. The value of such knowledge is uncertain. CEMO provides a systematic process for generating more objective, empirically grounded knowledge about interactions, without having to make any limiting assumptions about the nature of the said interactions or the behavior of variables/conditions. Asking 'what?' and 'how?' needs to precede numerical estimation. Building a regression model can often be technically feasible even with wildly mistaken preassumptions about the interactions between component parts (Jarvis, Burke, Mackenzie, and Podsakoff, 2003). With QCA, the interactions emerge from the data, unencumbered by limiting assumptions. This configurational theory building is a distinct and valuable complement to conventional multivariate approaches.

4. **Causal heterogeneity** is assumed, in contrast to implying uniformity and unit homogeneity of causation among the population. A single explanation is possible, but not expected or required. Multiple paths to the same outcome can be very different in composition, and small configurational changes among the conditions can have a profound impact on outcome. A consequential, self-imposed limitation of QCA is that the outcomes of empirically unobserved combinations of conditions cannot be estimated. This is in contrast to most known numerical modeling methods, where outcome estimates are technically possible (and routinely given) for

diverse, empirically impossible combinations or levels of input conditions – a common characteristic of logit models (e.g. Louvière and Timmermans, 1990).

Managerial relevance: In most real-world instances it should be instinctively obvious that there will always be a range of known and unknown mechanisms influencing causation in a given social context. Comprehensive, mathematically tidy formulae can often be constructed to model average behavior in larger samples. The same process, however, averages out heterogeneity, possibly hiding evidence of contrasting mechanisms altogether, and yielding results that are of average value at best. More specific knowledge is a source of competitive advantage for designing and implementing marketing actions.

Furthermore, it may be possible to overcome the limitation of unobserved outcome estimation ability in several ways. On a practical managerial level, the conditions are often known well enough in practice for experts to be able to estimate the substitutability of conditions for each other. This can greatly expand the possible scope of diversity. Actor-based models (Wilkinson and Young, 2005) and other simulations can also be used to generate data for configurational analysis of complex interactions in situations where direct data collection is impractical, infeasible, or prohibitively expensive.

5. In practice, assuming or implying unit homogeneity also implies that causal symmetry is assumed. In QCA, **causal asymmetry** is assumed: the explanations for negative and positive outcomes can comprise unrelated mechanisms and conditions. Relationships between conditions and outcome levels can be modeled, even if they are highly nonlinear and discontinuous. This is in contrast to the majority of typical statistical modeling tools.

   Managerial relevance: In practice, it is obvious that the reasons causing low sales, for example, are not necessarily the reverse of those causing high sales. Similarly, the explanations for extremely high sales can be wildly different from those that result in moderately high outcome levels. This is another manifestation of causal heterogeneity, and as such, a complement to existing modeling methods.

6. **Linear-additivity** of both model and variable behavior is a typical assumption and feature of statistical modeling methods. Its implications are closely aligned with those of causal symmetry. To construct uniform continuous solutions to explain contexts/reality assumed to be unit homogenous, log-form or directly additive solutions of factors and coefficients are the typical mathematical structures (Malhotra, 1984).

   The scalar variation of different variables is also assumed to behave linearly, with the significance of absolute changes in value being the same

wherever along the range the change occurs. QCA presents an opportunity to model behavior with little regard for the degree of nonlinearity or discontinuity of conditions vis-à-vis outcomes. Conditions can combine in any way. Both outcomes and conditions are calibrated to reflect the qualitative meaning of observed variation, allowing researchers to incorporate significant nonlinear variation on the level of individual conditions.

Managerial relevance: The opportunity to craft comprehensible and verbally interpretable models without linear-additive structures grants access to knowledge that might otherwise be obstructed. For managers, a more realistic model of past performance means better justifications for future marketing actions. If the mechanisms are nonlinear, an averaging equation may not be an optimal representation. On the level of individual conditions and outcomes, the ability to incorporate variation occurring on different levels according to its fiscal or operative significance is a distinct qualitative advantage.

7. In striking contrast to statistical norms, **populations in QCA are flexible** and manipulable constructs. Their composition is defined by the configurational solutions, which apply only to those cases that fit one or more of the explanations. If a case is not a member in any causal configurations, it cannot be a part of the final population, and no statement can be made regarding the causal mechanisms acting there to bring out the outcome in question.

   Managerial relevance: This odd feature of QCA requires care in presenting and explaining analysis solutions to audiences unfamiliar with the methodology. The results are often not applicable to the entire sample of data available. However, this explicit 'analytical honesty' should be regarded as a merit, not only in making it clear what is explained and for which observations, and which observations still require additional work to arrive at an explanation.

8. The assumed impermanent and **transient nature of causality** grounds analysis in scientific realism. Observed patterns may be found to extend into the future, but this is explicitly not the assumption. Continuous or regular iterations of analysis need to actively seek new evidence, on both the extent and nature of the property space, as well as changing behavior and qualitative significance of individual conditions. Encouraging new diversity with active disruption of the marketing context with new configurations is analytically desirable. Systematic observation of conditions and outcomes provides the evidence for observing changes in causal mechanisms.

   Managerial relevance: Although CEMO cannot directly provide probabilistic answers about future marketing outcomes, it is not an altogether ludicrous assumption that the discovered interactions and

configurations would be ones that future cases may also fit into. A manager might argue of transience, that causation is locally stable, even if on a larger scale the changes in contextual configurationality might be substantial over time. The QCA assumption of the impermanence of causality is certainly realistic, but does not mean the new knowledge is worthless as decision support – far from it. Furthermore, the rapid adaptability of CEMO to new conditions and qualitative changes gives it a distinct practical advantage over models that are mathematically laborious to re-specify for new contexts. Changes in the nature of interactions can be described as they happen.

9. QCA's theory-building power makes it ideally suited for drawing conclusions about behavior in **limited analytical contexts**, where the significant causal mechanisms may be very specific. This is in contrast to modeling methods, which either build on a general abstraction (function) of how specific variables combine to produce an outcome, or require a hypothesis of which variables should be included and what their causal connections are.

   Managerial relevance: Few claim the determinants of marketing performance to be universal, beyond the most abstract economic principles. Competitive advantage in a marketing context derives from the understanding and use of highly specific knowledge that competitors are unable to replicate. The ability to generate highly contextual, immediately relevant contextual information serves this purpose directly. Theory built in this way can be subjected to further tests with other statistical methods.

10. QCA provides a **holistic approach** to differentiating between observations (cases) that are explained with different causal mechanisms. This distinguishes it from conventional clustering methods (Cooper and Glaesser, 2011), which are strictly categorical in classifying observations and rely on often/largely arbitrary numerical criteria to set the number of categories. In QCA, categories representing different types of causal mechanisms emerge from the data as logical patterns, by qualitative instead of quantitative criteria, and with direct narrative interpretations. In contrast to variable-oriented statistical methods, the holistic approach most importantly means that individual cases (observations) are identifiable throughout the process, and not broken into distributions of values for variables. Qualitatively interesting findings can directly be illustrated with the empirical observations that comprise the configuration of interest.

    Managerial relevance: Since the component cases of configurational explanations are accessible, managers can immediately drill down to the original empirical observations. A configuration that attracts attention due to a previously unrecognized configuration of causal conditions or other

> reason can be taken under closer scrutiny. The causes are not numerical abstractions, but attributes of real observations.

Better statistical models can likely be built after an adequately large population is divided into configurationally similar subpopulations, and modeling tools applied there to gain improved estimates, making the not unreasonable assumption that a causally uniform population will lend itself better to linear modeling and statistical estimation/outcome prediction than a causally heterogeneous one.

4.4.1 Empirical studies

Finding empirical contexts where the methodology can be shown to deliver results demonstrating the ontological assumptions of QCA has been fundamental for the development of the CEMO process. While it is not conceivable that a methodological loan can immediately be formulated to fit the very wide range of marketing problem settings, FS/QCA shows great promise for studying complex causation. A key issue is the availability of data, on two levels. First, I have been faced with finding companies that are willing to divulge confidential business information and expend the required time and effort for data collection and interviews. Secondly, the data and case setting must be rich enough to allow an analysis to (successfully) be carried out according to the specifications set in pioneering work by Ragin and others. I have chosen empirical studies from two companies where it has been possible to meet these criteria.

In Chapters 5 and 6, I present two applications of the CEMO process to practical marketing contexts. The role of these studies is to demonstrate how one can successfully apply the research process I have described to deduce contextual theoretical knowledge about marketing phenomena. Empirical case data collected from two different business contexts – an airline and a dairy company – allow me to highlight some of the distinguishing features of FS/QCA elaborated above.

CEMO can potentially be a significant contributor to building knowledge about the specific mechanisms of marketing performance in a broad variety of contexts. Applying the method in different contexts will increase practical understanding of not only the contexts themselves, but also how to best learn from employing the approach. No doubt, the learning curve for CEMO application will become less steep. As the requirements and deliverables of the process become clearer for both the researcher and the representatives of the focal organization, data collection will become more effective and efficient.

5 Empirical Study 1: Blue1 Weekend Boosts

The first empirical study that I present as a demonstration of the CEMO analysis process considers a series of e-mail promotions, carried out by an airline to boost revenue on specific routes over 14 months. The objective is to discover what configurations of properties of these offers can explain high and low revenue outcomes.

In this chapter, I first provide a general description of the case company and its operating environment to relate the broader business context. I also comment on how the empirical research process and field work proceeded in practice. Then, the CEMO analysis is covered as it was carried out in its final form, following the five-stage process put forth in Chapter 4, from defining the research context to crafting configuration impact assessments, managerial implications and final conclusions. The chapter concludes with a discussion relating the empirical demonstration back to methodological development and reflection on the suitability, relevance, reliability, and validity of CEMO as a tool for knowledge discovery in marketing performance assessment.

5.1 Blue1 business case background[1]

Blue1 is a Finnish airline that is a fully owned subsidiary of Scandinavian Airlines (SAS). Established in 1998 to compete on European feeder routes integrated with SAS and Star Alliance, as well as domestic services, Blue1 has grown to a turnover of 186 MEUR in 2010 (Kauppalehti, 2011). Blue1 currently operates a fleet of 9 aircraft, serves 29 destinations with 68 daily

[1] Except where otherwise referenced, this background description is based on interviews with Blue1 managers at the onset and at points along the data collection and analysis process.

flights and 1.6 M annual passengers, making it the second-largest in the Finnish market, after the incumbent national airline Finnair.[2]

Revenue management is the core process of Blue1's operations, involving the allocation of resources (aircraft and personnel) to most efficiently drive the daily operations of filling flights with as high revenue as is possible. Blue1 shares information systems and the technical revenue management span with SAS and the Star Alliance. This means that revenue is optimized for the entire network of routes and destinations for which flights are sold, and not only the segments operated by Blue1 itself. Building an itinerary with multiple Star Alliance flights is made more affordable than selecting single flights, in order to maximize revenue for the entire system.

The same revenue management principle is also behind efforts to ensure that capacity does not go to waste. In situations where Blue1 identifies a need to improve capacity use over a certain time period – typically, either to launch a new route or improve the fill ratios of a route that is not performing on the level that it has been assigned transport capacity – e-mail promotions knows as Weekend Boosts are used to promote specific routes to an audience of approximately 250,000 opt-in recipients.

The Weekend Boost promotions are sent out on Fridays, with the routes on offer being available for purchase online on Saturday and Sunday. Some exceptions to this general scheme have been made to fit the offers with other ongoing promotions, three-day weekends, and other irregular circumstances. On some weeks, the promoted flights have been available for purchase immediately on the same day as the offer is sent, and in some cases the sale period for the promotion has differed from the usual in some other manner, such as duration to Monday.

The Weekend Boosts are planned on an approximate level about 12 months in advance, as a part of overall route and capacity planning, as well as attention to consumers' main holiday travel planning periods. In addition to pre-planned demand management roles, they can be adapted flexibly to respond to emerging promotion needs. The revenue management system includes a control function that alerts staff in situations where confirmed bookings are not meeting plans and expectations. Weekend Boosts are a cost-effective promotional tool for responding to these trends, as the cost of sending email is negligible. Despite their flexibility and efficiency, Weekend Boosts are not a major incremental contributor to the overall bottom line, representing only 2-3 percent of sales. Their value, however, extends beyond the direct sales effect, as they are effective tools for informing a receptive opt-in audience about the airline's destination

[2] Source: http://www.blue1.com/fi/fi/Blue1/yrityksesta/, referenced 11 February, 2012.

offering, promoting travel in general, and affirming the positioning the brand.

The Weekend Boosts typically feature a price discount from regular price. The regular price of a ticket, however, is not a trivial concept in itself. Tickets for each route are normally sold from several quotas of different booking classes of tickets. Differently priced booking classes carry different terms with respect to, for example rights to change, transfer, or cancel the booking. A Weekend Boost promotion involves setting a promotional price on the least flexible booking class or classes, and may involve adjusting the booking class quotas. Tickets from the more flexible booking classes are intended for business travelers, whose booking behavior is characterized by late decision-making in the days immediately before travel. Weekend Boosts targeted at the consumer market do not therefore threaten business travel revenue; business travelers pay a premium price for booking their flights with a flexible booking class, or wait until only days before departure to buy.

The price promotion pushed in a Weekend Boost is not exclusively available to Weekend Boost email subscribers or to a specific online sales channel. The tickets are made available for anyone purchasing through any channel, as not to discriminate against travel agencies and other partners. Thus, there is no identifying consumer-level information that can be linked to purchases prompted by the Weekend Boost emails. From a practical perspective, this is unfortunate as it bars linking promotion performance back to customers, many of whom the airline has detailed personal and purchase behavior data on in their frequent flyer database. This exemplifies a broader difficulty in the industry, seen by managers as being burdened by legacy information systems in addition to being constrained by numerous International Air Transport Industry (IATA) regulations that must be taken into account in system design and fare structuring.

The revenue management function at Blue1 determines all differentiating criteria for the Weekend Boosts, including

- Destinations to be promoted,
- Promotional prices and respective ticket quotas,
- The time window during which the offer is valid,
- Days that the promotional prices are a valid offer, and
- The day that the email will be sent out on.

After these are set, the marketing communications function is tasked with drafting the email copy to frame the offer as e.g. a holiday shopping trip suggestion and commission any visual elements. The handover is singular,

in that marketing as a function at Blue1 has historically had little or no impact on the Weekend Boost planning process; and the revenue management function, conversely, no influence on the communications aspect of the promotion beyond the handover point. The communication aspects can be seen to constitute the positioning stage of the marketing process, which can be included among analysis conditions in the action locus.

5.2 Research process iterations

Two complete iterations of the CEMO process were carried out. Over the first iteration, the project was initiated with background interviews of the SVP, the head of the revenue management team, and the marketing manager. I was provided with quantitative data on all x Weekend Boosts undertaken during 2009, including route-specific projected and realized booking figures. I also received copies of the promotion emails themselves, and message tracking information from the email sending system.

The first empirical data on the business context and the cases were collected from an initial interview with the senior vice president of marketing. I explained the basic rationale behind the analysis framework, and we discussed issues that might benefit from a better understanding of causality n their business. Due to the developmental nature of the method, we agreed to begin our collaboration by looking at how CEMO could be implemented on the Weekend Boost offers, as these were a setting where some degree of data was immediately available, and where the property space – approached from a managerial perspective in terms of 'a known set of moving parts in the process that we can affect' – was comparatively straightforward.

The initial property space was drafted following the first meetings with operative personnel. With the revenue manager, we went over the revenue management process at Blue1 and the specific role in the process played by the Weekend Boosts. The meeting was followed up on with a package of material comprising all the numerical data available on the Weekend Boosts from the revenue management perspective, i.e. route details, reference and target seat sales and revenue, and outcomes as sold seats and in euros. After the interview with revenue manager, the communications implementation process of the Weekend Boost emails was charted with the responsible marketing operative. She supplied me with data on email response rates drawn from an automated tracking system, as well as more details of when the routes on offer were available for sale, and what dates were eligible for the offer price.

The first round of CEMO analysis was completed using these data calibrated in a rudimentary fashion. The results of the analysis were presented first to my main informant, the head of the revenue management team on and then to a broader internal audience consisting of members of the revenue management and marketing teams. The results received an encouraging reception and provoked immediate discussion on practical implications.

The positive feedback provoked a second iteration of CEMO to incorporate new data from 2010, and on my behalf, greater ambitions with respect to developing fuzzy set membership score calibration into a more systematic and substantively grounded process. Using the same property space template, data from 2010, with some missing values with respect to the conditions observed for the 2009 data, were added to the pool. The calibration of all conditions was reassessed and subsequently readjusted in most instances. The composition of the final property space adjusted by adding and removing some conditions to reflect the entirety of the available information and diversity better, and several conditions reformulated to be better proxies of case data. Subsequently, the logical analyses were carried out a second time. The results of the second iteration were found to be superior to the previous ones in transparence and substantive grounding, and yield configurations that had greater managerial relevance and analytical reliability and validity. The research process was concluded at this point.

5.3 Step 1: Research setting

Three aspects of the Weekend Boosts make them appealing for CEMO analysis. Firstly, the population is limited and qualitatively diverse. From a managerial perspective, no metrics individual are immediately apparent that would offer satisfactory correlation to revenue outcomes (see Appendex B for a Pearson product-moment correlations matrix). This can be seen as evidence of causal complexity, which is also a voiced suspicion of the managers involved: the outcomes are regularly surprising. Furthermore, the diversity among the Weekend Boosts includes qualitative, categorical variation, further limiting the possibilities to approach the problem with statistical analysis tools, both in terms of population definition and the encoding of variables.

Secondly, the Weekend Boosts offer an analytically approachable research setting, where there are clearly defined and analytically separable marketing actions for which data has been collected. In contrast to many other empirical marketing and sales situations, the performance outcomes

of the actions are also analytically separable to a greater extent than is typical. Given the restricted time window that the offer is on sale for, their impact can be distinguished with comparative reliability, and based on a demand estimate metric in continuous operative use.[3]

Finally, the managerial will to involve Blue1 was present throughout the process. Critically, the interest of the SVP enabled others to contribute their time towards interviews and data solicitation over the first iteration. Faith on the potential of the approach combined with academic interest was important, as no concrete demonstrations of CEMO were available at the time. Interest in the results of the first CEMO iteration provided the platform to continue data collection and subsequent qualitative reflection with managers regarding my findings.

Research problem and CEMO aims. To meet my objectives of demonstrating applying CEMO on marketing problem settings and identifying causal configurations in the airline revenue management and promotion case context, I put forth the following research questions to be answered in the analysis example:

1. How do differences in comparable promotion actions explain high and low revenue outcomes?
2. What properties of email promotions are relevant as causal conditions?
3. What causal configurations can be distinguished among the properties of the promotions and their outcomes?

The aim of these questions is to provide empirical evidence on configurational complex causality within the Weekend Boost context, to counteract the lack of knowledge on the specific consumer behavior and its interaction with the choices made regarding the promotions. A stated aim of the process was also to provide a test for the method to assess its application potential to other promotion contexts at the case company.

Unit of analysis. The unit of analysis is set to be an individual route promoted with a Weekend Boost email. Another alternative would have been to consider each Weekend Boost, comprising several routes on sale, as the case unit. Separating the routes, however, allows the diverse route level outcomes and qualitative conditions (e.g. destination type) to be accounted

[3] The Weekend Boosts certainly have trailing sales effects for the promoted routes as well, and influence bookings during the same period that do not fall completely or at all in the restricted travel window. These can be estimated to a varying degree, but have been omited form this study with the stated assumption that their effect is proportional to the immediate incremental effects of the promotion. The size of this effect would act as a positive multiplier on revenue.

for better, even though some conditions (e.g. email visits) are not directly tracked on a route level.

5.4 Step 2: Property space

Table 5-1 lays out the initial scope of conditions available for constructing the property space. All data that could research economically be gathered on the cases are included. For each condition, the table includes a brief verbal description of its nature, a typing of the condition based on the discussion in chapter 4. The characterizations of the conditions are based on substantive knowledge and a preliminary assessment of the potential of the condition as an explanatory causal condition. The empirical diversity encountered among the data with respect to that condition is also characterized.

These two assessments serve, in this case, as the practical criteria that shape the trimming of the property space to its final form for the calibration stage, to a size that is limited to a dimensionality approachable with the current software implementations of FS/QCA. Thus, the calibration routines in the next subsection are only detailed for conditions, which are subsequently included in the final property space – in other words, the vectors of fuzzy values that form the truth table in stage 4 of CEMO.

Table-5-1. The initial (maximum dimensionality) property space for data on Blue1 Weekend Boost conditions and outcomes.

Condition	Locus	Explanation	Condition type	Causal potential	Diversity
Week (identifier)	(System)	Calendar week and year	-	-	-
From revenue management staff:					
Destination	Action	Destination airport (city)	Higher level (qualitative and categorical)	High	High
Availability	Internal: organization	How many seats available for sale over designated offer period	Tangible resource	Low	High
Reference seats	Internal: organization	How many seats should be sold based on a (weighted) reference figure calculated from sales during the previous four months	Intellectual asset	Low	High
Objective for seats	Internal: organization	Company-set objective for how many seats should be sold coinciding with the Weekend Boost offer	Intellectual asset	Low	Low (collinear with reference seats)
Result seats	Internal: organization	Outcome number of seats sold coinciding with the route and travel period	Outcome (continuous and incremental)	N/a	High
Reference revenue	Internal: organization	How much revenue should be accrued based on a (weighted) reference figure calculated from sales during the previous four months	Intellectual asset	Low	High

Objective for revenue	Internal: organization	Company-set objective for how many Euros of revenue should accrue on the route/travel period combination as a result of normal sales plus the offer's impact	Intellectual asset	Low	Low (collinear with reference revenue)
Result revenue	Internal: organization	Total revenue attributable to the Weekend Boost offer	Outcome (continuous and incremental)	N/a	High
From promotional email:					
Price point	Action	Offer price in euros	Higher level (categorical and numeric)	High	High
Other promo	Action	Competitions etc. promoted in the same email	Higher level (qualitative)	Moderate	Low
Theme	Action	Message theme, e.g. city getaway, snow holiday	Higher level (qualitative)	Moderate	Moderate
Title	Action	Any promotional content included in the message title header in addition to a generic title	Higher level (qualitative)	Moderate	Low
Destination	Action	The destination was not revealed in the email on all weeks, but left untold, requiring the email recipient to click the link first	Higher level (Boolean)	High	Moderate
From marketing staff:					
Available immediately	Action	Are flights available for purchase immediately, or the day after the email is sent?	Higher level (Boolean)	High	High
Days until	Action	Days until the earliest opportunity to travel on an eligible flight	Higher level (numeric and discrete)	High	High

Travel period	Action	Length of travel period during which flights are eligible for the offer price	Higher level (numeric and discrete)	High	High
Days until end	Action	Days until the end of the travel period	Higher level (numeric and discrete)	High	High
Email visits	Internal: customer	Number of visits to the website based on clicking links in the email	Outcome (continuous, incremental, and intermediate)	High	High
Email revenue	Internal: organization	Euros of revenue directly attributable to buys made by clicking links in the email	Outcome (continuous, incremental, and intermediate)	High	High
Delivered	Internal: customer	Number of emails successfully delivered to recipients	Outcome (continuous, incremental, and intermediate)	High	Low
Opened	Internal: customer	Number of emails opened by recipients	Outcome (continuous, incremental, and intermediate)	High	Low
Forwarded	Internal: customer	Number of emails forwarded to recipients' friends (proxy of interest)	Outcome (continuous, incremental, and intermediate)	High	Moderate
Recipients	Internal: customer	Number of different recipients opening the email	Outcome (continuous, incremental, and intermediate)	High	Moderate
Reactivity	Internal: customer	A hybrid score for consumer reactivity because of the email, from the tracking system	Outcome (continuous, incremental, and intermediate)	High	Moderate

Conditions beyond scope. The property space does not cover conditions where data is research economically inaccessible but which clearly would be theoretically interesting causal conditions. Such condition categories specifically include

Competitors' promotions and performance – Promotions can have complex effects both as overall demand stimulants and as competing suppliers. Market share information is impossible to obtain in practice on a level of analysis attributable to the short promotional window.

Customer buying behavior – Segment or individual level information on the targets of the Weekend Boost promotions or the relation of background descriptors to purchase behavior is not available, but their potential as configurational causal conditions is very substantial.

General travel and destination proclivity – Economic and seasonal conditions impact travel decisions in general and with regard to destination type. Their scale and nature are difficult to assess, and suitable information difficult to acquire from third parties, even national statistical agencies.

Thus, the maximal property space is defined in practice by data available in the organizational and marketing action level loci, representing independent conditions that are subject to immediate managerial decision-making and dependent intermediate outcome and final outcome conditions that are the result of marketing actions. This is in line with the operative reality of the company: these are the conditions for which data is available in practice, and the conditions based on which managers must base their understanding of the context.

Final property space. In this empirical study, the maximum dimensionality of the property space was largely defined by the data immediately available. Consequently, a separate stage of data collection following a property space template is superseded by operations to form some of the composite conditions of the final property space:

- The revenue outcome is calculated as a composite value, the proportion of the result revenue to the estimated reference revenue (i.e. expected regular price sales on the route, which would have occurred without the promotion).
- The destination is characterized by three independent conditions, reflecting whether the destination is a seasonal destination (offering a 'sun' or 'snow' getaway depending on the season), a city destination (as opposed to smaller resort town or similar), and a Nordic destination.

- When one Weekend Boost promotes more than one route, email visits due to that email are shared among the promoted routes, in proportion to the observed revenue gain from each. This ignores interaction effects.

Conditions discarded before calibration, due to their information being better incorporated by selecting other conditions, include:

- Seat availability is a possible impacting factor for the determination of the price set on the offer and the target objectives, but it is not a direct causal condition for the outcome of the marketing action.
- The objective, reference, and result seats – the stated managerial outcome focus is set on revenue.
- The objective revenue value is not used as a condition, but its values guide calibration by giving an indication of where to set the crossover point.
- Email revenue, as it is unavailable for some cases, and its calculation process is not transparent and not entirely correlated with actual reported revenue.
- The numbers of emails delivered, opened, forwarded, and received, as they are all components of the reactivity index.

The final property space covering 12 conditions, formed after these modifications to and trimmings of the initial form, is summarized in **Table 5-2** together with a sample row of uncalibrated case data as an example. Notably, the naming of the conditions contrasts with how variables might be named: for example, the revenue gain associated with a Weekend Boost is now seen as degree of membership in the set of Weekend Boosts with high revenue gain. This scheme ingrains qualitative perspective into the naming. In this study, condition names are set in small capitals.

Table 5-2. Final property space with masked sample case data (before calibration).

Condition	Description	Sample data
HIGH REVENUE GAIN	Proportion of outcome revenue to estimated reference revenue	1.64
DESTINATION TOLD	Does the email reveal the destination the offer promotes?	Yes
EXPENSIVE	The price point of the ticket	EUR 79
BUY NOW	Can the ticket be bought immediately, or beginning the following day?	No
LONG SALES PERIOD	For how long is the offer is on sale for	3 days
CAN TRAVEL SOON	How long until the earliest possibility to travel (inverted in calibration)	8 days
CAN TRAVEL LATE	How long until the last possibility to travel	82 days

EMAIL VISITS	Number of clicks on the link included in the email	4,062
EMAIL REACTIVITY	Index measuring recipient reactivity provoked by the email	49 %
SEASONAL DESTINATION	Whether the desatination is seasonal, i.e. beach in summer or slopes in winter	No
CITY DESTINATION	Whether the destination is a metropolitan city	Yes
NORDIC DESTINATION	Whether the destanation is in the Nordic countries	No

5.5 Step 3: Fuzzy set calibration

All 12 conditions forming the property space are now calibrated from their original data form to fuzzy set membership scores. The starting points for calibration are the type of the condition (Figure 4-2) and qualitative reflection on the empirical distribution of the values for the condition among the cases. The calibration, including any qualitative sorting or mathematical transformation, is carried out as follows for each of the conditions:

High revenue gain. The focal outcome condition of revenue gain from a boosted route is calculated as the proportion of the outcome sales during the sale period to the estimated revenue that would normally have been gained on the route during the same time, without a special promotion.

The value of the index varies stochastically between 0.32 and 8.98 with median 2.09, mean 2.33, and standard deviation 1.56. The frequency distribution (**Figure 5-1**, panel 1) resembles a skewed, left truncated normal distribution.

The crossover point is set at an index value of 2.0, as in most cases doubling the reference revenue was the recorded objective set by Blue1 for the Weekend Boost. It is also close to the median and mean, giving statistical support for the value as a suitable midpoint. The threshold for full nonmembership in the positive outcome was set at 1.0, signifying meeting the normal revenue expectation. The threshold for full membership in the positive outcome was set at 3.0 to set a congruous, albeit not as strongly justified breakpoint.

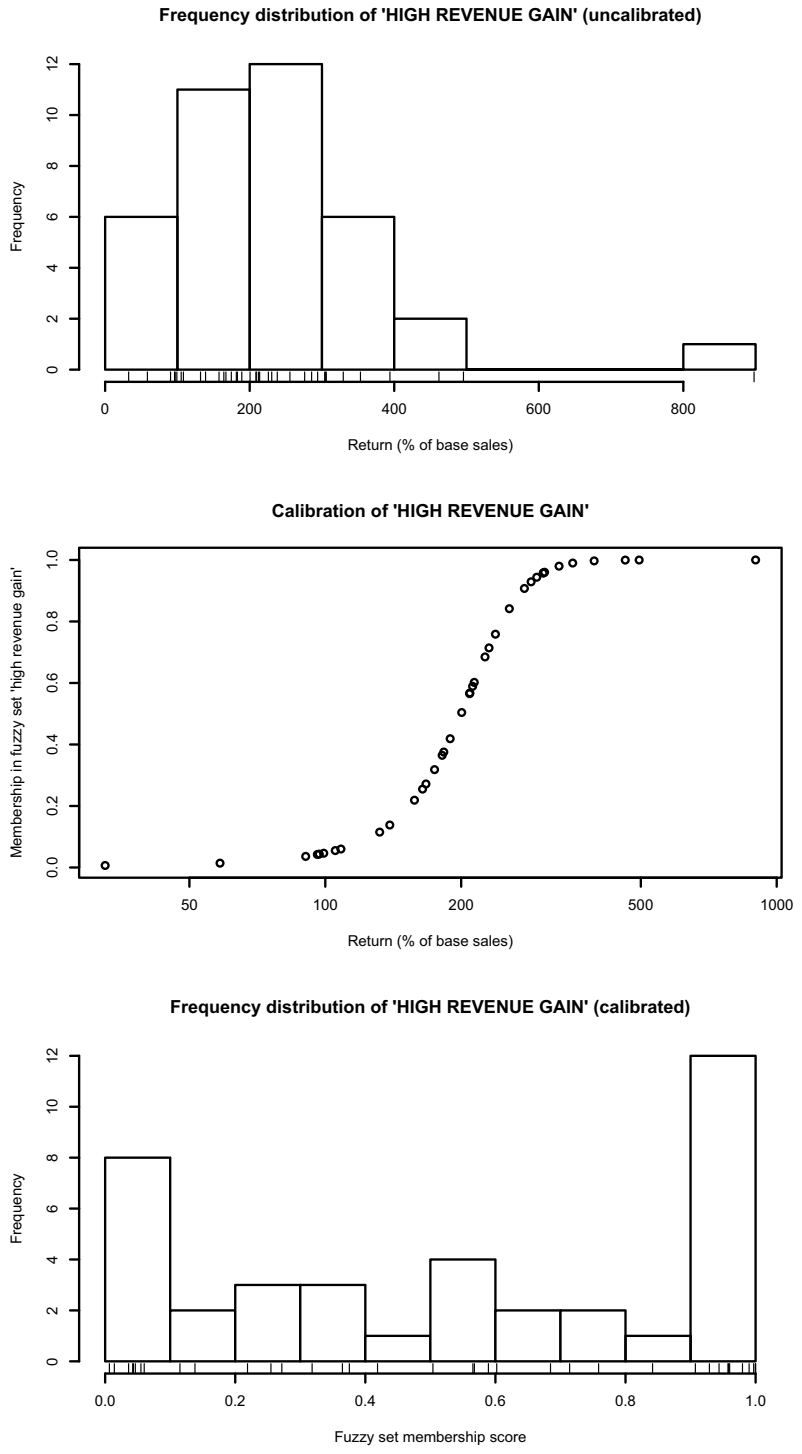

Figure 5-1. Calibrating HIGH REVENUE GAIN.

The log odds transformation is selected as the calibration method to keep with Ragin's established recommendation. Panels 2 and 3 of **Figure 5-1** show a plot relating the raw index scores to their calibrated counterparts and the frequency distribution of the calibrated fuzzy membership scores for revenue gain.

Destination told. The condition of whether the route destination was revealed in the email itself was calibrated as a Boolean value, with ones in cases where the destination was told, and zeros when it was not. Destinations were withheld from emails sent on two occasions, before and during a major annual consumer travel fair associated with extensive promotion from all key competitors, to be told once the consumer arrived at the website.

Expensive. The price of the ticket promoted is a discrete numerical value, but one that behaves in a special manner both in setting it and in interpreting it as a consumer. The procedure used for calibrating the price must take into account the price perceptions that moderate its outcome effect of purchase behavior. The appropriate approach is to use manual qualitative sorting. Unsurprisingly, and as expressly verified by managers at Blue1, an increase of one euro that moves price (for example) from 78 Euros to 79 Euros has less impact than an increase from 79 Euros to 80 Euros. Here, a similar effect is assumed to be found at sums evenly divisible by five as there is for sums divisible by ten.

The distribution of the price points set for Weekend Boost flights is indicated by the frequency counts in **Table 5-3**. These reveal the clustering around even sums and the use of 'just under' price points by the company. Calibration of the values proceeds manually. The crossover point is set between 75 euros and 80 euros, just above the median of 75 euros, because setting it at 75 would have removed the large frequency of 75 euro offers from having analytical significance. I wanted to keep the 75-euro cases below the crossover point to balance the volume, as the other larger frequency spike is in the nineties. The minimum and maximum observed prices were set at the fuzzy extremes. The remaining values manually assigned to fuzzy membership scores with the principle of aligning differences of five euros or less within a 'ten' with a 0.05 fuzzy membership score difference. The same increment was applied to differences of one euro across an even sum border (e.g. from 70 to 71 euros). Greater differences were given proportionally equal membership score displacements. The resulting calibrated values are given in **Table 5-3**.

This method of calibration take into account the perceptual impact of the prices based on substantive understanding of consumer buying behavior. The approach is simple and transparent. However, a fully valid and reliable procedure would entail interviews or experiments with appropriately selected consumers to determine the actual impact of price perceptions.

Table 5-3. Observed frequencies and calibration of price points.

Price point (€)	Frequency	Membership score
51	4	0
65	1	0.3
71	3	0.4
75	12	0.45
80	2	0.55
89	1	0.65
90	1	0.7
94	4	0.75
95	1	0.8
99	7	0.85
100	1	0.9
110	1	1

Buy now. If the flights were available for purchase on the same day that the email was sent, a case was assigned a membership score of 1 for this condition. If the flights were only released for sale on the following day (typically Saturday), the score was set to 0.

Long sales period. The length of the period during which the Weekend Boost offer was available varied among the data. Two and three days are by far the most common, with individual outliers at four and seven days. To emphasize the distinction between two and three days, seen to be fundamental if the conditions is to have a causal role, the values are calibrated manually so, that two day sales periods are assigned 0 membership in the set of long sales periods. Three days are assigned a score of 0.8, four days a 0.9, and seven days full 1.0 membership in the set of long sales periods.

Can travel soon. The number of days to the opening of the travel window is used as the basis for a calibrated condition signifying how soon travel is possible. The distribution of values for TRAVEL SOON, indicating what the earliest departure date was for tickets taking advantage of the Weekend

Boost offer, is clustered around typical one and four week increments that are evidently used as an approximate grid for setting the start of the travel window. The transformation is done using Ragin's direct method, using the qualitative nature of the perceptual increments to fix the upper bound for full nonmembership and lower bound for full membership. A qualitative sorting procedure, or Ragin's indirect method following a similar logic (Chapter 4), might be more appropriate. However, performing them would require separate empirical evidence on consumer perceptions of travel window proximity, especially with regard to how blocks of weeks and months are perceived.

The qualitative anchors for calibrating CAN TRAVEL SOON are built on the assumption that the days falling on the sale period itself can clearly be considered to be full members in the set of cases where CAN TRAVEL SOON is possible. The crossover point for the distribution is set at 14 days (two weeks). The reasoning is, that two weeks can arguably represent a typical planning horizon for a consumer, with an approximately 50 percent likelihood of the date falling on the next calendar month, giving added semantic distance. This was seen to represent a reasonably high degree of ambiguity, and also fall very close to the observed median value of 13.8 days. The threshold for inclusion as full nonmembers of CAN TRAVEL SOON was set at 30 days (one month), presumed to represent a common, clear semantic marker in the perception process.

The distribution of the uncalibrated data, the correspondence of calibrated and uncalibrated values, and the frequency distribution of the fuzzy membership scores are plotted in **Figure 5-2**.

Can travel late. The data reflecting the last possible travel date available for tickets included in the Weekend Boost promotion are distributed and calibrated in the same manner as for CAN TRAVEL SOON. The qualitative anchors are set at maximum of 30 days for full nonmembership in the set of cases where there is plenty of time until the travel window closes (to correspond with the threshold for full exclusion with CAN TRAVEL SOON), the crossover point at 61 days to represent two full months, another semantic marker, and the threshold for full membership at 91 days, representing three full months.

Again, this is a situation where the perfect calibration procedure would include consumer interviews or experiments to investigate the nature and impact of travel window breadth on purchase behavior.

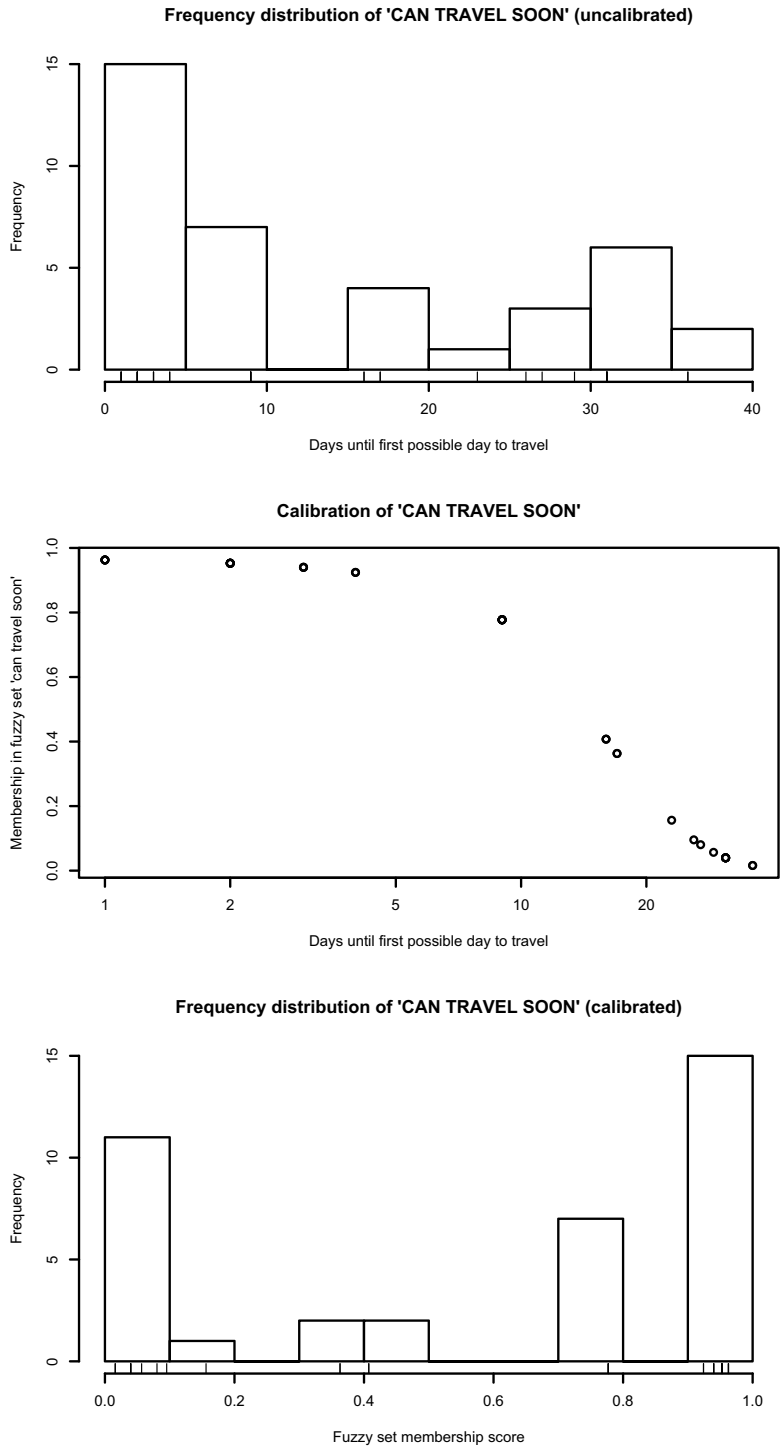

Figure 5-2. Calibrating CAN TRAVEL SOON.

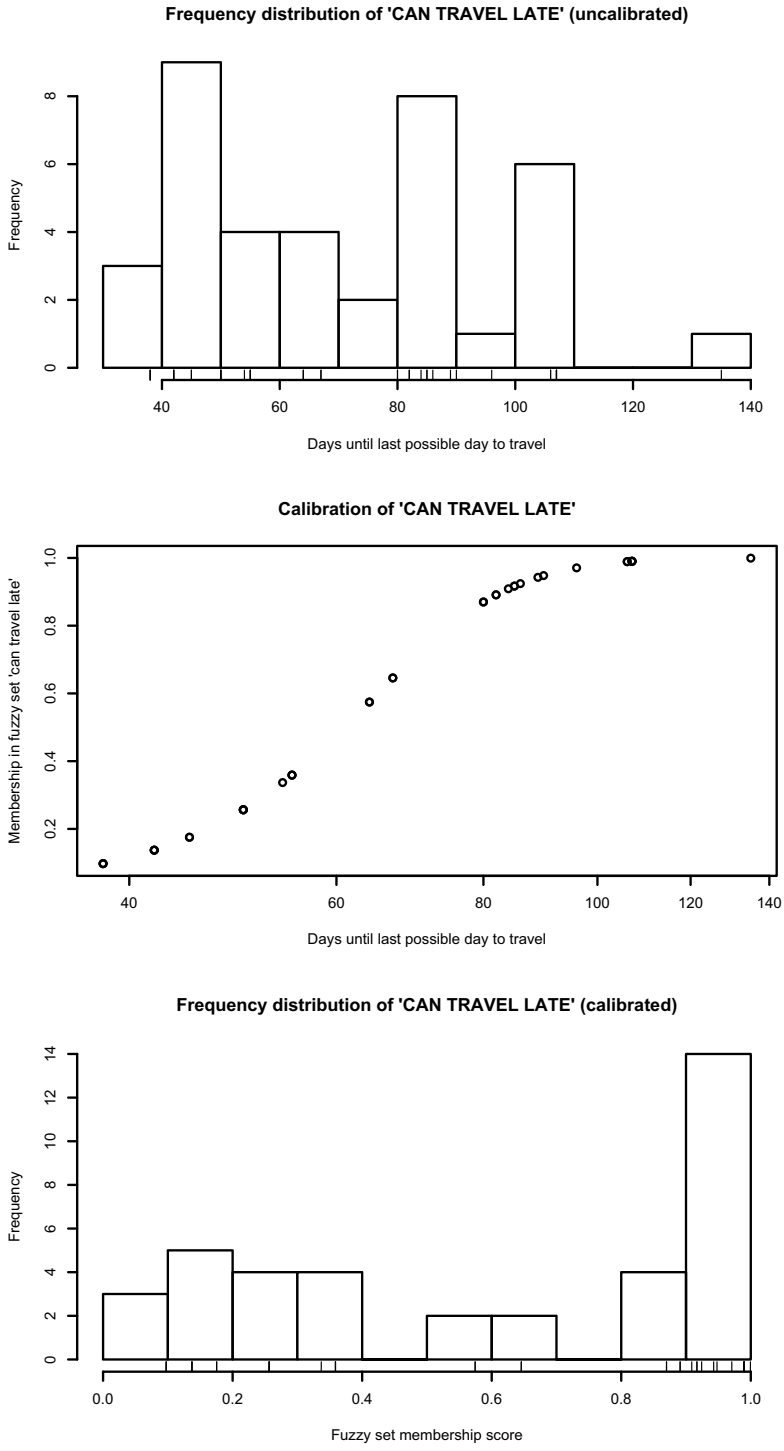

Figure 5-3. Calibrating CAN TRAVEL LATE.

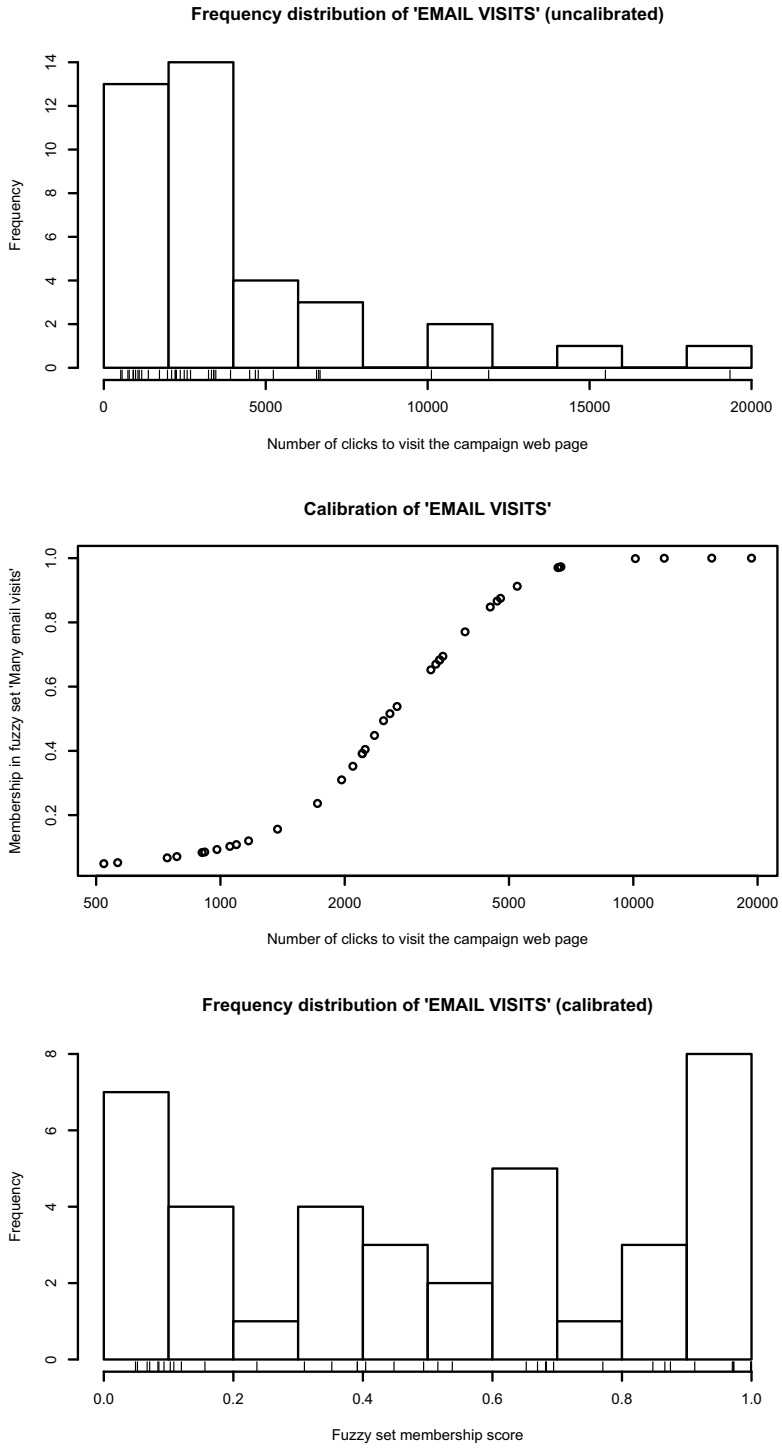

Figure 5-4. Calibrating EMAIL VISITS.

Email visits. The number of visits to the Weekend Boost campaign web page was tracked each time. Every individual click was counted separately. It is therefore both a causal condition for the revenue outcome as well as an intermediate marketing outcome (dependent internal condition) of the marketing action. The total number acts thus as a measure of interest generated by the offer, as each link forwarded to other users and acted on also increases the tally. As the Weekend Boosts often promote more than one route, the total number of visits has to somehow be related to differences in interest attributable to the different routes on offer. Here, the total value is divided across multiple routes in the proportion that they have created revenue during the observation period. This assumes that the consumers' proclivity to purchase is proportional to interest on a general level (measured as web site visits), and disregards a possible positive synergistic effect increasing the total click volume for the combination of routes offered in the promotion. The condition is also presumed to respond differently depending on the value of DESTINATION TOLD and with regard to any additional promotions, such as prize draws or competitions, brought up in the email.

Email visit figures are calibrated using Ragin's (2008) direct method. For the lack of any external, substantive criteria for setting the qualitative anchors, they are based on the approximate characteristics of the distribution itself. To indicate the degree to which a case belongs to the set of high incurred visits, the threshold for full nonmembership was set just below the lowest observed value, at 500 visits; the crossover point at 2500 visits, rounded from the median at 2528; and the threshold for full membership at 6000 visits, approximately one standard deviation from the median. The plots corresponding to the calibration are presented in **Figure 5-4**.

Seasonal destination. If the destination can be characterized as a seasonal destination, it is assigned full membership in this condition. This includes both resort-type destinations as well as city destinations with a natural connection to seasonal activities – sun and beaches or snow and mountains. Other cases are assigned 0 membership. There are 18 member cases and 20 nonmembers among the data.

City destination. If the destination can be characterized as a city, as opposed to a smaller, resort-type destination, it is assigned full membership in this condition. Other cases are assigned 0 membership. There are 32 member cases and 6 nonmembers among the data.

Nordic destination. If the destination is in the Nordic countries, it is assigned full membership in this condition. Other cases were assigned 0 membership. There are 11 member cases and 27 nonmembers among the data.

Table 5-4 summarizes the calibration methods used on data for the different conditions. The entirety of the calibrated case data forms the truth table that is the basis for logical analysis in the next stage of CEMO.

Table 5-4. Final property space conditions, data distribution, and fuzzy set membership value calibration methods of conditions.

Condition	Distribution	Calibration method
HIGH REVENUE GAIN	Continuous	Direct log-odds with substantive qualitative anchoring
DESTINATION TOLD	Categorical	Boolean
EXPENSIVE	Discrete	Manual qualitative sorting, 12-valued fuzzy set
BUY NOW	Categorical	Boolean
LONG SALES PERIOD	Discrete	Manual qualitative sorting, 4-valued fuzzy set
CAN TRAVEL SOON	Discrete	Direct log-odds with substantive qualitative anchoring
CAN TRAVEL LATE	Discrete	Direct log-odds with substantive qualitative anchoring
EMAIL VISITS	Continuous	Direct log-odds with statistical distribution based thresholds
SEASONAL DESTINATION	Categorical	Boolean
CITY DESTINATION	Categorical	Boolean
NORDIC DESTINATION	Categorical	Boolean

5.6 Step 4: Logical analysis

Before the actual logical analyses, reviewing the correlations of the conditions with respect to each other (Appendix B) verifies that not single causal condition correlated strongly with or against the outcome condition of revenue gain. This supports the proposition that possible causal links involve more complex relationships.

To create a truth table, the data prepared in the preceding stage are entered into a procedure in the QCA or QCA3 packages of the R software application, in the Windows platform fsQCA program (Ragin, Drass, and Davey, 2006), or another implementation of FS/QCA. The *fs_tt* procedure of QCA3 for R (Dusa, 2008) outputs a listing of all the empirically observed combinations of conditions with respect to the corner of the vector space

they are closest to (Appendix B). The capital letters heading the columns refer to causal conditions as described in the legend below the table, and the 'OUT' column to the presence or absence of the outcome. The first column is a numerical reference to the number of the truth table row out of the complete truth table of 2^{11}=2048 rows – the rows that do not match any empirical observations are omitted from the listing. For each row and condition, a 0 or 1 is given to indicate how the row is positioned in the vector space with respect to the condition. The columns entitled 'freq1' and 'freq0' list, respectively for the presence and absence of the outcome, the number of cases matching the description. As each case can mathematically have a 0.5 or greater membership in exactly one combination of all the possible truth table rows, each case is only listed on one row. The consistency column gives the consistency score of the cases in the configuration as a subset of the selected outcomes (HIGH REVENUE GAIN and ~HIGH REVENUE GAIN).

Here, I review three solution alternatives, which I judge to represent the range of discovered configurational information in a balanced manner. The minimal solutions contained in them are alternative explanations that essentially view the problem from different perspectives, and contribute to a sense of the relevance and analytical expressiveness of the various conditions (parsimony) and to a general understanding of the causal mechanisms in the context.

5.6.1 Analysis of positive outcome cases

As the analyses for a presence of the outcome and its absence have to be performed separately, I first describe the logical analysis stage of CEMO for HIGH REVENUE GAIN.

Here, the result of the logical analysis is not a singular minimal solution, but a range of alternative solutions that use different prime implicants to distinguish configurations from each other. In other words, there is more than one way to explain a part of the outcome with configurations.

Each configuration of every minimal solution is a valid causal configuration in itself. Comparing the different alternatives – possible in situations like this where there is a broad range of possible and possibly collinear conditions – can help to see how individual conditions impact configurationality in the system as a whole. Each minimal solution is one limited perspective to the context; together, the solutions provide overlapping evidence to present a more complete, well-rounded perspective.

Different versions of the truth table produce different minimal solutions. In iterating through the various options, and observing the impact on the solutions of keeping and releasing individual conditions, several key trends are observed:

- NORDIC DESTINATION does not appear in solution configurations, signifying irrelevance as a causal condition for high revenue
- EMAIL VISITS only appear sporadically as an alternative explanator to another condition
- BUY NOW and LONG SALES PERIOD have the same impact, are generally substitutable, and thus can be seen as collinear. The correspondence is immediately evident in the data: BUY NOW is 1.0 only when LONG SALES PERIOD is high, i.e. three or more days. This is a subset relation indicating that LONG SALES PERIOD is sufficient and necessary for buy now. It can thus be absorbed by it in analysis.

The results of truth table minimization for the entire truth table prepared in the previous stage are considered first (Appendix B). We observe a gap in the consistency scores between 0.69 and 0.84; the latter of these can conveniently be set as the consistency threshold, and is equal to the total solution consistency. The frequency threshold is set at 1, as cases are few in number and all are considered to be configurationally significant. This qualifies 19 cases for inclusion in the analysis (0.5 total solution coverage).

The analysis produces 41 solution alternatives and requires the researcher to select prime implicants to choose which configurations or individual conditions should act as the ones charged with making the distinction between solution components. The situation is typical in FS/QCA and associated with a lack of diversity in the data. Several different conditions can be used as criteria to divide the cases to configurations with little or no difference in the sets of cases that fit the configurations. To an extent, this is associated, again, with condition collinearity. The choice of prime implicants does not necessarily affect all the components of the minimal solution. Typically, there are some component configurations that have adequate ability to separate cases into a causal configuration without additional parsimony.

Parsimony was involved in selecting the final minimal formula from among the 41 similar alternatives generated by the software algorithm. For example, BUY NOW with LONG SALES PERIOD were observed to serve in the same conditional role in numerous configurations, and thus a choice could be made to select one of them for expressing the observed overlapping causal role.

Thus, we observe a minimal solution with evidence of causal complexity:

~CITY DESTINATION
+ ~BUY NOW • ~CAN TRAVEL LATE
+ ~EXPENSIVE • ~BUY NOW • ~SEASONAL DESTINATION
+ EXPENSIVE • ~LONG SALES PERIOD • SEASONAL DESTINATION
→ HIGH REVENUE GAIN

the presence and absence of conditions affects the outcome differently when the condition is part of a different configuration.[4]

However, many conditions exhibiting diverse values are included in the 41, but have no consistent causal impact. Another iteration of the logical analysis using a modified version of the truth table produces evidence that further expands understanding of the context by providing a second perspective, less confounded by the collinearity and redundancy of some conditions. Eliminating NORDIC DESTINATION, EMAIL VISITS, and BUY NOW produces a second truth table (Appendix B). We observe a convenient gap above the 0.76 consistency scored row, and the consistency threshold is set at 0.853, leaving 14 cases that can be connected to the focal outcome. Logical minimization of the second truth table produces a minimal formula where a single solution emphasizes the role of ~DESTINATION TOLD (as a new aspect) and ~CITY DESTINATION (as above) as individual sufficient conditions. Additionally, a further complex configuration (~LONG SALES PERIOD • CAN TRAVEL SOON • CAN TRAVEL LATE • SEASONAL DESTINATION) is seen as a third sufficient path to HIGH REVENUE GAIN in the complete minimal formula:

~DESTINATION TOLD
+ ~CITY DESTINATION
+ ~LONG SALES PERIOD • CAN TRAVEL SOON
  • CAN TRAVEL LATE • SEASONAL DESTINATION
→ HIGH REVENUE GAIN

This solution both supports the total explanation and extends it with additional configurational information with the third term.

5.6.2 Analysis of negative outcome cases

In the same manner as discussed obove for analyzing the determinants of the positive outcome, a truth table for the negative outcome was constructed to omit buy now and keep other conditions. The complete truth table is given in Appendix B. A gap is observed in the consistency scores

[4] The solutions here are produced by the 'Enhanced Quine-McCluskey' algorithm in the QCA package for R (accessed in the program as 'eqmcc'; Dusa, 2010).

between 0.798 and 0.907, and the consistency threshold can be set accordingly at up to 0.9. The frequency threshold remains at 1. There are 18 cases on the remaining truth table rows, yielding the following minimal formula after logial minimization:

DESTINATION TOLD • ~SEASONAL DESTINATION • ~NORDIC DESTINATION
+ LONG SALES PERIOD • CITY DESTINATION • ~NORDIC
+ DESTINATION TOLD • ~EXPENSIVE • EMAIL VISITS • CITY DESTINATION
→ ~HIGH REVENUE GAIN

This solution is in contrast to the previous observations about the configurational irrelevance of NORDIC DESTINATION and EMAIL VISITS for a positive outcome.

The solutions given above are only two of many. Depending on the choice of conditions, thresholds, and prime implicants, many parallel sets of configurations can be discovered, with different degrees of coverage and consistency. In general, there is a nondirect tradeoff between the two. A more consistent solution is more readily found when criteria for coverage are relaxed, in other words, when fewer configurations are considered. Better coverage is often found, not surprisingly, when configurations are less consistent of bringing about outcomes. Different solutions include a different selection of cases, but cases with similar conditions tend toward each other in the aggregations.

5.7 Step 5: Causal conclusions and assessment of economic impact

The causal explanation of the findings of the logical analysis consists of separate narrative explanations and economic impact assessment of both the causes of high revenue gain and the causes of low revenue gain. Both contribute to developing a general understanding of the research context and the formation of managerial implications.

5.7.1 Causal explanations for HIGH REVENUE GAIN

No condition or configuration alone is necessary to bring about high revenue gain. We can qualitatively describe and discuss the configurations that are sufficient for high revenue gain (positive outcome), provided by the two lternative configurational solutions presented above, as follows:

1. ~CITY DESTINATION — A consistent trait shared by a set of successful Weekend Boost promotions is that they were not to a city destination, i.e.

large metropolises like London, Milan, and Paris, but to non-city holiday destinations in Lapland and the Mediterranean. It is not immediately obvious why this condition alone arises as a sufficient one. Reasons and further information could be sought in the appeal of the offers themselves: all cases in the configuration represented new routes or routes that have not traditionally been promoted on price. This aspect of novelty or breaking industry practice should be investigated further.

2. ~BUY NOW • ~CAN TARVEL LATE — A set of successful offers was characterized by not being possible to buy immediately on the date that the message was sent, combined with relatively few days until the last possible date to travel. The configuration shares some of the cases from the first causal path, but adds diverse major city destinations to the set. No narrative explanation is immediately obvious, and ~BUY NOW is particularly counterintuitive as a component, as a conventional assumption would be that revenue would increase if purchase immediately possible when an offer is made would increase returns. The finding may, however, might suggest the opposite about the nature of the product: requiring deliberation form the consumer may be a working alternative.

3. ~EXPENSIVE • ~BUY NOW • ~SEASONAL DESTINATION — A third set includes cases that were not expensive, not available of purchase immediately, and not to seasonal destinations. The cases included in the set are all flights to European capitals. Low price and the nonseasonal city destination type together is a solid finding about consumer interest. The added presence of ~BUY NOW, however, is interesting and its implications not immediately obvious.

4. EXPENSIVE • ~LONG SALES PERIOD • SEASONAL DESTINATION — A fourth configuration describes cases that, in contrast to the previous set, are more expensively priced flights, but again with the same peculiar feature of not being possible to buy on the day that the email was sent (among the observed data, ~LONG SALES PERIOD ⇔ ~BUY NOW), and combined with the seasonal destination nature of the Mediterranean metropolises that comprise the cases.

5. ~DESTINATION TOLD — Drawn form the second, trimmed truth table described earlier, a distinct group of cases emerges as not mentioning the exact destination on the email, but requiring recipients to visit the campaign web page. Building interest through mystery may not be the pertinent explanation, however, as these cases from early 2010 are also ones during which there was incidental heavy trade fair associated promotion from competitors. The role of the general level of promotion is, however, difficult to factor in to the model due to insufficient information. Interestingly, the number of clicks generated did not emerge as a parallel/collinear condition, further dissuading from the interest-

generation goal that may have been in mind at the communications execution stage.

6. ~LONG SALES PERIOD • CAN TRAVEL SOON • CAN TRAVEL LATE • SEASONAL DESTINATION — The final configuration for high revenue presented here is a version of the fourth one, restricted to cases where the travel window is broad (can travel very soon or late from the offer). For these cases, price is not as determining a condition, as opposed to flexibility.

The overall causation for high revenue gain, as described by the available data, focuses on the distinctions between city destinations and holiday destinations, the peculiar requirement of a short purchase window beginning the day after the email is sent, and evident causal complexity with regard to price, which is linked to destination seasonality as an explanator of performance.

The role of sales period length and the ability to buy a flight immediately as it becomes available is the key question requiring elucidation in subsequent studies. Additional substantive knowledge on the buying behavior of consumers is required to discover how decisions are formed and when purchases are made, on what criteria. The configurational explanation of nonseasonal destinations performing best with a low price and seasonal destinations with a high price warrants managerial attention and experimentation for confirm the findings and study their persistence in a theory testing process. If the causal mechanism is felt to hold, pricing can be adjusted according to the optimum revenue potential in future Weekend Boosts.

Cash flows of high revenue configurations. Maintaining a link to the original cases is a hallmark of QCA. In the case of CEMO, the linking back of the causal configurations to the quantitative determinants and measures of marketing performance as a return on investment is the final analytical stage. **Table 5-5** relates the causal configurations for high REVENUE GAIN back to the cash flows in the original case data. Using the sum totals of the revenue objectives provided by Blue1[5] as a benchmark, I calculated the difference in outcome to the target in each case, and added the values to form a sum indicator of the economic significance of the

[5] Revenue objective was set as a varying target of between 67 percent and 300 percent of reference revenue, with the clear majority values either 200 percent or 300 percent. For data from 2010, the objectives were missing, so a value of 200 percent was used. The same 200 percent was also used, as a compromise, as the crossover point in calibrating the revenue gain outcome condition. A more sophisticated, but technically unfeasible solution would have been to calibrate each case with it's own crossover point set at the appropriate revenue objective value.

configuration as a whole, and on average, for each case in the configurations (**Table 5-5**).

Table 5-5. Causal configurations for high REVENUE GAIN and associated cash flow.

Causal configuration		# Cases	Consistency	Coverage	∑Δ€	Δ€ (avg.)
(1)	~CITY DESTINATION	7	1.00	0.18	38 334	5 476
(2)	~BUY NOW • ~CAN TRAVEL LATE	11	0.89	0.29	26 357	2 396
(3)	~EXPENSIVE • ~BUY NOW • ~SEASONAL DESTINATION	6	0.84	0.16	14 225	2 371
(4)	EXPENSIVE • ~LONG SALES PERIOD • SEASONAL DESTINATION	4	0.98	0.11	40 576	10 144
(5)	~DESTINATION TOLD	5	0.89	0.13	15 706	3 141
(6)	~LONG SALES PERIOD • CAN TRAVEL SOON • CAN TRAVEL LATE • SEASONAL DESTINATION	2	0.85	0.05	23 851	11 926

From a managerial perspective, the economic significance of the configurations is valuable as a descriptor when combined with solution cover and solution consistency. The higher the associated revenue, the more interesting the causal configuration becomes. Here, the fourth configuration that manages to build high total revenue on a higher price point than other offers clearly stands out. The sixth configuration, which highlights two of the cases in the fourth configuration further positions the independent conditions behind the highest grossing configuration on travel date flexibility, which can be seen to be afforded with a corresponding high price.

A next level would usually be to calculate a Return on Marketing value, but since the costs for the Weekend Boosts are fixed and small, the absolute revenue gain is a more appropriate measure. Thus, even configurations that are not highly consistent in outcome can still be economically significant. Essentially, we are looking at the value that the combinations of conditions have played in the history of Weekend Boost promotions, and can conclude that

1. Different configurations of causal conditions are associated with distinctly different levels of economic impact, and that
2. Cash flow analysis of causal configurations can help managers identify and evaluate causally heterogeneous, nonobvious groups of marketing actions on a pecuniary level.

5.7.2 Causal explanations for ~HIGH REVENUE GAIN

Similarly, we can qualitatively describe and discuss the configurations behind low revenue gain (negative outcome) as follows:

1. DESTINATION TOLD • ~SEASONAL DESTINATION • ~NORDIC DESTINATION — Approximately a third of all cases investigated were associated with both weak revenue and shared conditions of having a non-Nordic, nonseasonal destination revealed in the email itself. The cases are flights to major European metropolises. The emergence of destinationtold as a condition may be incidental, and an unspecified environmental causal condition of general promotion level a more appropriate causal condition.

2. LONG TRAVEL PERIOD • CITY DESTINATION • ~NORDIC DSTINATION — A long sales period is associated with low revenue from non-Nordic city destinations. The cases in this configuration are similar in kind to the first explanation, and overlap with each other by about 50 percent. In contrast, this configuration includes seasonal city destinations.

3. DESTINATION TOLD • ~EXPENSIVE • EMAIL VISITS • CITY DESTINATION — The final configuration is also about badly performing city destinations, drawn from the entire temporal spread of the data, and further characterized by low price and high numbers of visits to the campaign web page, possibly indicating consumer interest that is not capitalized.

The managerial implications of the two first configurations are immediate: city destinations, especially nonseasonal ones, are often behind low revenue gain. This represents a distinct but related path to the same outcome. One route (a flight to Berlin) figures in on all three configurations, also giving them the shared consistency level; the flight is also the least consistent outcome contributor to be included above the threshold. Experimentation on pricing, travel date flexibility, and marketing communication could provide additional diversity and evidence for causal conclusions. Currently, the cases associated with low revenue share a substantial amount of characteristics with each other. With the email medium, experimentation, including split testing is easy and cost-effective, and should be encouraged systematically to discover ways to improve performance for city destination Weekend Boosts – taking into account, of course, the capacity adjustment requirements prompting the action in the first place.

Cash flows of low revenue configurations. The correspondence of the causal configurations for low revenue with the cash flow differences their component cases exhibit with respect to revenue objectives are given in **Table 5-6**.

Table 5-6. Causal configurations for low REVENUE GAIN and asociated cash flow.

Causal configuration		# Cases	Consistency	Coverage	∑Δ€	Δ€ (avg.)
(1)	DESTINATION TOLD • ~SEASONAL DESTINATION • ~NORDIC DESTINATION	11	0.81	0.29	-124 723	-11 338
(2)	LONG TRAVEL PERIOD • CITY DESTINATION • ~NORDIC DESTINATION	12	0.81	0.32	-169 680	-14 140
(3)	DESTINATION TOLD • ~EXPENSIVE • EMAIL VISITS • CITY DESTINATION	5	0.81	0.13	-50 649	-10 130

Surveying the cash flows associated with the configurations reveals a degree of harmony with regard to average displacement. The causal similarity of the cases and overlapping large configurational groups tend to even the contributions, with only the second one showing a more pronounced outcome effect. Negative cash flows represent difference to the projected promotion sales target, reflecting excess capacity. Different destination, time restriction, and pricing choices could have resulted in different performance with respect to the company's own targets.

5.8 Evaluating solution goodness

Despite its many apparent merits, and in part due to them, this empirical study entails a number of weaknesses and limitations; some pertinent to how CEMO was carried out in this specific instance, some highlighting properties of the FS/QCA approach itself.

5.8.1 Validity

Besides the validity of FS/QCA as a method, the validity of a CEMO analysis is dependent on a valid epistemological approach to applying FS/QCA as a method, the validity of constructs, and the validity of the outcome as an answer to the set research question. The QCA analysis criteria discussed by Schneider and Wagemann (2007; cf. Section 4.3) provide practical discussion points.

First, the use of FS/QCA in this case is warranted, as the goal of developing causal hypotheses based on observable patterns in the data is one of the five possible specified by Ragin and Rihoux (2004, p. 6). However, FS/QCA is used as the only method, not allowing for triangulation. This is a limitation of the present study, and must be

addressed in the future with additional research efforts using the same data. The limitation may, however, be somewhat forgivable as the study is intended to be a demonstration of the application of FS/QCA into a marketing performance context, as opposed to a demonstration of a complete, fully conclusive assessment of marketing performance.

In the execution of the research strategy, Wagemann and Schneider (2010) emphasize the "explicit and detailed justification for the (non) selection of cases," the selection of a moderate number of conditions and the outcome on the basis of "adequate theoretical and empirical prior knowledge." Arguably, these criteria are satisfied to an adequate extent in this empirical study. The initial population was restricted only by data availability and the existence of Weekend Boost promotions. The number of conditions was likewise limited by data availability, and further reduced in the course of truth table construction and trimming. However, content validity is impacted negatively by the restriction of the CEMO property space to data that were economically available. It is obvious that a number of relevant and important conditions for outcomes are left outside the scope of logical analysis. The absence of their contribution is noticeable especially in the question-provoking and obfuscated causality behind high revenue gain. Since the data for the outcome and input conditions were collected together, and the clear majority of the data not interpreted in any manner at the company end, organizational preferences or expectations for some results are not a bias issue. The outcome and its negation are considered in separate analyses, without assuming the causes for high revenue to be reversed to bring about low revenue.

Schenider and Wagemann (2010) voice concern over overinterpreting "single conditions which only appear as causally relevant in conjunction with different combinations of other single conditions" as not being "in line with the epistemological foundation of QCA." However, the interpretation of, for example, ~CITY DESTINATION as a single causal condition for high revenue gain falls into their relaxation of this criterion to permit the demonstration of configurationality by contrasting such a condition with another path to the outcome that does not include the criterion. This keeps the analysis for causes of high revenue gain in line with the epistemological goals of QCA. In itself, this, or the inexplicability of the ~BUY NOW criterion, does indicate that there is a structural weakness in the method, data, or execution, but does imply that the explanations for causality require more information, especially on conditions that are formative for high revenue gain to a greater degree than the ones that were accessible as data in this iteration. In particular, the customer side is an untapped and highly interesting locus of causal conditions and source of data.

With regard to the validity of solution consistency, FS/QCA is a young methodology, and much less tested and reviewed than e.g. statistical methods in daily use in marketing research and practice. The minimum outcome consistency criterion of 0.8 for case inclusion is consistent throughout FS/QCA literature, and is adopted in this study. The value is seen to be appropriate in the context, as it captures an adequate number of cases from the entire data set. There are no qualms with regard to the validity of this study in this respect.

Assessing and criticizing the validity of the narratives built around the causal configurations is bound to reliability and transparence. The qualitative implications and interpretations of the findings will always be such: interpretations. In this study, the conclusions are presented in the language of fuzzy sets, sufficiency, and necessity, without resorting to the epistemologically incorrect language of covariance and probability, as warned against by Schenider and Wagemann (2010). The validity of the presented conclusions is determined, ultimately, by their contribution to advancing substantive understanding through new practical insights for business development and new directions for research and development. Linking the findings back to the cases themselves assesses their plausibility as contributions, and reflecting on the common qualitative nature of the cases grouped by causal configurations. The cases in the groupings discovered in this study were found to be congruent in this respect, and thus support the validity of the analysis process. In the Blue1 case, the first complete iteration of CEMO gave strong indication that the process was providing new knowledge, which was felt by managers (and myself) to be valid through its contribution to practical understanding. The final results and implications will, of course, take time to develop, and further iterations of the research process, with additional data, would naturally serve to improve the overall validity of the findings.

The validity of the cash flow calculations depends directly on the validity of the original data and the validity of the research process behind the configurations. Their role in typing the configurations based on economic significance satisfies the explicit justification criterion of Schneider and Wagemann, which requires empirical evidence to back up assertions of relative significance. Cash flows certainly fit this requirement. Moreover, their ultimate validity as findings is only discovered later, as product of the marketing actions and other business decisions they have provoked, altered, forbeared, or restrained.

Finally, it must be stated once again that the results of the analysis do not in themselves prove a causal link. Indeed, such a feat can be seen to lie far beyond the scope of social science in general. The solutions do, however,

provide valid description of the empirical nature of patterns in the data, usable as platforms for further research and business development, as exemplified by an expressed desire by the case company to use CEMO to approach other marketing contexts within the same company as well as in the parent airline.

5.8.2 Reliability

Reflecting on the reliability of the research process returns us to the concept of transparence. If an analysis process is reliable, it can be repeated by another researcher on the same context and problem setting with the same results. The degree to which this is possible depends on transparence and reliable documentation of the analysis process. For CEMO, the key determinants of reliability are transparence in data collection, property space construction, data calibration, truth table formation, logical analysis, and the final stage of selecting solutions and drawing conclusions.

Wagemann and Schneider's criteria concerning the research process are relevant for reliability. The empirical study presented here is in no way a mechanical application of QCA as a software tool (to be avoided), and qualitative understanding of and familiarity with the cases is referred to throughout the analysis. With regard to the transparence and replicability of the research process, Wagemann and Schneider (2007) suggest that the raw data matrix should be published when possible, as well as the truth table. The former is in this instance impossible, due to the confidentiality of the raw data, but the truth table is included in the report. Furthermore, the authors set the criteria that the solution formulas should be provided in correct, formal notation, in addition to the narratives, and with the associated consistency and coverage scores (they are). Appropriate QCA terminology is likewise followed. Multiple forms of representing the cases and conditions are used to some degree, but triangle plots, for example, have not been included for the outcome relationships.

The data collection procedure and the initial constraints on the property space have been discussed at length. The fuzzy set calibration stage is perhaps the most significant with respect to demands for transparence to ensure replicability. Accordingly, an effort has been made to detail it as well as the analytical steps of calibration and data transformation to an extent that allows another researcher to replicate the analysis and form the same truth table, given the raw data. Computerized, peer-reviewed algorithm implementations are used to minimize the truth table.

The iterations of performing the truth table building and minimization on different sets of conditions allow qualitative reflection of the nature of

causation. Patterns emerge, and at the same time, conditions not contributing to an understanding of the context, given the available information and other conditions, become increasingly obvious. Though possibly tempting on first sight, this process cannot be equated with 'shopping around' for a solution in a questionable sense. Sharpening the analytical focus is a necessary and justified part of the process. The causal combinations of conditions are not taken as representations of a strict empirical reality, but steps towards building an understanding to give suggestions about the underlying relationships. In the case of the Weekend Boost data, care has also be taken not to excessively emphasize the number of cases in a configuration, as many cases share a number of condition values with the other cases representing offers made in the same email. Finally, in interpreting the results, the asymmetrical nature of causality must be remembered in that a causal configuration represents one path that has been successful in bringing about the outcome, but not an explanation of the outcome in general.

5.9 Discussion

Analysis of the Blue1 Weekend Boost promotions proceeded through the five stages of CEMO. The analysis was restricted by the availability of data on conditions outside of the organization's internal loci. The CEMO process had to build on managerially available information. This corresponds to what the managerial contingency for carrying out an analysis would, in actuality, be, and can thus be regarded as more a practical merit than a weakness in application or methodology, allowing the usefulness of CEMO to be reflected on in the same context as it would be in practice.

This demonstration of CEMO has successfully provided answers to the research questions set in Section 5.3. Differences between Weekend Boost conditions have helped to structure the causality behind high and low revenue outcomes (1). In the course of the analysis, I have identified which of the causal conditions forming the initial property space are seen to be relevant as parts of configurations in explaining the outcomes (2, 3). The goal of answering these questions to a degree that provides managerially actionable information has been fulfilled; my second goal of demonstrating a valid and reliable CEMO analysis using such empirical data as would be available in a managerial contingency is likewise met.

With regard to the contribution of this empirical study to an assessment of the worth of CEMO as an analytical approach, I find that applying it on micro-level case data from the promotion effort process of an airline yields consistent results. The results are arrived at through an objective,

systematic, documented and replicable process, and form a meaningful and managerially relevant basis for discussion of the causal mechanisms involved.

Compared to conventional quantitative techniques, CEMO can yield valid and reliable results with small case populations. The results are strongly context-bound theoretical explanations of causal mechanisms, and offer a new, rigorous approach to managerial problem solving. Compared to exclusively qualitative techniques, the approach allows crafting empirical analytical generalizations, expanding the scope of managerial use considerably. Clearly, the qualitative depth of the findings would not have been possible to reach otherwise. The especial aspect of the findings and CEMO is, however, that it has been possible to demonstrate aspects of configurational causality among the data in a context where manual qualitative cross-case comparison would not have been analytically possible, and where the population is far too small for configurational analysis using statistical multivariate methods.

Most importantly, the configurations here are parsimonious, objective generalizations about the conditions behind outcomes in the context. No previous structured or explicated knowledge existed about what aspects were common to the more successful Weekend Boosts, making the contribution managerially and substantively significant.

On a managerial level, this application of CEMO into an airline's biweekly promotional offers has direct implications for revenue management by imparting a relatively objective description of the managerially controllable conditions influencing buying behavior. This knowledge can then be used as a basis for creating an accurate and relevant marketing metrics system, and used to develop the marketing mix of conditions in the weekly offers to a maximal revenue generating form.

In the marketing context of Blue1 Weekend Boosts, the results of the analysis for causes of low revenue gain can be seen to be more explicit and interpretable for managerial implications than those for high revenue gain. In the explanations for high revenue gain, the absence of the BUY NOW condition is striking in its immediate inexplicability. More research is needed to improve the qualitative understanding of the condition's role in the consumer decision-making process in general, and if there are other unidentified collinear conditions that could help to explain the phenomenon. The result, thus, is a new and unexpected question. The causation of low revenue provides us with a new qualitative perspective into the nature of city and nonseasonal destinations as poor sources revenue when used in Weekend Boosts. The finding is more parsimonious that could have been inferred from the results of e.g. a plain correlation analysis,

and provides new, managerially relevant, actionable perspective to shared causes of weaker performance.

Further research as discussed above will likely see the managerial relevance of result from this form of analysis develop into a key source of information of the operation of a context-specific marketing system. Potentially, developed frameworks will allow managers to focus marketing efforts on specific, empirically verified path of influence, substantially reducing resource waste in promotion and other marketing activities, and dramatically improving the efficiency and effectiveness of their marketing system.

6 Empirical Study 2: Functional dairy product

The second empirical study considers a fresh dairy product produced and marketed by Valio Ltd. in Finland. The product is a functional dairy product available in a variety of flavors and retail unit sizes. The functional health benefits of the product are due to extensively researched probiotic bacteria used as a live ingredient. It is sold nationally and in all major retail outlets, and experiences relatively stable demand as one of the first functional products to have entered the market over 20 years ago.

This chapter demonstrates the application of CEMO on marketing and sales data in fast-moving consumers goods (FMCG). The objective of the second empirical study is to investigate the nature of configurational causality influencing the sales of a major dairy product brand in a national retail chain over an 87-week period. The knowledge that can be accessed with CEMO is qualitatively different from the type of information and answers that would be available with multivariate approaches in the same analysis context. In particular, the complex configurational nature of the mechanisms explaining marketing response becomes apparent, providing strong evidence for the power and novelty of the approach demonstrated in this chapter.

As in the first empirical study, I first provide a background for the business case on a general level, and then describe how the empirical research process manifested in practice. Next, I move through the steps of the CEMO process, and finally comment of the implications of the empirical study on providing evidence for the suitability, relevance, reliability, and validity of CEMO as a tool for knowledge discovery in marketing performance.

6.1 Valio business case background

Valio is the largest milk processor and premier dairy brand marketer in Finland, the market leader in all key dairy product groups (total market

share approximately 60%), with an annual net turnover of 1.8 billion euros. The company also has extensive holdings and interests in neighboring countries and several other European locations. Valio's product development is strongly driven by continuing pioneering research and development of products and products with distinct functional health benefits.

The key competition to Valio's dairy business comes from Arla-Ingman (Swedish-Danish cooperative owned Finnish company, total dairy market share approximately 20% [2010]) and, in select dairy product categories, from Danone (French international) and a growing number of other European entrants.

Marketing and sales at Valio. The marketing and sales organization at Valio has experienced continued evolution, with both functions having at times in recent history been subordinated to the other. Currently, the sales and marketing organizations exist as separate entities on all practical levels, with their own line organizations. Cooperation and collaboration between the two and product development is not managed through shared operative management or specific shared compensation mechanisms, such as collaborative performance criteria for bonus pay. The key operative links between the functions are in matching annual plans and tracking sales performance.

The current line marketing organization of Valio's fresh dairy products business is formed around product categories (e.g. cooking products) comprising products related by use and manufacturing method (e.g. crèmes and quarks in various flavors). Product managers are responsible for individual products, including variants, planning and managing advertising campaigns to fit an annual budget.

The sales function of fast-moving consumer goods is structured around a field sales organization, charged with negotiating product purchases and deliveries retailers. In contrast to the prevalent retail organization led wholesale models in Finland, Valio acts as its own stockist and wholesale supplier. The field sales organization negotiates wholesale prices with individual retailer franchisees and manages deliveries. To support Valio product presence in both retail space and retailer advertising (both local, by individual retailers or franchisees, or national, for retail chains), Valio provides subsidies in both cash and as discounted pricing.

The annual retail cycle is divided into three periods. Retailers make stocking decisions per period; new product introductions must coincide with them. Exceptions are rare. Consequently, the marketing cycle in both promotions and field sales activity follows the same calendar. Media use is

planned far in advance, both to assure retailers of advertising support for products – especially new introductions – and, in the case of television, because air minutes on national channels typically sell out up to 12 months in advance. It is not atypical for media agencies and advertisers to purchase nonallocated minutes in advance, but often campaign-level plans will have been made on a comparable schedule.

Only some products in each of Valio's fresh dairy product portfolio are promoted over the course of a year using advertising media. Even then, continuous, regular promotion is rare, and only typical in the case of products experiencing moderate or heavy competition. Valio is a nationally esteemed household brand, and many basic products can be sold by corporate brand power and trust alone. A substantial share of advertising expenditure is used for product and product variety introductions, simultaneously supporting the corporate brand and associated nonpromoted products.

Marketing analysis at Valio. Although Valio is a major advertiser in the Finnish market, with substantial expenditure levels in the FMCG market, quantitative analysis of sales response effects has been inconclusive. In conversations with top managers at the company, a repeatedly expressed concern over analytics, both in-house and third party, was over the 'qualitative sense' of the findings. Market phenomena were felt to be over-simplified to fit existing response models, due to a lack of modeling approaches able account for causal complexity and configurationality. This need has been expressed by the CEO and others as 'knowledge about what works together with what', that goes beyond marketing conventions, subjective assumptions, and ingrained media mix practices. FS/QCA, coupled with developing data collection and systematic marketing experimentation, was seen to carry potential to provide models that specifically consider these concerns.

Several further considerations make Valio a propitious research partner for developing and testing CEMO. Concerns or delays over legal disclosure restrictions have at no point been an issue in the collaboration. Neither organizational resistance nor access on the individual organization member level have been significant obstacles or hindrances to data collection, as the entire top management team has demonstrated continued active support and prioritization for the project.

6.2 Research process

Multiple iterations of the CEMO process were carried out in a process that saw refinement of the outcomes and conditions of interest, additional data collection, and refinements to calibration.

The research collaboration with Valio was initiated rapidly after it emerged that the analytical problems the company was facing were closely aligned with my search for suitable empirical material to develop CEMO. Valio's problem setting and data availability were immediately appealing, as were the analytical promises of the configurational approach. A group comprising key informants from both marketing and sales was appointed by the CEO to initiate the project. Not insignificantly, the group was headed by Valio's VP for finance. The goal was to explore Valio's marketing and sales efforts from a configurational perspective, test and develop CEMO with actual empirical evidence, and propose systems and approaches for developing marketing control in the future, specifically in integrating advanced analytical tools into a systematic management process.

The research process began with a mapping of data availability. To begin with, four products were identified as being especially promising for CEMO. The key criteria were empirical diversity among possible causal conditions, and sales data validity. Products that met these initial criteria are ones that are actively promoted, and with short-shelf lives and stable life cycle stages. Many established and iconic Valio products were thus excluded from consideration due to lack of active promotion actions. Conversely, analysis of new product introductions, experiencing rapid and unpredictable growth, was deferred until CEMO was first tested with product cases believed to be simpler in configurational dynamic.

Preparation for property space construction and data collection began with a review of data sources and a series of meetings and interviews for becoming familiar with the case context, the organization, and the key actors and institutions involved. First requests for data on sales were made to database specialists within Valio, and purchase orders made for third party advertising tracking data. The collection of information on price promotions by both Valio and competitors was initiated, and annual marketing plans reviewed, supported by some campaign-level briefing materials.

It was already clear at this stage that data on several interesting condition types would be unavailable within reasonable time constraints for delivering a 'proof of concept' model. The goal of the 'proof of concept' is to confirm that the adopted ontological assumptions of asymmetric, heterogeneous, and configurational causation are valid, and that the

approach can provide new knowledge about the causal mechanisms of the specific marketing context. Intermediate outcome metrics such as brand perceptions, in particular, are among the causal conditions that are not included in this analysis. The current brand metrics used by Valio had inadequate internal consistency and validity in target metrics, bad availability, or incompatible temporal units of analysis (months instead of weeks, as for historical sales data). Metrics such as these will be incorporated into future analyses, most likely supported by further developments in market and customer data collection.

Two full iterations of CEMO were completed during the empirical research process. Both cycles comprise several property space versions, working hypotheses, and problem formulations. Between them, the single most significant change was in focusing CEMO on a specific subset of retail outlets, where more detailed data on price promotions were available, and focusing on a single product out of four possible ones, for all of which data were collected. The functional dairy product was selected because its causal conditions exhibited the highest degree of empirical diversity among the data.

Continued feedback from the Valio side steering group was instrumental in defining and refining a problem setting that was managerially significant and relies on correct assumptions. Regularly scheduled meetings effectively juxtaposed operative resources and realities with strategic direction and analytical requirements, ensuring that the process met both. Arguably, this is pivotal for deploying CEMO as a practical managerial tool for marketing control.

6.3 Step 1: Research setting

From the perspective of developing CEMO as marketing analytics, the Valio case presents a FMCG marketing context that is familiar to many researchers and practitioners. Thus, the type of knowledge produced with CEMO can readily be contrasted with the types of knowledge accessible with other statistical tools.

Managerial demand for decision support. As discussed above, the managerial mindset for carrying out data collection and CEMO development was favorable. The interest of the CEO and other top management team members on finding configurational and qualitatively relevant explanations for observed marketing response phenomena resulted in rapid access and firm commitment to the process.

Analysis setting. Several aspects of the operative context make it particularly conducive for CEMO. First and foremost, and in contrast to much of the FMCG market in Finland, relatively accurate behavioral sales outcomes are available. Since AC Nielsen[1] exited the market in 2007, comparably comprehensive information on FMCG sales in Finland has not been available. Retailers have been reluctant to share POS data due to antitrust legislation and perceived (nonlegislative) competitive issues. The fact that the focal dairy product is sold fresh with a shelf life of only days, and that Valio handles its own distribution all the way to individual points of sale, gives access to data on demand that are more reliable than for those involving third party distributors or the possibility of unpredictable warehousing.

In addition to the quality of the available data, the analytical setting seems well suited for configurational analysis. The product is not new to the market, but at a relatively stable life cycle stage. Although there are weeks with little promotional activity, the empirical diversity observed among the data is encouraging, with both equifinal outcomes and configurational differences between them. The population has a moderate size (N), but the hypothesized complex and possibly nonlinear interactions rule out using many conventional multivariate techniques. The lack of purely qualitative data among the conditions is somewhat unfortunate, as I will not have the opportunity, within this iteration, of exploring the integration of such data into the analysis. It is thus the fuzzy set calibration stage that best embodies the role of qualitative consideration in CEMO.

Combined with the managerial commitment, and unexplained and presumably configurational phenomena, the functional dairy product marketing context at Valio allows for an analytically and managerially appealing demonstration of CEMO and its findings.

Research problem and CEMO analysis aims. To meet Valio's and my aim of developing a proof of concept of managerially useful and practicable CEMO analysis, and guidance for its further development at Valio and elsewhere, I set the following research questions:

1. What combinations of promotional factors are relevant as causal conditions?
2. How do configurational differences in marketing action use and intensity by Valio and competitors explain high and low sales volume outcomes?

[1] ScanTrack™ scanner data monitoring

The aim of these questions is to provide empirical evidence on configurational complex causality within the functional dairy product marketing context that can be used to suggest causal mechanisms to explain marketing performance determinants. A further aim of the study is to explore the uses of CEMO in a FMCG context as well as to provide justifications and consider data collection requirements for broader application across Valio's businesses.

Unit of analysis. After initial consideration of data availability within the timeframe of the study – intended as a proof of concept to precede more substantial resource commitments – a calendar week was set as the unit of analysis. Several practical considerations supported the choice. Sales data was sourced from Valio's retail shipment logs. Daily supply information would have unnecessarily reflected weekday-wise irregular replenishment schedules, and historical data, used to model seasonal fluctuations, were not available on other levels.

Data on advertising expenditure by Valio and its competitors was available on a weekly level from the media tracking agency. Price promotions had likewise been recorded and, nearly without exception, also originally scheduled on a weekly basis. Granularity finer than a week would furthermore have been impractical, due to the difficulty of connecting actual media contact with consumers and daily purchase outcomes. Concerns for maximizing diversity with the present data set favored a week-level comparison.

Population and outcome. The initial population[2] of cases (weeks) was set at 87, comprising all weeks from the beginning of 2009 to data handover (Week 34, 2010). The dual outcomes of interest were sales volume in liters of product, and sales turnover in euros. The final selection for both population composition and focal outcome would be made in the course of analysis, following FS/QCA research logic and convention.

Selection and typology of conditions. The constraints on time and resources, though not inhibiting to analysis, meant that interesting conditions on the system level and in the competition and customer loci would have to be excluded from consideration. These include market share data (subject to POS data availability and the resolution of competitive and

[2] As discussed previously, the population is a flexible construct, only fixed at the *end* of the analysis process. The 87 weeks represent could be viewed as a 'sample' in the sense that they do not represent the entire history of Valio's activites. However, the notion of sampling is irrelevant here: in QCA, analysis is concerned with entire populations, not generalizations based on sampling a broader population.

legal issues), demographic and behavioral information on end customers, and detailed brand metrics.

Within the scope of Valio's own organization and in the marketing action locus itself, sufficient data on the marketing planning process related to the specific weeks was unavailable. The same applies to qualitative information on the nature of advertising, such as creative solutions and argumentation. Future research would be rewarded with their systematic and theoretically informed inclusion, perhaps in conjunction with experimentation and consumer interviews. Nevertheless, the present situation coincides closely with typical managerial reality, and can therefore be viewed as a realistic constraint that CEMO applications would have to withstand.

6.4 Step 2: Property space

Table 6-1 lays out the initial scope of conditions available for constructing the property space. All data that could research-economically be gathered on the cases are listed. For each condition, the table includes a brief verbal description of its nature, a typing of the condition based on the discussion in Chapter 4. It covers the substantive knowledge regarding the condition available at this point, as well as my subjective assessments of the potential of the condition as an explanatory causal condition in the analysis. The table also considers the empirical diversity encountered among the data with respect to that condition. These two assessments serve, in this case, as the practical criteria that shape the trimming of the property space to its final form for the calibration stage, to a size that eliminates unnecessary collinearity and is limited to a dimensionality that is approachable with the current implementations of FS/QCA.

In this particular marketing context, advertising or price promotions are not continuous week on week, but used intermittently. Advertising expenditure is, in practice, concentrated on selected key media, and price promotions carried out in short bursts. I thus include a tally of weeks on which the possible causal conditions have been active (non-zero), which provide a concrete basis for limiting the property space for effective descriptive power and parsimony. Conditions that represent extremely rarely used advertising media, for example, can be trimmed from the property space. Conditions with exceedingly low empirical diversity are excluded from the final property space. In particular, media expenditure in some channels (e.g. radio advertising), low in volume, and only spent on three or fewer weeks of the 87 in the observation range, is excluded. The calibration routines in the next subsection are only detailed for conditions,

which are subsequently included in the final property space or, in other words, the fuzzy vectors forming the truth table of stage 4 of CEMO.

Table 6-1. The maximal extent of the property space, with all basic conditions information is available on.

Condition(s)	Locus	Explanation	Condition type	Causal potential	Diversity (observed incidence among weeks)
Week (identifier)	(System)	Calendar week and year	-	-	(Total 87)
From field sales staff:					
Sales volume	Internal: organization	Volume of daily product supplied to retailers, summed in liters for focal retail units	Outcome (continuous and incremental)	N/a	Moderate
Sales turnover	Internal: organization	Actual invoiced value, in euros, of functional dairy product supplied to retailers during the week in question (including discounts)	Outcome (continuous, incremental, and intermediate)	Moderate	Moderate
Valio price promotions	Action	Price promotion campaigns carried out by retailers on focal product, classified by discount percentage and scale (retail outlets involved in promotion)	Higher level (categorical and ordinal)	High	High
Competitors' price promotions	External: competitor	Price promotions carried out by retailers on competing products, classified as above	Higher level (categorical and ordinal)	High	High
From marketing staff:					
Advertising expenditure	Action	Advertising expenditure in different media (newspapers, periodical magazines, television, radio, outdoor, cinema, online). Expenditure estimates in Euros purchased from third party media tracking agency.	Higher level (continuous)	High	Low to high, depending on medium

The data covers retailers in two Finnish national franchise chains, sharing the same parent corporation. Valio managers consider geographical differences within Finland insignificant for this purpose, and data availability and validity of that level would have been weak. Most advertising is national, with the notable exception of independent local advertising by retailers, often Valio-subsidized. This local advertising is not included in the purchased advertising expenditure reporting. Price promotions in the two chains may be shared or independent, but always common to all retailers in the chain.

Both sales outcome conditions may better be characterized as moderate in diversity, as the demand for functional dairy product only fluctuates within a range, the width of which is a fraction of the absolute sales level. Notwithstanding, the differences in sales volume and turnover between weeks are managerially substantial enough to warrant the present investigation.

Definite information on the role of substitute products would require specific consumer studies. The category is broad, and competition for consumer spending transcends category borders. Cannibalization can, to some extent, be modeled by including a related basic dairy product ('Product B', discussed later) in the analysis. Data for all conditions referenced here (**Table 6-1**) is also available on Product B.

In the course of CEMO iterations, population composition was reconsidered, particularly with respect to excluding weeks with major public holidays, particularly around the winter holiday season. However, the issues have largely been resolved for this product with a base demand estimate model that accounts for seasonal fluctuations in sales. The formation of the subpopulations of high sales volume weeks and low sales volume weeks (as fuzzy sets) are discussed later.

The refinement of the property space focused on developing an in-depth qualitative understanding of the cases as wholes; dynamic interactions of known and unknown internal and external factors, variously experienced and documented from a managerial perspective.

The weekly demand for functional dairy product is characterized by a degree of seasonal variance that combines variance associated with the time of the year with sharper peaks associated with demand-influencing holidays that do not fall on the same week annually, and may change place considerably on the calendar on different years (e.g. Easter).

The final property space presented here is the one arrived at after numerous iterations of CEMO. The trimmings that transpired emerged gradually. The final property space covering 13 conditions, formed after

these modifications to and trimmings of the initial form, is summarized in **Table 6-2** together with a sample row of uncalibrated case data as an example. The outcome of interest was fixed as volume sales of product, in order to circumvent the effect of price on demand. The average weekly price level (unit price) was added as a new compound condition. Furthermore, the analysis was now restricted to only one retail chain, for which accurate price promotion data was available for both Valio and competitors.

Table 6-2. Final property space with data sample for a single case week (masked).

Condition	Description	Sample data
HIGH SALES VOLUME	Product sales volume, available as the percentage proportion of actual sales volume (in liters, in the observed retail chain) to an estimate for what the expected total sales volume for all retailers in the market would have been.	26 % (of expected total sales in the entire market)
TOTAL ADEX	Valio's total ADvertising EXpenditure on direct promotion of the focal product during the week in question.	15.93 k€
NEWSPAPER ADEX	Valio's advertising expenditure for the product in newspaper media.	1.1 k€
TV ADEX	Valio's advertising expenditure for the product in television.	11.03 k€
OUTDOOR ADEX	Valio's advertising expenditure for the product in outdoor media (transportation, billboards etc.).	2.73 k€
NON-TV ADEX	Valio's advertising expenditure for the product in non-television media (TOTAL ADEX less TV ADEX).	4.85 k€
COMPETITOR TV ADEX	Total TV advertising expenditure for all directly competing products in the same functional dairy product category.	21.6 k€
PRICE PROMO	Managerial summary metric of price promotion intensity during the week – higher level signifies larger discount percentages and/or broader promotion validity across outlet types and customer groups.	Level 2
PRODUCT B PRICE PROMO	Intensity level of price promotions for a Valio product in the parent category (basic product without functional health benefits).	Level 3
COMPETITOR PRICE PROMO	Intensity level of price promotions by competitors on products competing directly in the same functional dairy product category.	Level 2
HIGH UNIT PRICE	Average weekly wholesale price per volume unit of the focal product to outlets in the observed retail chain.	1.81 €/liter

6.5 Step 3: Fuzzy set calibration

All 11 conditions forming the property space are calibrated from their original data form to fuzzy set membership scores. The starting points for calibration are the type of the condition (**Table 6-1**) and qualitative reflection on the empirical distribution of the values for the condition among the cases. The calibration, including any qualitative sorting or mathematical transformation, is carried out as follows for each of the conditions:

All conditions in the Valio case suffer from a lack of external evidence about the qualitative significance of the levels observed among the data. To a large extent, calibration has to rest on statistical analysis of the distribution of values across the 87 case weeks, supported with qualitative reasoning about the managerial processes and decision-making behind marketing and sales decisions. Perhaps the most significant addition to improve understanding of the mechanics behind the marketing response process would be to incorporate qualitative consumer study data in the analysis.

Sales volume. Product sales volume was selected as the focal outcome over cash flow, because this represented a managerial perception of the marketing context as a 'volume business'. Long-term profitability is driven by volume focus and on the sustained and minimally volatile use of milk supplied by Valio's owners, not by adjusting prices to optimize the product's demand curve position.

The relative volume of product sold during the week defines membership in the 'high sales volume' fuzzy set. No market share data or POS scanner data are available. However, the short refrigerated shelf life of the product makes delivery volumes a reliable proxy of sales volume on a weekly level. Qualitative comparison to competing products or to benchmark sales volumes in Valio's own portfolio is justifiable. Calibration for membership in the fuzzy set of high sales volume weeks rests on endogenous statistical evidence of historical weekly sales and the ex-post comparative sales performance of the week against base sales level with respect to other weeks in the population.

Seasonal peaks in the demand for dairy products with functional health benefits are found during the fall and spring 'flu seasons', with advertising by all marketers acknowledging this in both argumentation and promotion intensity. The degree to which this phenomenon is 'push' or 'pull' by nature is unknown. Additionally, potential narrower and sharper peaks and

troughs in demand may occur on and around weeks with public holidays and other comparable seasonal occasions.

To account for recurring seasonal effects on demand, I created a base sales estimate model using all available historical sales data (2005–2010). In the model, each calendar week of the 87-week the observation period is matched with one or more seasonally corresponding weeks from each year of data to determine an expected sales volume estimate. The share of the respective annual sales volume of each historical week in 2005-2010 is calculated first. For each calendar week in the case population, the calendars from past years are compared to determine which weeks in the past would correspond to the focal week in representing the same seasonal position. For example, a Christmas week is matched with other Christmas weeks, and weeks between holiday-wise distinguishable weeks are evenly matched with weeks in the corresponding calendar range in the past years. Past weekly shares of annual sales volume from corresponding weeks are averaged to yield and estimate for seasonally expected sales volume on the focal case week. This can then be weighted with the annual sales volume in 2009 or 2010 to give an estimate for weekly sales of Valio's functional dairy product, in liters shipped.

The difference of the actual sales volume to the ex-post estimated base sales level for the week is the basis for calculating the values for the sales volume condition. The analysis in this empirical study is limited to one national retail chain, as price promotion information was unavailable from others. Unfortunately, historical data on sales volume was only available on a total compound level, making it impossible to create a base sales estimate model for sales in the focal retail chain alone. Consequently, the raw sales volume condition values used in this example are calculated by dividing the observed weekly sales volume in liters in the focal retail chain by the national base sales estimate. The resulting value indicates the proportion of actual sales in the chain to what could have been expected to be sold nationally that week.

The first panel of **Figure 6-1** represents the frequency distribution of HIGH SALES VOLUME proportions in the population. The values are calibrated using Ragin's recommended log odds method. Panels 2 and 3 of **Figure 6-1** show a plot relating the raw sales volume proportion percentages to their calibrated counterparts and the frequency distribution of the calibrated fuzzy membership scores for HIGH SALES VOLUME.

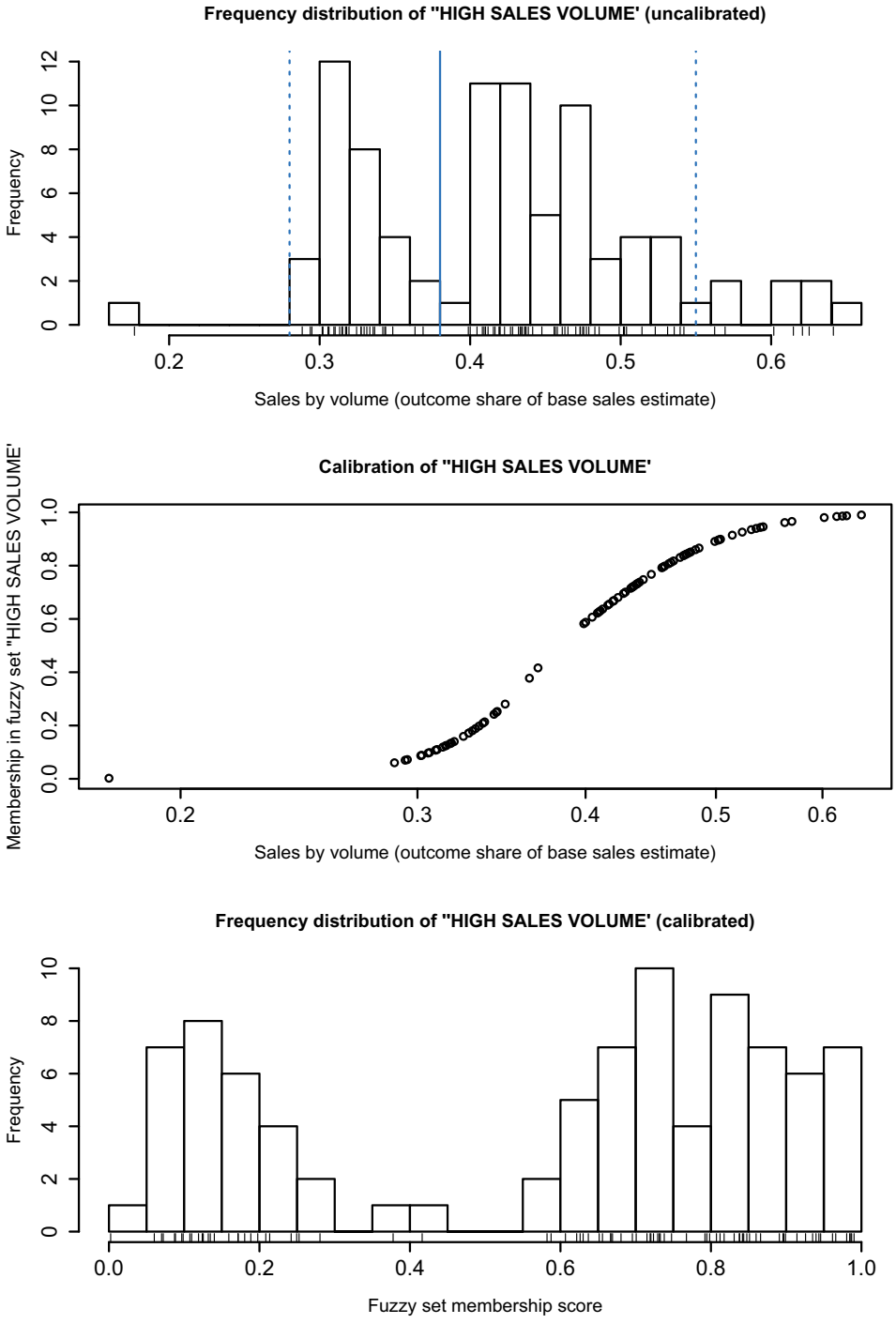

Figure 6-1. HIGH SALES VOLUME calibration.

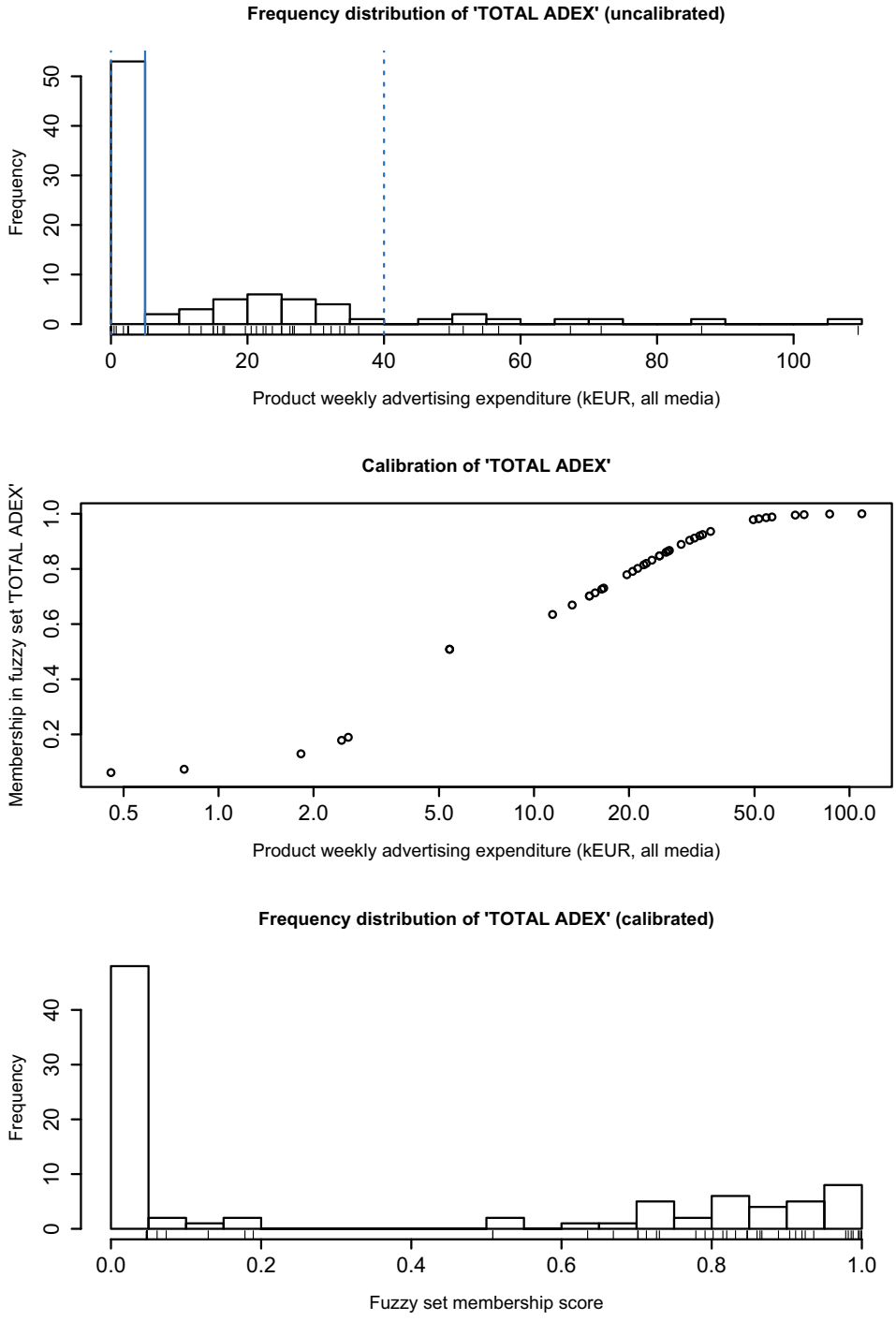

Figure 6-2. TOTAL ADEX (advertising expenditure) calibration.

The frequency distribution itself is the key element for determining an appropriate crossover point and the thresholds for full membership and nonmembership in the set of HIGH SALES VOLUME weeks. I computed a kernel density estimate over the distribution data and discovered local maxima at approximately 32 percent and 44 percent, representing the peaks of what resembles two distinct distributions. A temporal plot of the sales volume data revealed no apparent progression in absolute base sales volume, and thus I hypothesized a causal difference to exist between the clusters. Accordingly, I place the crossover point between them, at the local minimum of the density function (38 percent). The threshold points are placed at the other visual borders of the two main clusters, 28 percent and 55 percent. The three calibration values are represented in **Figure 6-1**, with a solid vertical blue line for the crossover point, and dashed lines for the threshold values.

Total advertising expenditure. The total advertising expenditure used by Valio to promote the focal product, tallied in thousands of euros, is the sum of third-party media tracking estimates on a given week. The sum includes all observed spending in television, newspapers, magazines, online media, outdoor media, movies, and radio. Of these, only newspapers, television, and outdoor were used on more than three occasions. These are also separately considered as causal conditions, and all non-television advertising expenditure – as television represents nearly 70 percent of Valio's advertising expenditure during the 87-week period – is also separately considered as non-television advertising expenditure.

Although marginally more reliable internal data would have been available on Valio's advertising expenditure, I chose to use the same external source for Valio data as for the competitors' advertising expenditure, as a way to ensure comparative validity of the data.

The frequency distribution for TOTAL ADEX values is given in **Figure 6-2**, together with the distribution of the calibrated fuzzy membership scores and the correspondence plot between the two. As with all advertising expenditure conditions, the log odds method is used for calibration. I set the crossover point at five thousand euros, to distinguish the zero and nearly zero spending weeks from the normal-like distribution of higher expenditure weeks that peaks at around 22 thousand euros. I set the threshold for full nonmembership at zero and the threshold for full membership in the set of high total advertising expenditure weeks at 40 thousand euros, to correspond with the end of the main cluster of observed values.

Newspaper advertising expenditure. Valio advertised in newspapers on only seven of the 87 observed weeks, the lowest frequency of individual media included in the final property space. The role of newspaper advertising emerged on multiple occasions in interviews at the product manager level. There is evidence of a practice-linked assumption that television advertising will often need to be supported with newspaper and other print advertising. The origin of the assumption is unclear; however, it is an excellent example of marketing practice with configurational assumptions that warrants systematic investigation with CEMO.

In calibrating newspaper advertising expenditure via log odds (**Figure 6-3**), I place the crossover point at one thousand Euros in order to distinguish the zero expenditure weeks clearly from those with spending. The zero expenditure weeks have full nonmembership in HIGH NEWSPAPER ADEX, and weeks in excess of ten thousand Euros – a value approximately halfway between the two clusters of expenditure levels – full membership.

Television advertising expenditure. Although not as overwhelming in share of expenditure as for Valio's competitors, television advertising expenditure rises clearly above other media. Even more so than with combining it with print advertising, the effectiveness of promotion of fast-moving consumer goods via television is taken as granted by interviewed operative marketing managers. However, specific contextual or relevant category-level evidence is scant. Arguably, television is institutionalized as a medium, and the media and advertising industry structures support to maintain it. Experimentation is implied to be risky in practice; expressed interest remains largely unacted. Spending as much online as a campaign would have cost on television would require a strong heart, even in 2010. Configurational analysis has potential to ease experimentation with different combinations of media, possibly shedding light on better managing the effectiveness, efficiency and adaptiveness of marketing performance.

The three panels of **Figure 6-4** represent the calibration procedure for Valio's television advertising expenditure. As with NEWSPAPER ADEX, zero expenditure weeks are given full nonmembership in TV ADEX. I set the qualitative crossover point (between high an low expenditure weeks) at ten thousand euros – between the cluster of low expenditure weeks towards zero and the main cluster of observed values centered around 25 thousand euros – and the threshold for full membership at 40 thousand euros, where the main cluster visually loosens, in order to integrate the remaining outliers to its right into the same qualitative category.

Outdoor advertising expenditure. Valio had outdoor advertising of their functional dairy product out on 14 weeks of the 87. The managerially perceived campaign role of outdoor advertising is not as clear as that of print and television. For the product examined in this study, the share of total media expenditure is just above 11 percent.

Figure 6-5 documents the calibration of outdoor advertising expenditure. I attribute weeks with zero spending to full nonmembership in OUTDOOR ADEX, and weeks with 13 thousand euros or more (a single outlier beyond the main cluster) full membership. The crossover point is at four thousand euros, in a gap in the distribution that allows distinguishing between weeks with expenditure levels generally considered to require a strongly deliberated managerial decision.

Non-television advertising expenditure. In all, 20 weeks out of the initial population had Valio non-television advertising activity for the functional dairy product in question. In addition to the relatively more common newspaper and outdoor media, this condition covers magazines, online, movies, and radio, each with only two or three active weeks. The incorporation of all these media under a single condition is due to the special role of television advertising as the medium against which all other expenditure is generally juxtaposed.

The calibration procedure for the NON-TV ADEX condition is documented in **Figure 6-6**. The crossover point for the log odds system is set at 7.5 thousand Euros, where a gap exists in the distribution of values, as above with outdoor advertising expenditure. 'Zero spending' weeks are set to full nonmembership in NON-TV ADEX, and the threshold for full membership is at 26 thousand euros, beyond which there are only two very distinct outlier weeks.

Competitors' television advertising expenditure. Valio's competitors' advertising expenditure for directly competing functional dairy products in the same category is over 97 percent television. For this reason, other media is disregarded in this analysis: it is clear that television-only is an accurate characterization of the competition's advertising strategy. This exclusive focus provides an interesting platform for developing advertising approaches that may leverage a more complex media mix. Furthermore, and in addition to the considerable lead times involved with video production in practice, television advertising air time on all main channels in the Finnish market is booked over six months in advance, hindering dynamic response to competition through that medium.

The expenditure levels are distributed over a broad range of values, with only five weeks among 87 on which no television advertising for competing products was running. As with Valio's sales, I computed a kernel density estimate over the distribution data, and discovered a density peak at 33.1 thousand euros. In absence of other external qualitative evidence, I selected this point as the crossover point for calibration using the log odds method. The visually apparent main cluster (**Figure 6-7**, panel 1) extends approximately one standard deviation (19.1 thousand euros) in either direction, providing convenient threshold values for full membership and full nonmembership in the set of high COMPETITOR TV ADEX weeks.

Price promotions. Alongside advertising, price promotions to consumers are habitually used to promote products in the analyzed category. Price promotions are financed with direct subventions to retailers (for e.g. local print advertising by the individual retail franchisee, which are beyond the scope of the present study) as well as being evident as discounts to the supplier wholesale prices on given weeks, given to encourage lower retail pricing. As the wholesale price is variable, but not directly linked to consumer retail price, it is not an accurate reflection of pricing of a weekly level. Data for the price promotion condition are based on notes by Valio field sales staff liasoning with the retailer. Price promotions are recorded separately for the two major national chains operated by the same retailer (applicable only in one chain) and for price promotion campaigns available to registered frequent shoppers for purchases in both chains.

In the Finnish fast-moving consumer goods market, price promotions are nearly without exception offered to consumers as direct in-store discounts, to anyone purchasing the item or, at times, restricted to consumers who have signed up with the retailer's frequent shopper program. Coupons are not used. Price discounts are usually tied to given package sizes of purchase volumes, for example, a discount price on a four-bottle pack of product.

The price promotions active during a week are recorded by Valio field sales staff, and categorized into three levels based on the percentage price discount level and use of retail chain frequent shopper mailings as an additional promotion channel. In forming a price promotion level score, a campaign associated with a below 20 percent retail price discount is given one point for each channel where the offer is valid (national chain or frequent shoppers). A 20 percent to 40 percent discount receives two points, and greater discounts three points per channel. The empirical maximum among the observed weeks is five points.

'Price promotions' continues »

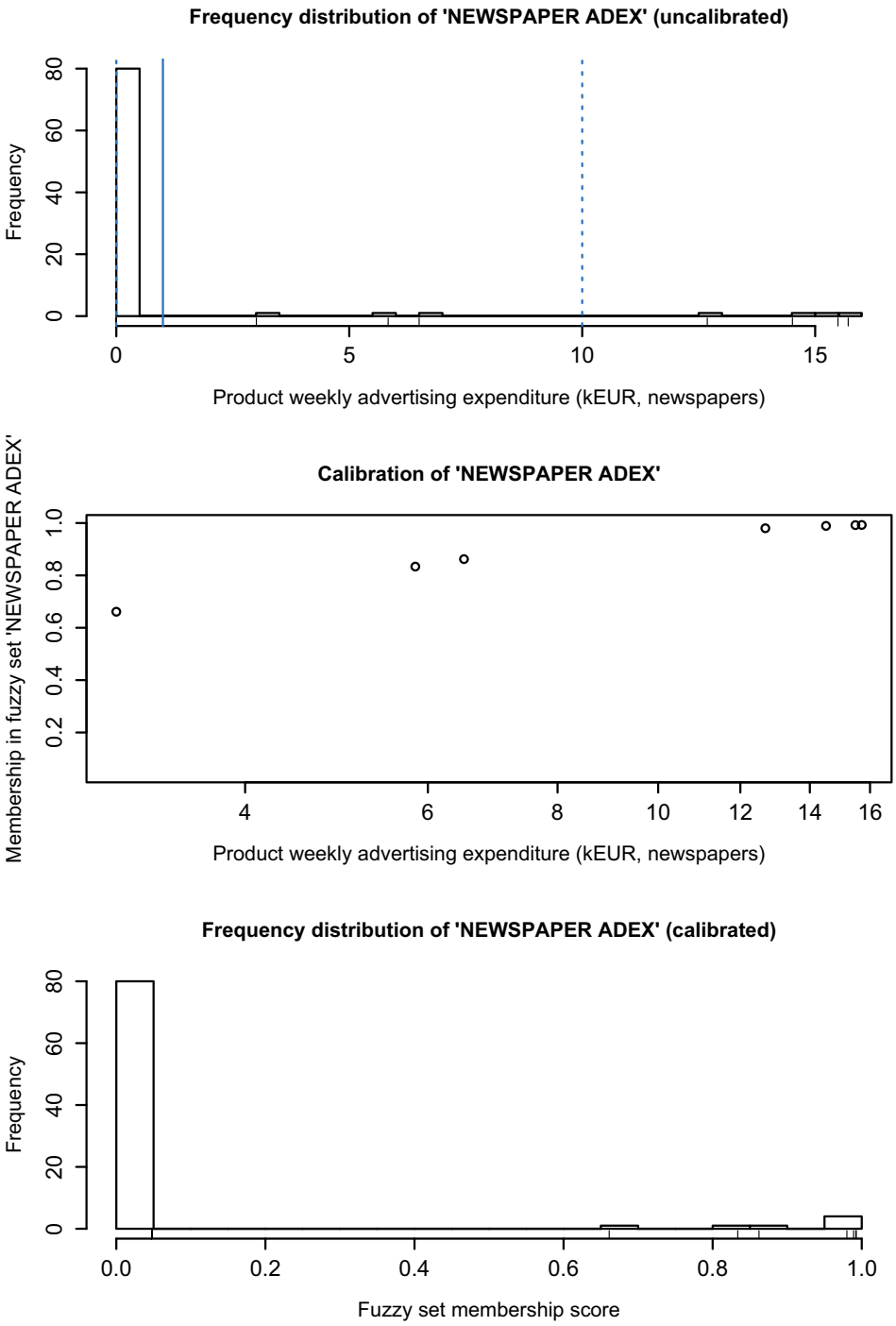

Figure 6-3. Calibrating NEWSPAPER ADEX (advertising expenditure). Note: For clarity, the second panel plot omits zero expenditure weeks (calibrated to 0.0).

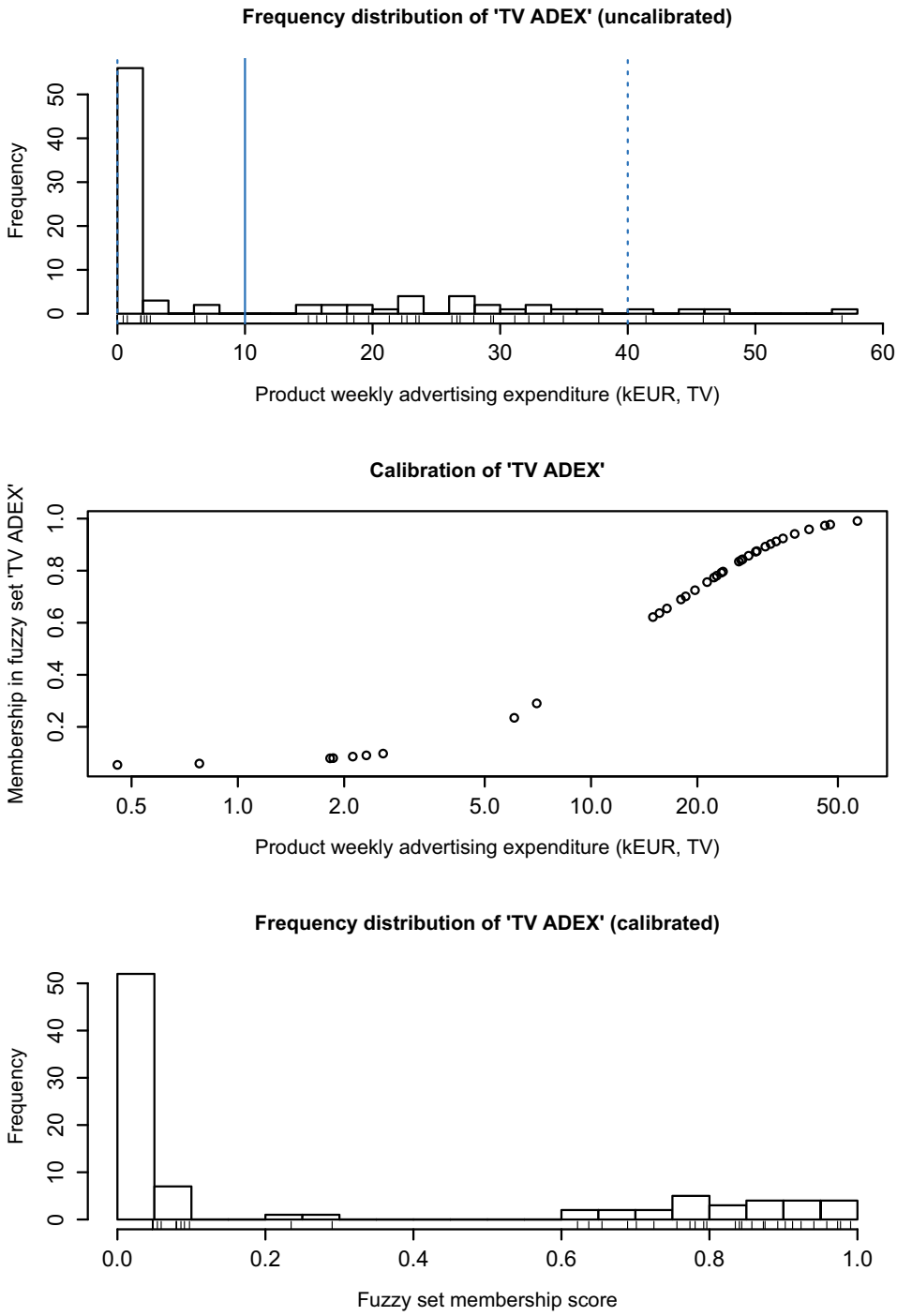

Figure 6-4. Calibrating TV ADEX (television advertising expenditure). Note: For clarity, the second panel plot omits zero expenditure weeks (calibrated to 0.0).

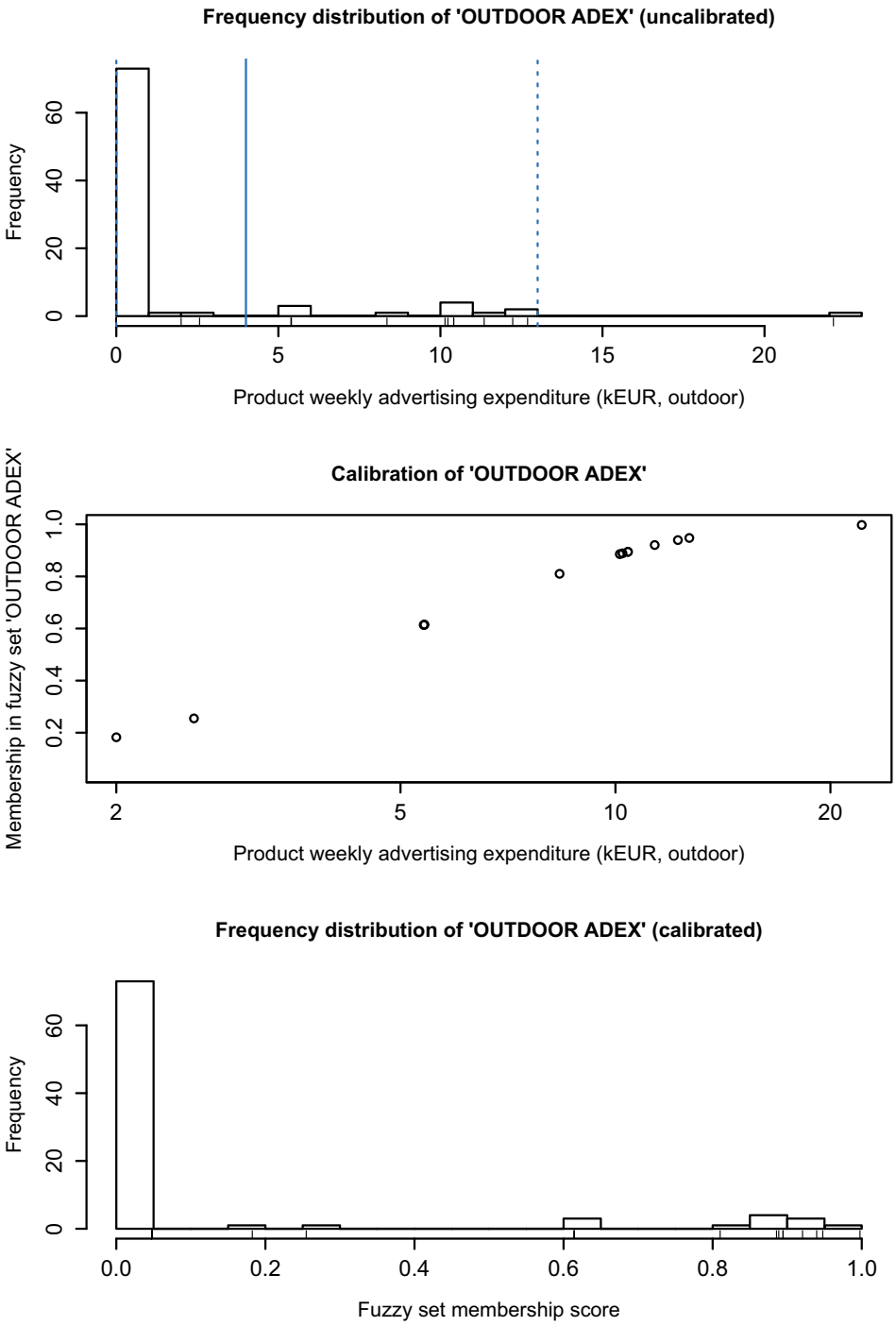

Figure 6-5. Calibrating OUTDOOR ADEX.

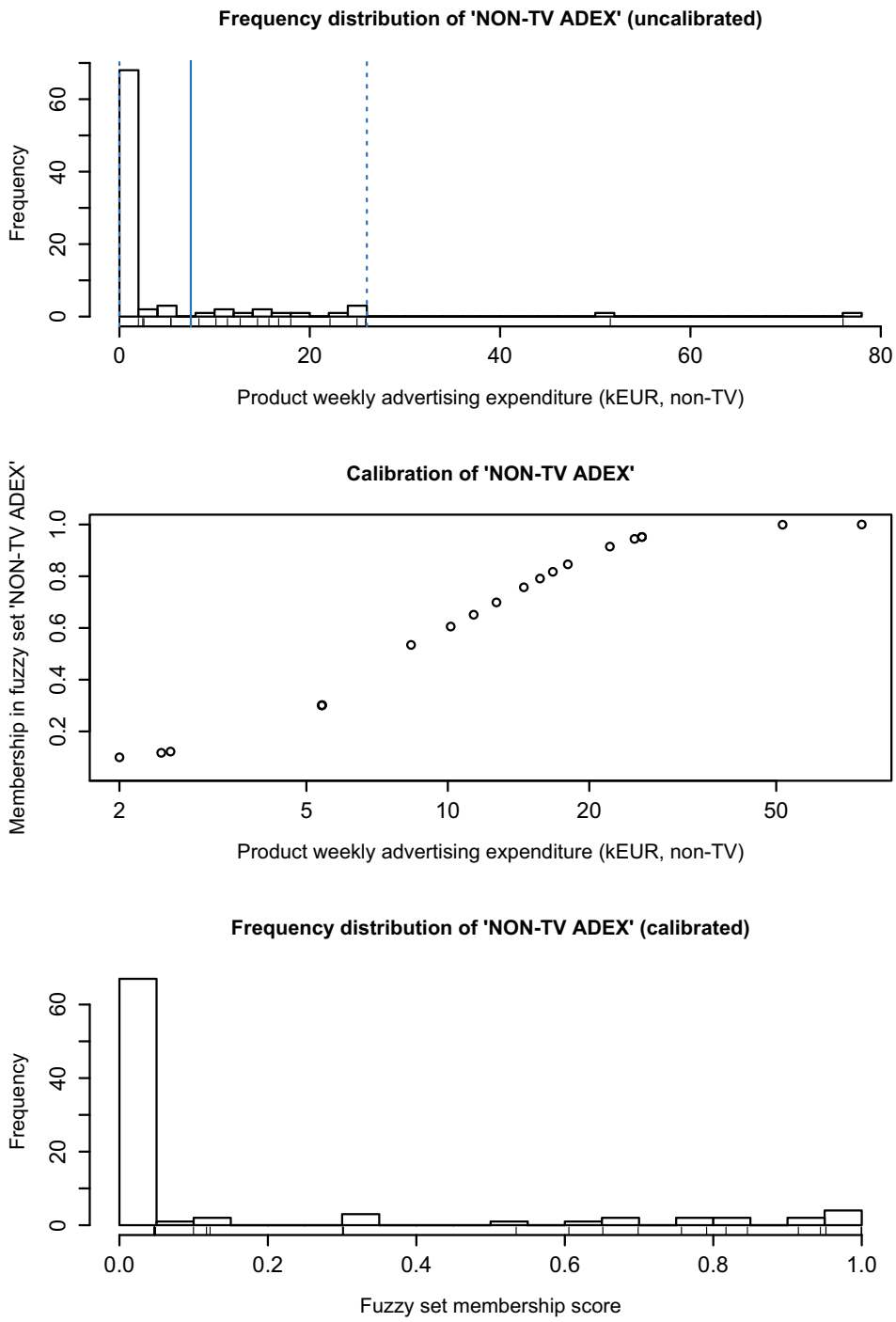

Figure 6-6. Calibrating NON-TV ADEX (non-television advertising expenditure). Note: For clarity, the second panel plot omits zero expenditure weeks (calibrated to 0.0).

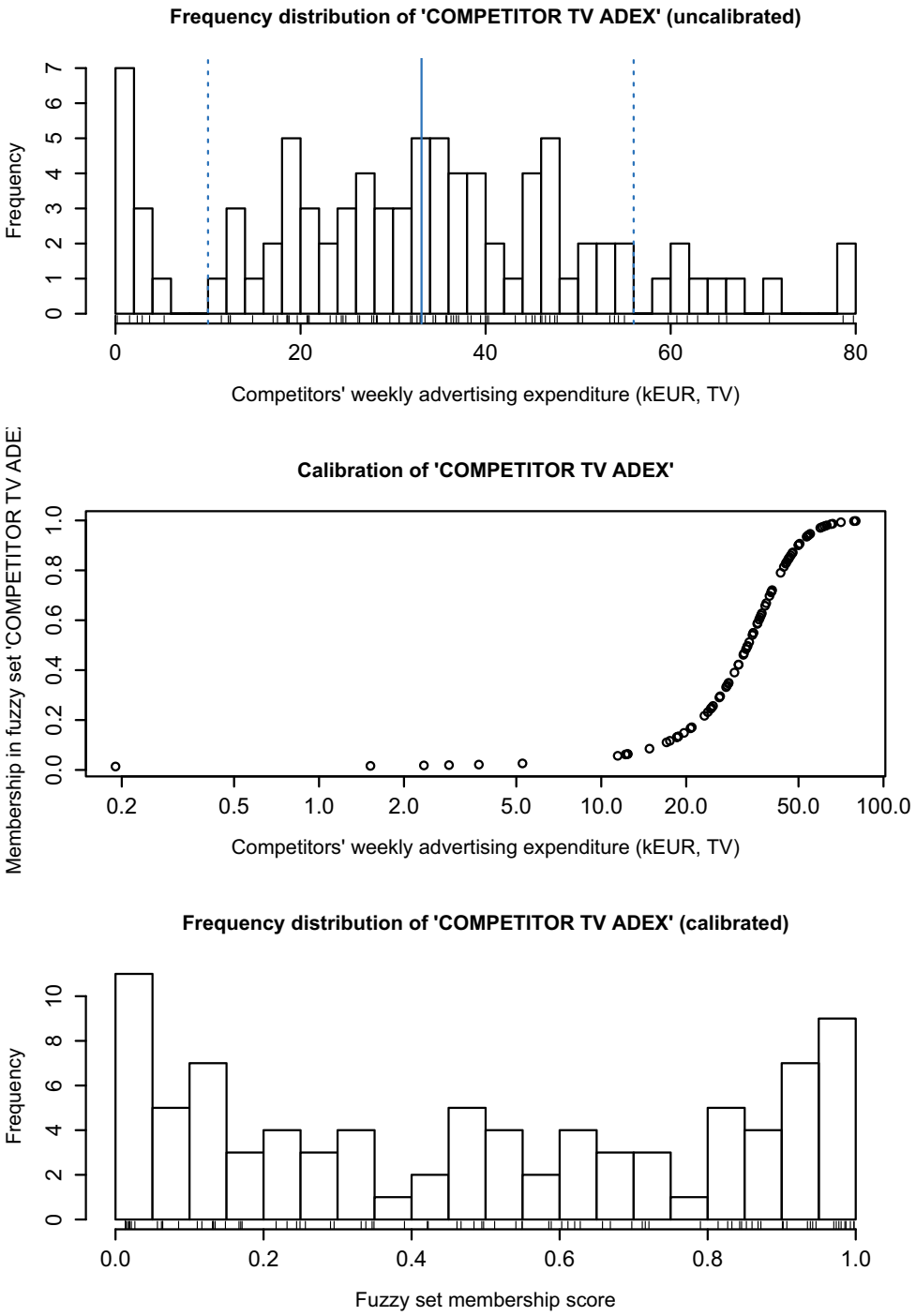

Figure 6-7. Calibrating COMPETITOR TV ADEX (advertising expenditure).

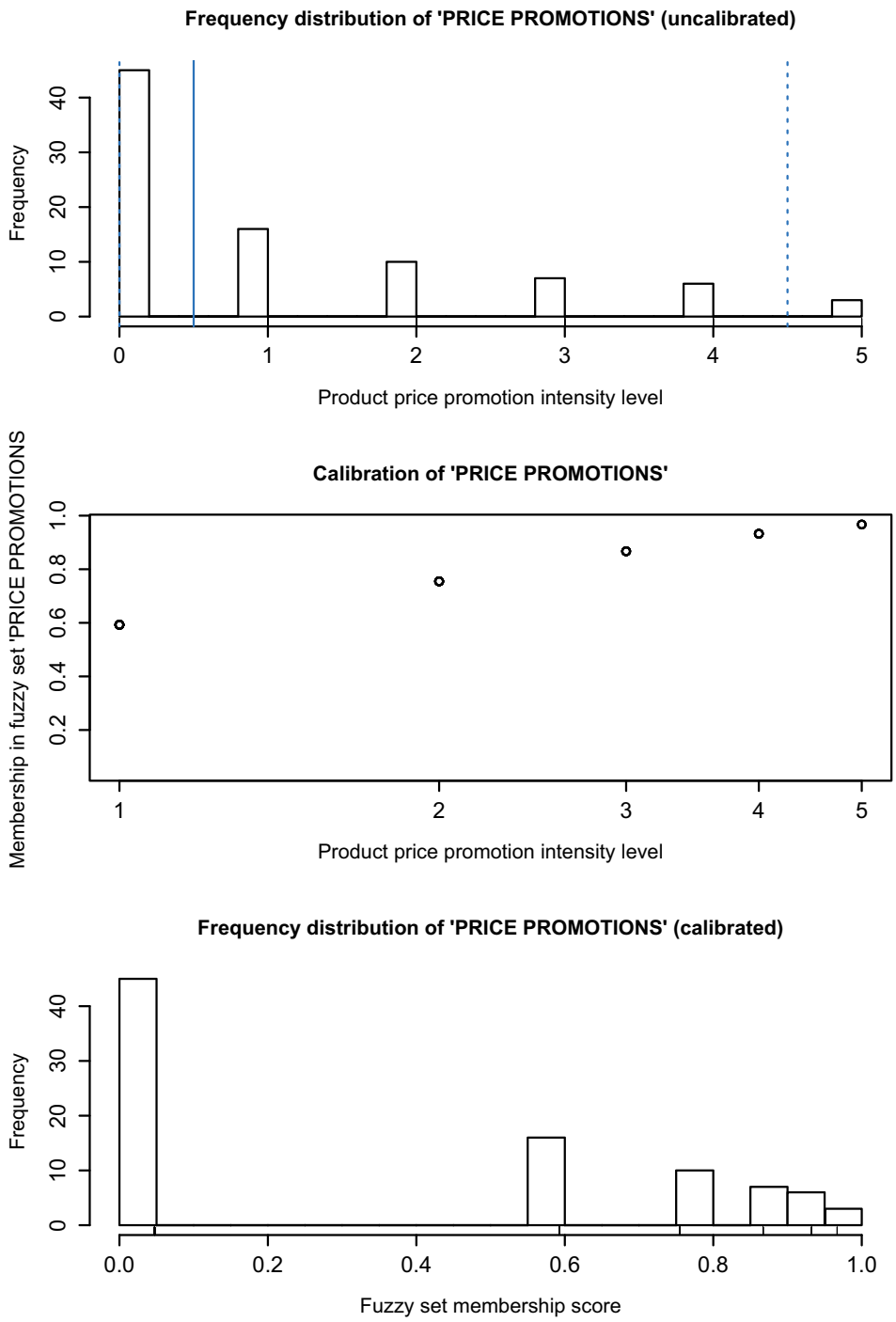

Figure 6-8. Calibrating PRICE PROMO (direct price promotions on focal Valio product). Note: For clarity, the second panel plot omits weeks without price promotions (calibrated to 0.0).

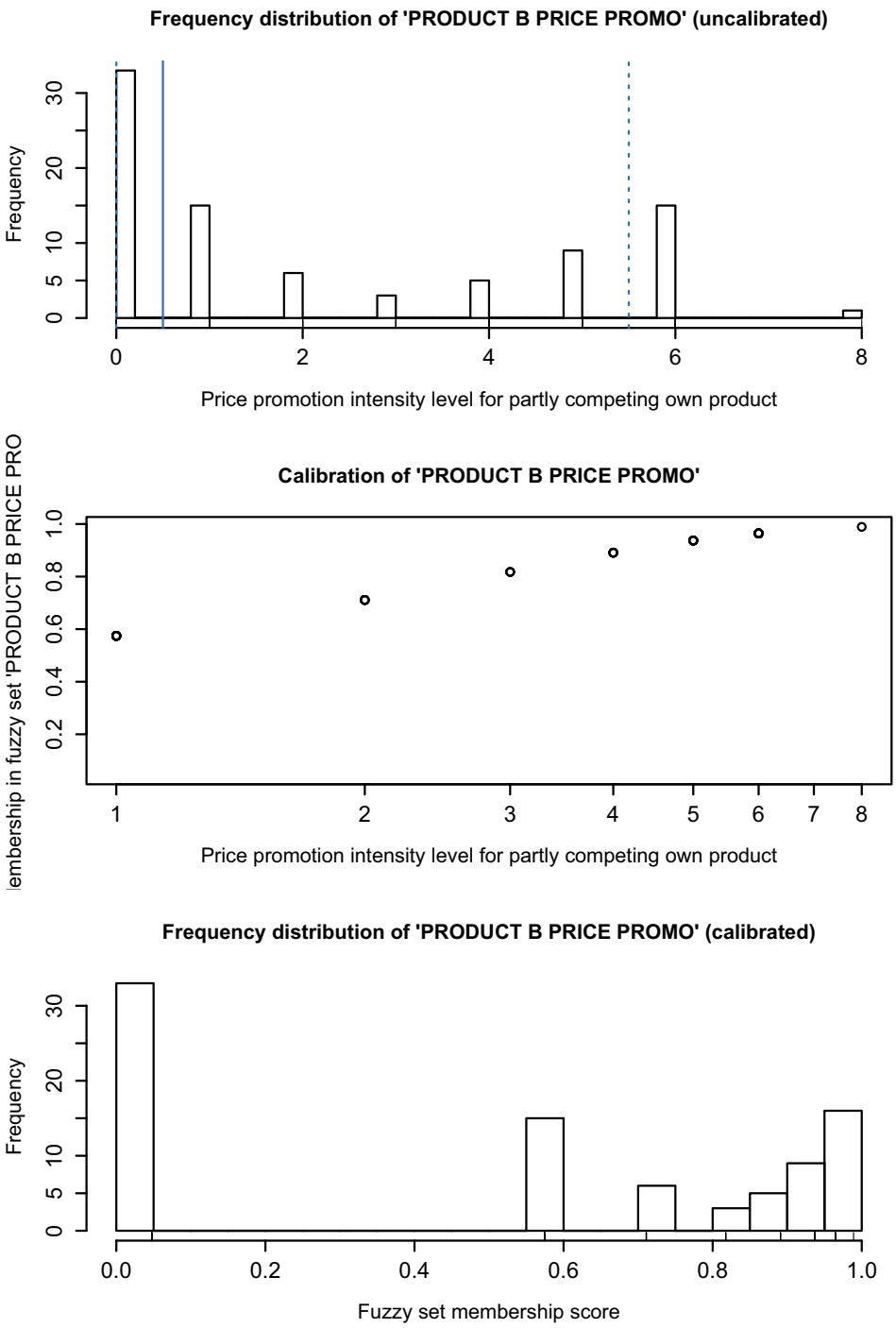

Figure 6-9. Calibrating Valio PRODUCT B PRICE PROMO intensity level. Note: For clarity, the second panel plot omits weeks without price promotions (calibrated to 0.0).

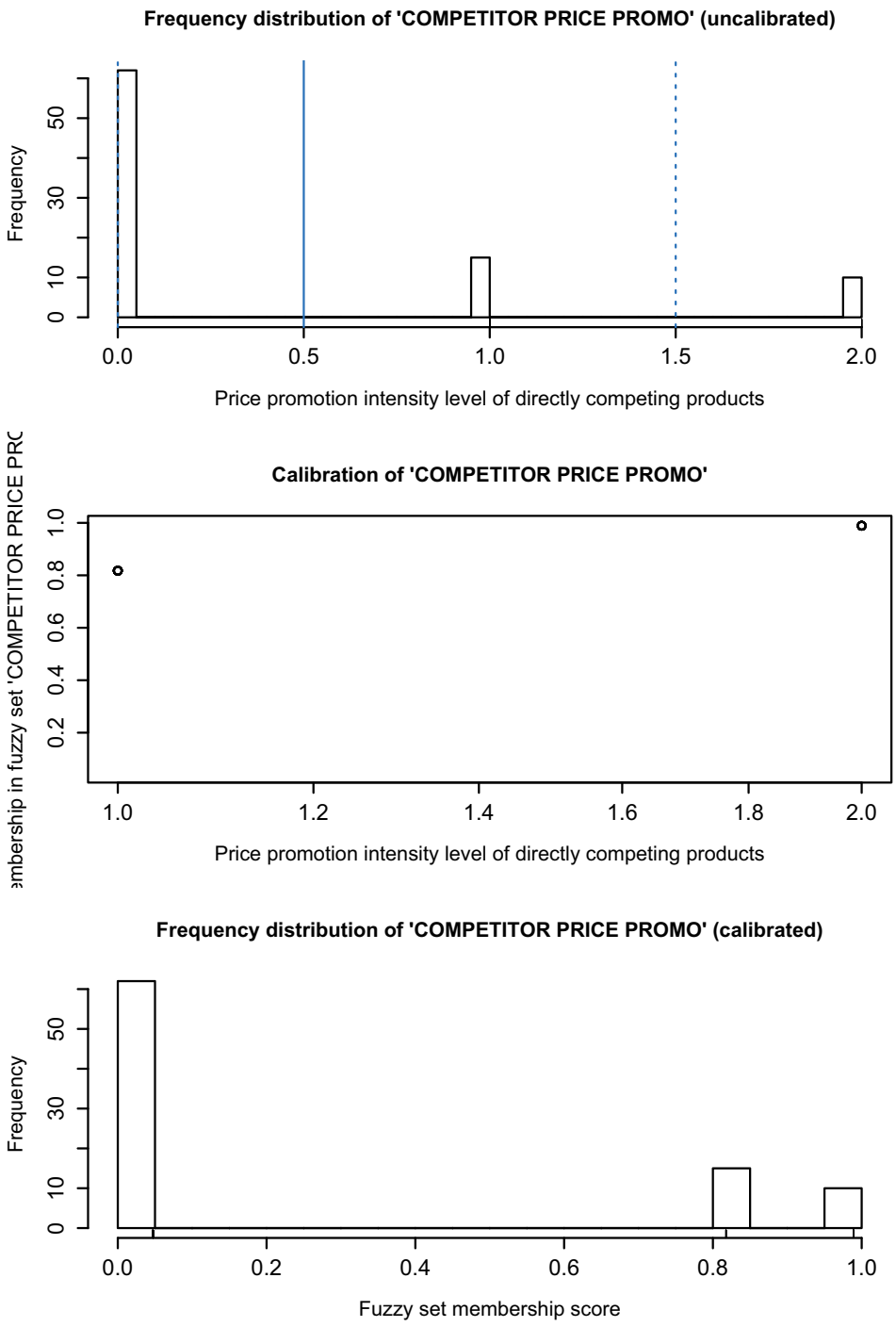

Figure 6-10. Calibrating COMPETITOR PRICE PROMO. Note: For clarity, the second panel plot omits weeks without price promotions (calibrated to 0.0).

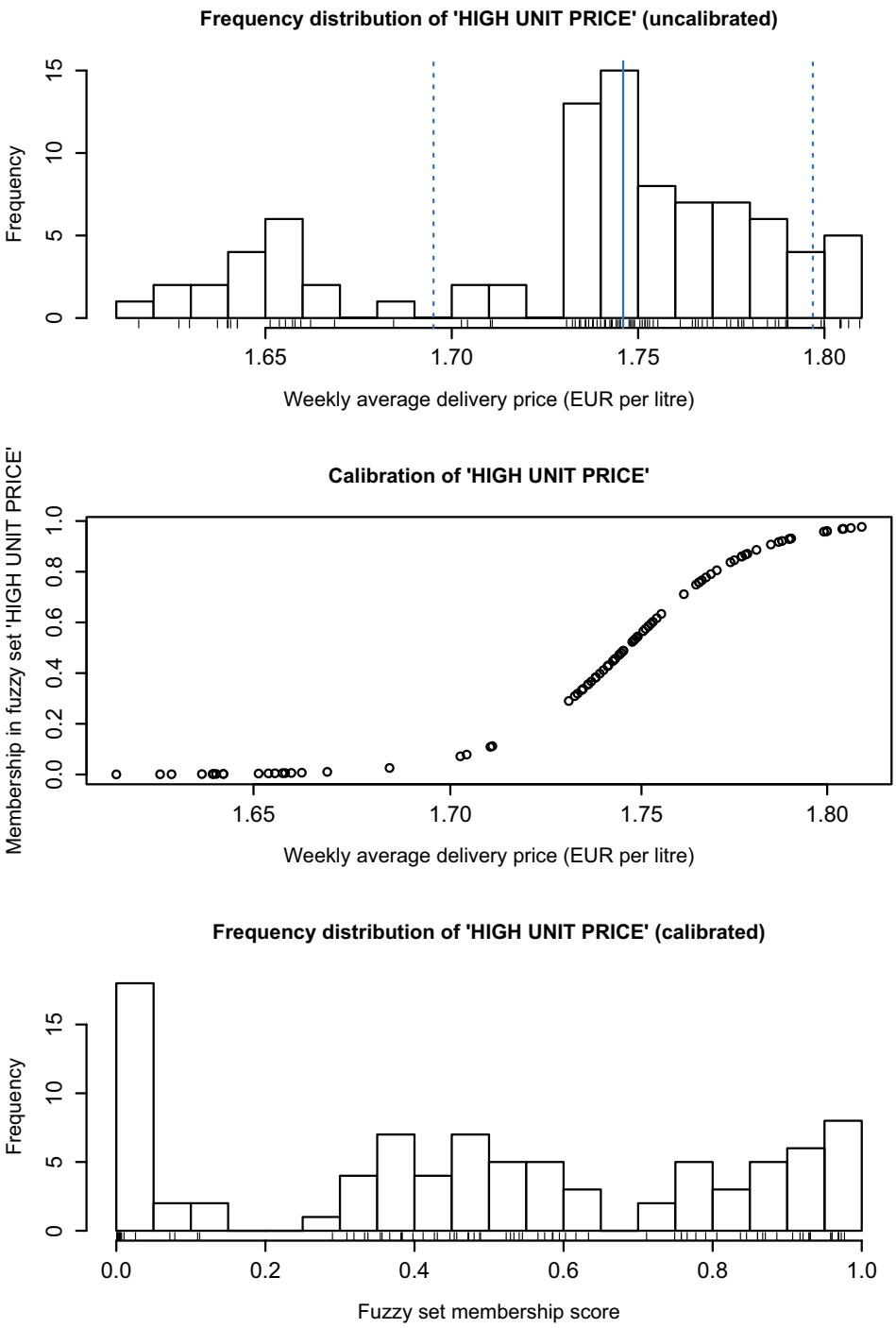

Figure 6-11. Calibrating HIGH UNIT PRICE.

To calibrate the price discount level scores, I chose to make the key qualitative distinction between weeks, which had no price promotions, and weeks which had some degree of price promotion. This is supported by Valio field sales' classification of their and competitors' promotions on one of three intensity levels, if any activity was observed. Thus, weeks without any price promotions full nonmembers of PRICE PROMO. The criterion for full membership is set before the empirical maximum of five. The distributions and calibration are illustrated in **Figure 6-8**.

Product B price promotions. In addition to the focal functional dairy product, Valio manufactures a basic version of the product ('Product B'), which does not have the special probiotic components. The product is not advertised directly to an analytically meaningful degree – media expenditure on only seven weeks out of the 87 – but is a consistent seller as a domestic staple. Price promotions, however, are used on as many as 38 weeks in the initial case population.

The branding of the basic product is tied more closely to the household name corporate brand than is the case with the focal functional dairy product. Combined with its 'staple good' nature, the role of and requirement for advertising may be fundamentally different for the two goods. Although the two goods are driven by different consumer needs, purchase of one will in most cases preclude the purchase of the other due to shared basic category. Thus, the sales volume of Product B would also be a valid potential causal factor explaining sales of the functional dairy product. However, since the interest of this study and of CEMO is in managerial actionability, price promotions of Product B are a better causal condition, as they are the only managerially used and controllable action condition with regard to Product B. Sales volume would in an intermediary outcome, and consequently of less interest.

The calibration for case membership in PRODUCT B PRICE PROMO follows the same reasoning as above for the functional dairy product (**Figure 6-9**). Crossover is set to separate no price promotions from the price promotion level score of one. No promotion signifies full nonmembership; full membership is set to include score level six and a single outlier at score level eight.

Competitors' price promotions. Besides television advertising, Valio's direct competition in the specific functional dairy product category competes with price promotions of their own. The only data available on these promotions are notes by Valio field sales staff on end retail price discount levels in the two sister retail chains, and to frequent shoppers of

the retailer. These are scored and tallied using the same method as Valio's own price promotions.

Figure 6-10 relates the distribution of direct competing price promotions. In all, 25 weeks had competing price promotions. The maximum weekly score level is two, calibrated to full membership in COMPETITOR PRICE PROMO. Weeks without price promotions are full nonmembers, and setting the crossover point at 0.5 calibrates a price promotion level score of one to approximately 0.81 membership.

Unit price. Although the price promotion level gives the most reliable indication of final retail price to consumers, the weekly variation in negotiated wholesale price per liter of functional dairy product is reflected in the price retailers are able to sell it at to consumers. A significant proportion of the variation is due to the specific mixture of unit volume sizes shipped, as larger containers and packages are generally sold for a proportionally smaller price. Other variation is due to promotional arrangements with retailers and other discounts agreed on with Valio. Unit price serves as another perspective to pricing and an intermediate summary metric with maximal data reliability: the price is computed directly from actual weekly invoiced Euros and shipped product.

The distribution of the observed weekly average unit prices is shown in panel 1 of **Figure 6-11**. A kernel density estimate yielded a value of approximately 1.75 euros per liter for the distribution of values peaking to the right. Despite an apparent but slight distribution peak at the lower end of the observed unit price range, the thresholds for full membership and nonmembership in HIGH UNIT PRICE are placed at one standard deviation on either side of the maximum. This relegated most of the variation at the lower end of the range to nonmembership, as arguably would be the immediate qualitative distinction on observing the general distribution.

Table 6-3 summarizes the calibration methods used on data for the different conditions. The entirety of the calibrated case data forms the truth table that is the basis for logical analysis in the next stage of CEMO.

Table 6-3. Final property space conditions, data distribution, and fuzzy set membership value calibration methods of conditions.

Condition	Distribution	Calibration method
HIGH SALES VOLUME	Continuous	Direct log-odds with qualitative anchoring guided by kernel density estimate for statistical distribution based thresholds
TOTAL ADEX	Continuous	Direct log-odds with qualitative anchoring based on visual evidence and fiscal significance
NEWSPAPER ADEX	Continuous	Direct log-odds with qualitative anchoring based on visual evidence and fiscal significance
TV ADEX	Continuous	Direct log-odds with qualitative anchoring based on visual evidence and fiscal significance
OUTDOOR ADEX	Continuous	Direct log-odds with qualitative anchoring based on visual evidence and fiscal significance
NON-TV ADEX	Continuous	Direct log-odds with qualitative anchoring based on visual evidence and fiscal significance
COMPETITOR TV ADEX	Continuous	Direct log-odds with qualitative anchoring, guided by kernel density estimate for statistical distribution based thresholds
PRICE PROMO	Discrete	Direct log-odds with qualitative anchoring to, foremost, distinguish non-promotion weeks from promotion weeks
PRODUCT B PRICE PROMO	Discrete	Direct log-odds with qualitative anchoring to, foremost, distinguish non-promotion weeks from promotion weeks
COMPETITOR PRICE PROMO	Discrete	Direct log-odds with qualitative anchoring to, foremost, distinguish non-promotion weeks from promotion weeks
HIGH UNIT PRICE	Continuous	Direct log-odds with qualitative anchoring, guided by kernel density estimate for statistical distribution based thresholds

6.6 Step 4: Logical analysis

A review of the correlations of the conditions with respect to each other (Pearson product-moments, see Appendix C) verifies that no single causal condition correlated strongly with or against the outcome condition of revenue gain. The trivially collinear conditions are apparent in, for example, the relationship between total advertising expenditure and

television advertising expenditure. Price promotions correlate with sales volume on an intermediate level. This adds interest to discovering whether a configurational explanation might provide more consistent findings about a sales response relationship within a subset of the cases delimited by other conditions and parallel causal mechanisms in the marketing context.

During the iteration leading to the final property space, alternative selections of causal conditions were tested with the QCA and QCA3 packages of the R software application. The *fs_tt* procedure of QCA3 for R outputs a listing of all the empirically observed combinations of conditions with respect to the corner of the vector space they are closest to (Appendix C, for both high and low sales volume outcomes separately).

The capital letters heading the columns refer to causal conditions as described in the legend below the table, and the 'OUT' column to the presence or absence of the outcome. The first column is a numerical reference to the number of the truth table row out of the complete truth table of 2^{11}=2048 rows[3] – the rows that do not match any empirical observations are omitted from the listing. For each row and condition, a 0 or 1 is given to indicate how the row is positioned in the vector space with respect to the condition. The columns entitled 'freq1' and 'freq0' list, respectively for the presence and absence of the outcome, the number of cases matching the description. As each case can mathematically have a 0.5 or greater membership in exactly one combination of all the possible truth table rows, each case is only listed on one row. The consistency column gives the consistency score of the cases in the configuration as a subset of the selected outcomes (HIGH SALES VOLUME and ~HIGH SALES VOLUME).

The process to reach the final property space involved a long series of experimentation. Counting all versions of all conditions (including all advertising expenditure media, and three retail chains with price promotion information, and volume and euro sales outcomes), the initial property space extended to 83 conditions. Use of subsets of the maximal property space was justified by focusing on single outcomes and retail chains at a time. Available computing power also restricted analysis in practice. Rotating the empirically rare and financially less significant conditions (e.g. marginal media expenditures in e.g. radio, which were made on only a few weeks) in and out of the analysis gave indication of their low occurrence in the causal configurations. This allowed analysis to focus on the conditions with higher diversity and higher expenditure significance.

Once the final property space (**Table 6-3**) was established, the conditions and calibrated data were transferred to the Windows platform fsQCA

[3] That the dimensionality (11 conditions including outcome) here is equal to that in the Blue1 Weekend Boost study is coincidental.

program (Ragin, Drass, and Davey, 2006), or another implementation of FS/QCA.

Here, I review the solutions for high and low sales volume outcomes delivered by the fsQCA software application using the parsimonious solution alternative. In the solution computation process, the user must select which *prime implicants*[4] from among the conditions should be used to define the distinctions between solution alternatives. In these selections, I have prioritized price promotions and television expenditure above other expenditure options, as these are the conditions given most significance in managerial decision making, as well as being the most frequent and empirically diverse among the case data.

The minimal parsimonious solutions contained in them are complementing explanations that explain two qualitatively different phenomena: high sales volume and low sales volume. Together, they provide a rich platform for developing a general understanding of the causal mechanisms in the context of functional dairy product marketing response.

*

Depending on choices made the analysis process, in particular on which conditions to fix as prime implicants in the production of the so-called parsimonious and complex solution[5] alternatives, and with respect to the consistency threshold, a researcher will typically arrive at a number of solution alternatives. These alternatives share basic structure, differing in what qualitatively similar conditions they use to communicate configurational information, and on which population of cases is available for configurational attribution. Given adherence to the specified basic criteria for the analysis process, no solution is categorically less correct than others. Each solution alternative contributes towards an increased understanding of causality as it is approached here, supplementing the entirety with new cues and suggestions about the nature of consumer response to marketing in the observed product and category context. The more broadly these complementary cues are considered, the broader the potential for increasing understanding.

---

[4] *Prime implicants* are reduced expressions derived in the course of Boolean minimization (Ragin, 2009, p. 183), consisting of conditions joined with logical ANDs. The minimal formula solution consists of prime implicants, each of which covers a series of configurations from the truth table for a given outcome.

[5] *Parsimonious solutions* are minimal formulae derived with the aid of user-chosen *logical remainders*, i.e. configurations of conditions without empirical instences (Ragin, 2009, pp. 181–182). *Complex solutions* are formed without using logical remainders as assumptions to simplify the formulae.

High sales volume outcome. As the analyses for a presence of the outcome and its absence have to be performed separately, I first describe the logical analysis stage of CEMO for 'high functional dairy product sales volume'.

The frequency threshold for case inclusion was set at one in order to include all material. The consistency threshold is set at 0.901. It exceeds Ragin's (2008) recommendation of a minimum value of 0.8, and complies with the recommendation of there being a natural gap in the values around that point. Setting the consistency threshold must be qualitatively informed. In this instance, a key practical discovery was, that at this level of outcome production consistency, all high sales volume configurations had, on average, a positive difference to base sales estimates. It should be noted, that a lower sales volume for an individual week does not disqualify it from the set of weeks counted as belonging to high sales volume configurations. If a lower sales volume week is highly similar in its other case conditions with a set of weeks that produce a high sales outcome, this lower sales volume week will nevertheless be included among high sales volume weeks, due to its overall vector position in the property space. However, the spread in membership in the outcome fuzzy set is reflected in the consistency score.

The complete truth table is presented in Appendix C. It is classifies 51 weeks out of 87 as members of configurations with a greater than 0.5 membership score in the set of high sales volume weeks. Running the minimization algorithm in the fsQCA program (Ragin, Drass, and Davey, 2006) to produce the parsimonious solution alternative yields six configurations of causal conditions behind the outcome. The coverage and consistency figures for the configurations are given in

Table 6-4 below. The overall coverage of the solution presented here is 0.867, meaning that nearly 87 percent of high sales volume weeks fall into these configurations. The overall solution consistency is 0.851, deemed adequate for valid conclusions to be made (Ragin 2008). This represents the degree of consistency to which the configurations as a whole account for the outcome.

Low sales volume outcome. As for the high revenue gain analysis, the frequency threshold for case inclusion was set at one in order to include all available material. The consistency threshold is set at 0.91, using an outcome-based consideration process similar to above. With this selection, the average volume sales outcomes for the configurations were all negative with respect to base sales estimates. A total of 48 weeks match the result configurations for a low sales volume outcome, but some, mirroring the

high sales volume outcome analysis, are individually above average sales volume week. Their inclusion in low sales volume configurations of due to other conditions besides outcome being shared with worse performing weeks. Again, the value exceeds Ragin's (2008) recommendation of a minimum value of 0.8, and complies with the recommendation of there being a natural gap in the values around that point.

As for the positive outcome, the complete truth table is presented in Appendix C. 48 weeks out of 87 have greater than 0.5 membership score in the fuzzy set of low sales volume weeks. The coverage and consistency figures for the configurations are given in

Table 6-4 below (parsimonious solution alternative). Overall coverage is 0.691, meaning that close to 70 percent of low sales volume weeks fall into these configurations. The overall solution consistency is 0.832, deemed adequate for valid conclusions to be made (Ragin, 2008).

6.7 Step 5: Causal explanation

The causal explanation of the findings of the logical analysis consists of separate narrative explanations and economic impact assessment of both the causes of high revenue gain and the causes of low revenue gain. Both contribute to developing a general understanding of Valio's functional dairy product marketing context and the formation of managerial implications.

6.7.1 Causal explanations for HIGH SALES VOLUME

Table 6-4 summarizes the relevant statistics for the parsimonious configurations presented here, in order of decreasing raw coverage. In the table, *raw coverage* refers to the unit proportion of weeks (i.e. cases in QCA parlance) out of the total number classified as high sales volume weeks that are explained by the configuration in question. Configurations are not mutually exclusive, but overlapping: a case can have membership, to a given degree, in any or all of them.[6] *Unique coverage* gives the

[6] The qualitative nature of these overlaps warrants some thought. The solution presented here, characteristically of the parsimonious solution type, has fairly few conditions combining to form individual causal configurations, contrasting the strongest associations. However, this only makes the overlaps somewhat more obvious, and is not directly associated with a more fundamental aspect of FS/QCA.

Each configuration represents a pattern of the co-occurrence of some conditions among cases data. If a week matches two different patterns, it is explained by two different configurations. Since all patterns do not involve all conditions (or, often with parsimonious solutions, a substantial share of conditions), this is easily seen

corresponding proportion of how many weeks the given configuration is the only solution discovered. The third metric, *consistency*, is a statistical measure of the strength of the subset relation between the cases as members of the outcome set. The next columns give the number of weeks (cases) in the solution, the sum total difference in functional dairy product liters to the base sales estimates of the weeks in question, and finally, the volume difference divided by the number of weeks for an average figure.

Raw coverage values ranging from 0.20 to 0.50 effectively indicate that all causal configurations are more or less equally represented among the case data. However, the configurations cover very different degrees of cases uniquely. Some have negligible values, meaning they are only found as parallel mechanisms acting alongside some others on some weeks.

The configuration consistency and overall solution consistency statistics can be used as a measure of the definitiveness of the answer. Configuration consistency is a statistical measure of the degree to which the case weeks are members of causal configuration. Geometrically, this represents how tightly the 'cloud' of cases belonging to the configuration in n-dimensional space is packed against the vector corner of the configuration's Boolean definition. The consistency scores of all configurations are high, exceeding the commonly used validity benchmark of 0.85 (Ragin, 2008).

Configuration characteristics. QCA orthodoxy cautions against succumbing to probabilistic urges. Configurations and their coverage proportions and do not represent likelihoods or probabilities, nor the average volume sales expected outcomes. These outcome values should serve chiefly as an illustration of the ease of returning to the original data. They cannot alone be interpreted as indicators of, for example, the strength or fitness of a configuration for brining out a certain level of outcome. The relationship would also have to take into account consistency in outcome, for example, the statistical spread of the weekly sales.

The six configurations for high sales volume can be characterized as follows:

1. VALIO PRICE PROMO • ~COMPETITOR PRICE PROMO — If only one product in the category is promoted on price, there is more demand for it. In other words,

to be the case. The qualitative interpretation of these patterns is more elusive. Causal heterogeneity was observed within the population, and now within the cases themselves! This suggests that parallel causal mechanisms are acting. Either of the two mechanisms can be interpreted as being a valid route to the outcome, but judging their relative dynamic and synergies, beyond that they clearly do not interfere enough to cause a reverse outcome, is difficult without future research.

a perception of a relative difference in price position is only realized if just one actor promotes price.[7]

2. COMPETITOR TV ADEX • NO COMPETITOR PRICE PROMO • HIGH UNIT PRICE — The combination of high promotion intensity for competing brands coupled with a lack of retail price promotion for their version suggests that demand is more for the specific functional dairy product category than for a specific brand. A competitor's advertising expenditure can be seen as windfall for Valio, if they do not support their television campaign with price promotions at the retail level. In this configuration, the interaction coincides with a high unit price on the wholesale level, suggesting that price is assessed relative to competing products within the category, or that the weeks in this configuration are particularly lucrative for retailers in Valio sales.

3. VALIO TOTAL ADEX • ~COMPETITOR PRICE PROMO — On weeks when Valio is active promoting their product on TV, and competitors fail to counter with price promotions at retail level, Valio sees high sales volumes of their product.

4. COMPETITOR TV ADEX • VALIO PRICE PROMO • ~HIGH UNIT PRICE — This configuration shares characteristics with the second. The condition of high competitor advertising expenditure is shared, and the price promotion condition effectively implies a comparative dynamic between Valio and competitor price impressions. The low unit price is most probably directly associated with price promotion execution, involving discounts for retailers at the wholesale level, leading to the inclusion of the third condition.

5. VALIO TOTAL ADEX • COMPETITOR TV ADEX • ~VALIO PRODUCT B PRICE PROMO — High category promotion, by either Valio or competition, increases category sales, especially in the absence of price promotions in the substitute dairy product category. Verifying the effect would require overall market data, but the explanation makes good sense.

6. VALIO NON-TV ADEX • ~VALIO PRODUCT B PRICE PROMO — This configuration corresponds closely with the previous one, but also has unique coverage by itself. There is something causally interesting in the role of non-television advertising that influences purchase behavior

Of these configurations, the first and the fourth emerge as the most significant in product sales volume. Both are highly consistent. The weekly volume differences are not all positive, and the first configuration covers

[7] This utterly unsurprising combination of conditions has particular value as an analysis validity indicator: no great assumptions or creative efforts are necessary to understand the mechanisms proposed in this chapter. The narrative has a logical consistency, and emerges readily from the conditions, elementary economic logic, and basic consumer behavior.

one week with an exceptionally weak outcome. Nevertheless, the overall consistency of the weeks as members of the configurations is high.

In addition to the configuration-level findings, the commonalities (overlaps) between configurations have qualitative significance. Configurations sharing a condition can be re-examined. For example, the first three configurations all share low competitor price promotion as a causal condition. The terms of logical expression can be refactored, and we may write:

~COMPETITOR PRICE PROMO • (VALIO PRICE PROMO
+ COMPETITOR TV ADEX • UNIT PRICE
+ VALIO TOTAL ADEX)
+ …
→ HIGH SALES VOLUME .

Thus, the lack of competitor price promotions acts not alone to produce higher sales volumes, but in conjunction with one of three other terms. Valio's price promotions, intense category promotion in television by competitors, and Valio's own total advertising level play a similar role in shaping the outcome, either via increasing weekly demand for the functional dairy product category[8], or adjusting the comparative price differential in Valio's favor. A price promotion, from Valio or competition, does not emerge alone as a consistent causal factor. To achieve high sales volume outcomes, configurational support is needed from either advertising or lack of competing price promotion.

[8] In this study, competitor activity has been demonstrated to increase category demand but, lacking competitor sales data, I cannot directly conclude that the effect is symmetric between brands. Thus, Valio advertising may well increase category demand, especially if the content emphasis is on function as opposed to brand. Valio can be assumed to benefit from the proximity of its corporate brand to the product brands.

Table 6-4. Causal configuration statistics and associated volume sale effects (high SALES VOLUME).[9]

	Causal configuration	Raw coverage	Unique coverage	Consistency	# Weeks	Total Δliters	Avg Δweek/week
(1)	VALIO PRICE PROMO • ~COMPETITOR PRICE PROMO	0.49	0.16	0.92	20	122 432	6 122
(2)	COMPETITOR TV ADEX • ~COMPETITOR PRICE PROMO • HIGH UNIT PRICE	0.37	0.07	0.88	17	41 972	2 469
(3)	VALIO TOTAL ADEX • ~COMPETITOR PRICE PROMO	0.36	0.03	0.87	20	35 028	1 751
(4)	COMPETITOR TV ADEX • VALIO PRICE PROMO • ~HIGH UNIT PRICE	0.31	0.03	0.96	14	107 594	7 685
(5)	VALIO TOTAL ADEX • COMPETITOR TV ADEX • ~VALIO PRODUCT B PRICE PROMO	0.23	>0.00	0.90	10	12 078	1 208
(6)	VALIO NON-TV ADEX • ~VALIO PRODUCT B PRICE PROM	0.20	0.02	0.89	8	34 270	4 284

[9] All of these configurations contain weeks which individually have an outcome below the base sales estimate. This aspect of QCA is explained by how the minimization algorithm applies the consistency criterion for case inclusion to the corners of the property space that are host empirical both positive and negative outcome instances of cases.

If a configuration is seen to produce a mostly positive outcome, there may still be individual cases within the configuration which are negative in outcome. Some unknown conditions not included in the analysis could allow us to separate them, but with present information they cannot be broken from each other, as this would skew the outcome consistency statistic to a deceivingly high level.

Return on marketing investment is an increasingly popular performance metric in many organizations. The challenges in calculating reliable and valid estimates are evident observing the broad spread across configurations of total sales returns on total advertising expenditure (**Table 6-5**, final column). Some high expenditure weeks produce marginal returns below the expenditure. Furthermore, the (opportunity) cost of price promotions would be exceedingly complicated to include in the weekly expenditure sum. Thus, configurations with high price promotion have inflated sales volumes that are not due to advertising expenditure. Valid and reliable evaluation of the ROI relationship requires either broader temporal scope, or significantly better information on the relevant causal conditions and the marketing dynamic within the context. There is no evidence (or reason) to suppose a *universal* causal link between expenditure and sales performance, even within the causal paths (configurations) presented here. Too many factors confound the relationship, from badly understood persistence effects of advertising to unknown costs and missing market data.

Table 6-5. Causal configurations with coinciding advertising expenditure and marginal sales revenue (HIGH SALES VOLUME configurations). 'Return on adex' indicates only direct short-term coincidence, not causal attribution to advertising effects.

	Causal configuration	**Total adex (€)**	**$\sum\Delta_C$ (€)**	**Return on adex**
(1)	VALIO PRICE PROMO • ~COMPETITOR PRICE PROMO	38 368	200 270	422 %
(2)	COMPETITOR TV ADEX • ~COMPETITOR PRICE PROMO • HIGH UNIT PRICE	82 764	74 547	-10 %
(3)	VALIO TOTAL ADEX • ~COMPETITOR PRICE PROMO	183 703	62 287	-66 %
(4)	COMPETITOR TV ADEX • VALIO PRICE PROMO • ~HIGH UNIT PRICE	90 936	177 664	95 %
(5)	VALIO TOTAL ADEX • COMPETITOR TV ADEX • ~VALIO PRODUCT B PRICE PROMO	148 320	19 068	-87 %
(6)	VALIO NON-TV ADEX • ~VALIO PRODUCT B PRICE PROM	183 676	56 625	-69 %

6.7.2 Causal explanations for LOW SALES VOLUME

As above for high sales volume, we can qualitatively describe and discuss the configurations that are sufficient for the negative outcome of low sales volume (**Table 6-6**) as follows:

1. ~VALIO PRICE PROMO • COMPETITOR PRICE PROMO — The inverse of the simple price perception difference considered in the first configuration of HIGH SALES VOLUME weeks, above. A competitor's price promotion only takes away business unless Valio can match the action.

2. ~VALIO PRICE PROMO • ~VALIO PRODUCT B PRICE PROMO • ~HIGH UNIT PRICE — Discounts to retailers (~HIGH UNIT PRICE) do not drive end sales without price promo activity. During result reviews, Valio managers associated these weeks with situations where retailers do not pass on their discounts to consumers.

3. HIGH VALIO TOTAL ADEX • ~VALIO PRICE PROMO • ~HIGH UNIT PRICE — High overall advertising expenditure can be ineffective if it's not supported by price promotion, making concurrent discounts to retailers worth further study. This finding alone does not conclusively validate a practice of scheduling price promotions on advertising activity, as attention should also be extended to the nature of the advertising run on these weeks, in addition to other unaccounted market phenomena.

4. COMPETITOR PRICE PROMO • HIGH UNIT PRICE — If Valio is selling to retailers at a higher premium, and rivals are competing on price, the low sales volume mechanism is essentially the same as in configuration 1.

5. VALIO TV ADEX • ~VALIO PRICE PROMO • ~VALIO PRODUCT B PRICE PROMO — As in configuration 3, high advertising expenditure (here limited to the television medium) without price promotion (and associated added shop floor prominence) for Valio's dairy products leads to low sales volume outcomes.

6. VALIO TOTAL ADEX • ~VALIO TV ADEX • COMPETITOR TOTAL ADEX • ~HIGH UNIT PRICE [10] — The importance of television in the media mix is highlighted by this configuration. Messages in other media are not effective in channeling the (presumably) high category demand built by the competitors advertising into Valio purchases. Another possibility is that on these weeks the competitor's advertising has managed to drive the brand, not only the category. The low unit price is likely a consequence of the high advertising expenditure being used as an argument, unsuccessfully sweetened with discounts, to get retailers to buy more stock. The retailer dynamic in order volume decision-making warrants further study.

[10] This configuration only explains two cases, and has zero unique coverage.

7. VALIO TOTAL ADEX • VALIO PRICE PROMO • HIGH UNIT PRICE [11] — Here, a price promotion is not subvented with discounts to retailers, perhaps with an understanding that the high level of advertising expenditure should suffice to drive sales during the campaign. Retailers may not be buying enough product or, more likely, have bought large stocks when price was lower, in anticipation of the campaign now underway.

The raw coverage of these configurations ranges from 0.14 to 0.43, with five out of seven having negligible unique coverage – several causal mechanisms must act in parallel in these instances. The average volume sales differences to base sales estimate (**Table 6-6**, final column) are all negative, a consequence of setting the outcome consistency threshold at 0.91, whereby many property space corners with overly good weeks were eliminated. Configurations 6 and 7 only have one and two weeks in their population, and overlap with other configurations as is evidence by the low unique coverage. For these reasons, justifying the informational role becomes more difficult on the managerial level, despite the QCA tenet of the qualitative value of even a single reliable observation of a configuration. Unknown or unknowable conditions build the element of chance into the causal contingencies of a marketing context.

[11] This configuration only explains one case, and has zero unique coverage.

Table 6-6. Causal configuration statistics and associated volume sale effects (~HIGH SALES VOLUME).

Causal configuration		Raw coverage	Unique cover-age	Consis-tency	# Weeks	Total Δliters	Avg Δweek/ week
(1)	~VALIO PRICE PROMO • COMPETITOR PRICE PROMO	0.43	0.12	0.86	15	-124 686	-8 312
(2)	~VALIO PRICE PROMO • ~VALIO PRODUCT B PRICE PROMO • ~HIGH UNIT PRICE	0.38	0.11	0.91	7	-70 984	-10 141
(3)	VALIO TOTAL ADEX • ~VALIO PRICE PROMO • ~HIGH UNIT PRICE	0.30	0.01	0.93	5	-45 052	-9 010
(4)	COMPETITOR PRICE PROMO • HIGH UNIT PRICE	0.28	0.02	0.88	9	-52 575	-5 842
(5)	HIGH VALIO TV ADEX • ~VALIO PRICE PROMO • ~VALIO PRODUCT B PRICE PROMO	0.25	>0.00	0.76	7	-22 296	-3 185
(6)	VALIO TOTAL ADEX • ~VALIO TV ADEX • COMPETITOR TOTAL ADEX • ~HIGH UNIT PRICE	0.16	>0.00	0.91	1	-1 344	-1 344
(7)	VALIO TOTAL ADEX • VALIO PRICE PROMO • HIGH UNIT PRICE	0.14	>0.00	0.94	2	-9 687	-4 844

As for the positive outcome, it is possible to calculate simple returns on marketing investment. As set up by my choice of outcome consistency criterion, all values are consistently negative. However, they lead to little meaningful interpretation beyond that. Price promotion components figure heavily among the conditions, but no combination among those in **Table 6-7** worked to Valio's advantage. The advertising expenditure given for the weeks in these configurations has gone to waste in as much as incremental (i.e. immediate fiscal) effects were its purpose.

Table 6-7. Causal configurations with Valio's coinciding advertising expenditure and marginal sales revenue (LOW SALES VOLUME configurations). *Return on adex* indicates only direct short-term coincidence, not causal attribution to advertising effects.

	Causal configuration	Total adex (€)	$\sum\Delta_C$ (€)	Return on adex
(1)	~VALIO PRICE PROMO • COMPETITOR PRICE PROMO	138 881	-215 725	-255 %
(2)	~VALIO PRICE PROMO • ~VALIO PRODUCT B PRICE PROMO • ~HIGH UNIT PRICE	24 925	-123 372	-595 %
(3)	VALIO TOTAL ADEX • ~VALIO PRICE PROMO • ~HIGH UNIT PRICE	49 396	-78 357	-259 %
(4)	COMPETITOR PRICE PROMO • HIGH UNIT PRICE	111 956	-92 452	-183 %
(5)	HIGH VALIO TV ADEX • ~VALIO PRICE PROMO • ~VALIO PRODUCT B PRICE PROMO	103 535	-38 548	-137 %
(6)	VALIO TOTAL ADEX • ~VALIO TV ADEX • COMPETITOR TOTAL ADEX • ~HIGH UNIT PRICE	2 084	-2 207	-206 %
(7)	VALIO TOTAL ADEX • VALIO PRICE PROMO • HIGH UNIT PRICE	18 877	-17 097	-191 %

*

The low sales volume narrative does not contradict the explanations for high sales volume, but complements them. The asymmetry of causality is frankly exposed. Rich, new information and avenues for further studies are found in the second analysis, knowledge which would have not been accessible had I only carried out the process for the positive outcome.

6.8 Evaluating solution goodness

Despite apparent merits, and in part due to them, this empirical study entails a number of weaknesses and limitations; some pertinent to how CEMO was carried out in this specific instance, some highlighting properties of the FS/QCA approach itself. Readers familiar with the previous chapter will discover strong similarities with the Blue1 Weekend Boost in both treatment and findings.

6.8.1 Validity

Besides the validity of FS/QCA as a method and evidence confirming the original ontological assumptions about configurational causality in the marketing context, the validity of a CEMO analysis is dependent on a valid epistemological approach to applying FS/QCA as a method, and the validity of the outcome as an answer to the set research question. The QCA analysis criteria discussed by Schneider and Wagemann (2010; cf. Section 4.3) provide practical discussion points.

First, and exactly as for the previous empirical study, the use of FS/QCA is warranted, as the goal of developing causal hypotheses based on observable patterns in the data is one that is explicitly specified by Ragin and Rihoux (2004, p. 6).

Second, the study is intended to be a demonstration of the application of FS/QCA into a FMCG sales response contest, limited to a single method. A more comprehensive view of the nature and scale of response would call for triangulation with other qualitative and quantitative methods. The configurations do, however, directly suggest further research, both with statistical assessment regarding e.g. expected scale and likelihood of the outcome for given configurations.

In evaluating the execution of the research strategy, Schneider and Wagemann (2010) emphasize the "explicit and detailed justification for the (non) selection of cases," the selection of a moderate number of conditions and the outcome on the basis of "adequate theoretical and empirical prior knowledge." This empirical study satisfies these criteria to a large extent. The initial population was restricted by historical data availability of detailed sales data. The number of conditions was likewise limited by data availability, and further reduced in the course of truth table construction and trimming to a moderate number.

In light of my current understanding, the majority of negative impact on content validity stems firstly from missing market share data, and secondly from poor metrics and missing qualitative information on advertisement

content. In all, the comparatively slight degree of qualitative familiarity with the cases on an individual level is a clear weakness of this empirical study.

In line with Wagemann and Schneider (2007) and others, the outcome and its negation are considered in separate analyses, without assuming the causes for high sales volume to be reversed to bring about low sales volume.

The result configurations presented in this study do not include single condition terms, rendering inapplicable Wagemann and Schneider's (2007) concern over overinterpreting "single conditions which only appear as causally relevant in conjunction with different combinations of other single conditions" as not being "in line with the epistemological foundation of QCA."

No causal mechanisms are considered more important or significant than others, but ideas are presented on further analyses that might yield managerially relevant information on the relative or absolute importance of configurations and cases comprising them.

With regard to the validity of solution consistency, FS/QCA is a young methodology, and much less tested and reviewed than statistical methods in daily use in marketing research and practice. The minimum outcome consistency criterion of above 0.85 for case inclusion is consistent throughout FS/QCA literature, and is reflected in this study. The value is seen to be appropriate in the context, as it captures an adequate number of cases from the entire data set. I find few qualms with regard to the validity of this study in this respect.

Assessing and criticizing the validity of the narratives build around the causal configurations is bound to reliability and transparence. The qualitative implications and interpretations of the findings will always be such: interpretations. In this study, the conclusions are presented in the language of fuzzy sets, sufficiency, and necessity, without resorting to the epistemologically incorrect language of covariance and probability, as warned against by Wagemann and Schneider (2007). Variable-oriented language is only used to contrast and compare elements of analysis to other techniques. The validity of the presented conclusions is determined, ultimately, by their contribution to advancing substantive understanding through new practical insights for business development and new directions for research and development.

Linking the findings back to the cases themselves assesses their plausibility as contributions, and allows reflecting on the common qualitative nature of the original cases, now grouped by causal configurations. The identifiable case weeks belonging to the causal

configurations cannot be included in this report due to contractual restrictions on publishing the raw data.

Finally, it must be stated once again that the results of the analysis do not in themselves prove a causal link. Indeed, such a feat can be seen to lie far beyond the scope of social science in general. The solutions do, however, provide valid description of the empirical nature of patterns in the data, usable as platforms for further research and business development, as exemplified by an expressed desire by Valio to extend the analysis to further product categories and marketing contexts.

6.8.2 Reliability

Reflecting on the reliability of the research process returns us to the concept of transparence. If an analysis process is reliable, another researcher working with the same data can repeat the analysis to get the same results. The degree to which this is possible depends on transparence and reliable documentation of the analysis process. For CEMO, the key determinants of reliability are transparence in data collection, property space construction, data calibration, truth table formation, logical analysis, and the final stage of selecting solutions and drawing conclusions.

Wagemann and Schneider's criteria concerning the research process are relevant for reliability. The empirical study presented here is in no way a mechanical application of QCA as a software tool, and qualitative understanding of and familiarity with the cases is referred to throughout the analysis. However, and as discussed above with regard to validity, the property space includes information on a broad range of factors, but some key qualitative understanding is currently missing. This weakness is being directly attended to with the establishment of new data collection procedures intended to capture, in narrative and along various assessment axes, more of the operative reality of marketing and field sales at Valio.

With regard to the transparence and replicability of the research process, Schneider and Wagemann (2010) suggest that the raw data matrix should be published when possible, as well as the truth table. The former is in this instance impossible, due to the confidentiality of the raw data, but the truth table is provided in Appendix C.

Furthermore, the authors set the criteria that the solution formulas should be provided in correct, formal notation, in addition to the narratives, and with the associated consistency and coverage scores. In this instance, I contradict their recommendation. One formulaic representation is included as a demonstration of refactoring the solution, but I feel that the benefit of representing the configurations with letter-coded symbols (or strings

interspersed with plusses and asterisks, running to several lines) for the sake of QCA-versed readers would detract too much from the value of the more accessible tabular representation.

Appropriate QCA terminology is followed throughout. Multiple forms of representing the cases and conditions are used to some degree, but triangle plots, for example, have not been included for the outcome relationships.

The data collection procedure and the initial constraints on the property space have been discussed at length. The fuzzy set calibration stage is perhaps the most significant with respect to demands for transparence to ensure replicability. Accordingly, an effort has been made to detail it as well as the analytical steps of calibration and data transformation to an extent that allows another researcher to replicate the analysis and form the same truth table, given the raw data. Computerized, peer-reviewed algorithm implementations are used to minimize the truth table. Wagemann and Schneider recommend presenting both the complex and parsimonious solution types, but in this empirical study, the broader purpose is better served with only the parsimonious solutions[12] being presented. The complex and intermediate solutions are too long to warrant managerially meaningful interpretation in his context.

6.9 Discussion

At the onset of this empirical study, its aims were set at first, finding which conditions used by Valio to promote the functional dairy product have been causally relevant and, second, discovering configurational explanations for sales volume outcomes. In the course of property space development, practical reflection on the diversity, necessity and sufficiency of individual conditions, together with consideration of their economic significance, led to a final property space of 10 causal conditions. These were used for a configurational analysis using FS/QCA to produce a set of explanations for both high and low sales volume outcomes, among a data set of 87 weeks. The empirical study provided substantial knowledge about approaching a FMCG marketing response context with CEMO. In addition to accrued knowledge on applying the method empirically, the substantive results regarding the marketing context of the functional dairy product had relevant and concrete managerial implications for Valio. Above all, the perceived quality results and the nature/type of the produced information

[12] The complex and parsimnious solution types differ in their handling of logical remainders. In complex solution, the logical remainders are assumed to lead to la outcome, and to all lead to the outcome in the parsimonious solution type.

matched expressed MMSS decision support demand to such an extent, that managers called for an integrated analysis solution for use in further contexts.

In review sessions of CEMO results with Valio managers, the high contextual relevance and 'qualitative sense' of the configurational explanations were the immediately most appreciated perceptions. The inability to make conclusions about the nature of complex interactions, of the mechanisms influencing performance, had earlier been identified as a problem. The analysis process summarized in this chapter has provided Valio with the possibility of systematically building configurational knowledge about their marketing contexts. Compared to statistical analyses carried out and offered by research consultancies, CEMO has delivered knowledge that is felt to be more relevant as a basis for decision-making, and standing up to the need for information. The main reason for this is the preservation of cases (weeks) as integral wholes in the findings, and not separating conditions from their qualitative empirical context as variables.

In addition to the specific functional dairy product context knowledge accrued in the CEMO process, the test investigation has afforded confidence for Valio to initiate two projects to:

1. Implement CEMO as weekly dashboards for a broader range of brands, as a basis for better understanding contextual interaction dynamic, and support to media mix and marketing content planning; and

2. Establish a new system for collecting qualitative and quantitative marketing and field sales observations. For CEMO analysis, the role of this system is to provide a broader range of causal conditions and weekly qualitative metrics. The more comprehensive history of marketing activities allows managers to drill down to individual weeks contained in configurations to access information on what activity was ongoing in the marketing context during the week in question.

The response at Valio is a sign of managerial interest and belief in the value of the information produced and producible with CEMO. The analysis approach is scalable, versatile, and robust. Foremost, it builds on existing data, integrates organizational knowledge of qualitative aspects of the marketing context, and offers access to configurational information that has not previously been available for decision support. As such, it has clear value as a knowledge-driven approach to MMSS.

The high population size (N) gave the functional dairy product analyses (87 cases, chiefly quantitative data) a distinctly different character from the Blue1 Weekend Boost promotions (27 cases, with relatively more qualitative data). The calibration of continuously distributed conditions to fuzzy membership scores relied now on observing characteristics of the

distributions of values, with some qualitative reflection on their possible significance with respect to the *kind* of variation they evidenced. Furthermore, the present context had a more clearly predefined property space, where little work had to be done to arrive at conditions along which to evaluate the cases and observe differences. The key challenge was, instead, in trimming the property space to an analytically workable dimensionality without losing conditions that were involved in the key causal mechanisms.

The high sales volume outcome configurations show that a model should be built to factor in the cost of price promotions. Additionally, the qualitative nature of advertising, unknown for the present data, protrudes from analysis as a future condition to investigate and include. Differences in the effectiveness of advertising can have substantial effect on behavioral outcomes. In conjunction with this information, it might be useful to examine the total advertising expenditure in the market as a condition of its own, to better understand how the functional category promotion effect interacts with brand communication.

On a managerial level, this application of FS/QCA into marketing performance has direct implications for marketing management by imparting a relatively objective description of the managerially controllable and observable conditions associated with specific sales outcomes. This knowledge can be used as a basis for creating an accurate and relevant marketing metrics system, and used to develop the “marketing mix” of tactics on a weekly level. Perhaps most fundamentally, the CEMO process is able to deliver rich qualitative information on complex contextual dynamics. Essentially, it is practicable to deduce contextual theory of marketing in a relatively straightforward and replicable empirical process.

Potentially, developed frameworks will allow managers to focus marketing efforts on specific, empirically verified path of influence, substantially reducing resource waste in promotion and other marketing activities, and dramatically improving the efficiency and effectiveness of their marketing system. The role of retailers that particularly manifests in the low sales volume explanations was of immediate interest to Valio managers when results were reviewed, encouraging further research into the phenomenon.

Analysis using FS/QCA is able to uncover interactions from among case data that are not accessible or interpretable with conventional statistical methods. The integration of qualitative understanding into the analysis process in the course of fuzzy system calibration combines the substantial degree of qualitative contextual preunderstanding available at the managerial level with a systematic process for knowledge generation. In all, CEMO and FS/QCA have potential to complement the present range of

marketing analysis toolset at Valio with valuable knowledge, and highly relevant and qualitatively insightful answers to pertinent configurational questions.

7 Discussion and Conclusions

In the previous chapters, I have presented my justifications and arguments for adapting FS/QCA into the methodological arsenal of marketing performance measurement, and specified an analytical process, CEMO, which I have subsequently demonstrated in two empirical studies. In this final discussion and conclusions chapter, I first return to the premises and assumptions of configurational research and the nature of organizational mechanisms, to discuss how the adopted research approach and analytical methodology has been shown to incorporate them. Next, I examine the conceptual framework used to structure marketing performance determinants with respect to its analytical value in this study.

In the this study, I found that with FS/QCA and CEMO, complex, heterogeneous combinations of causes can be captured, without undue assumptions about causal uniformity or universality. Subsequently, I review the methodological findings and experiences to reflect on the extent that CEMO can contribute to increasing our understanding of marketing performance measurement. Consequently, the CEMO process can be positioned as a new, knowledge-driven approach to marketing management support systems. In addition to reviewing the limitations of CEMO analysis and this study, I discuss what implications my findings have for managers and for further research.

7.1 Developing configurational explanations

Previously, I discussed the epistemological premises and ontological assumptions of this study with regard to observing causation in empirical settings. The conceptual model of marketing performance determinants presented in Chapter 2 assumed that causal mechanisms (1) exist and comprise various component conditions, (2) have an outcome, (3) involve 'lower level' conditions under managerial influence and 'higher level' background conditions, and (4) can accurately represent a relevant characteristic of the focal context. Systematic comparison (Mill, 1848) was

identified as an epistemological approach to identifying configurations of causes and, by direct extension (Ragin, 1987), configurations of causes.

In light of the broader range of ontological challenges faced in modeling of marketing response, examined at the onset of this investigation, in Chapter 1:

1. FS/QCA does not assume causality to be universal. Instead the initial assumption is that causal mechanisms are context-specific (Morgan, Clark, and Gooner, 2002; Homburg, Jensen, and Krohmer, 2008). Findings can be used as the basis for analytical generalization (Yin, 1994), but not statistical generalization (Ragin, 1987).

2. Neither variables (conditions in QCA parlance) nor their functions are assumed to be linear (Ragin, 2009). Qualitative theoretical understanding is used to calibrate conditions, and the analysis process assumes multiple configurational causality to allow for any type or number of interaction effects (Fiss, 2009). The resulting logical statements are readily verbalized and interpretable as qualitative narratives (Smith and Lux, 1993; Ragin, 2009).

3. Qualitative understanding is present throughout the analysis process, ensuring that that results are tied to real-world phenomena instead of a divorced numerical abstraction. No result describes or predicts a hypothetical situation that has not been empirically observed.

4. Incremental (short term), persistent (long term), and real option effects (Stewart, 2009) of marketing actions can be included in the same property space. Consequently, it is possible to observe their potentially complex and heterogeneous interaction roles as intermediary marketing outcomes, or focus on any dimension as the outcome for interest for the analysis.

5. The FS/QCA analysis process draws out measures that are empirically relevant as causal conditions in a very specific business context, which can subsequently form a well-informed base for a marketing metric system (e.g. Ambler, Puntoni, and Kokkinaki, 2004. It is possible to incorporate a broad range of conditions in the property space. If a configurational solution is an accurate representation of the causal mechanisms in a marketing context, it can form the empirically identified basis for a comprehensive marketing metric system (Punj and Stewart, 1983).

6. The CEMO analysis process specification allows and encourages causal mechanisms in marketing to be deduced in a replicable and controlled process. This qualifies the results in this respect for reliable marketing performance assessment (Morgan, Clark, and Gooner, 2002; Ambler, Kokkinaki, and Puntoni, 2004).

7. While FS/QCA cannot overcome difficulties in data collection and solicitation in itself, the practical relevance of the results allows a more

effective, efficient and adaptive control system to be constructed, unburdening the organization from data collection tasks that are irrelevant as performance metrics.

Thus, following Fiss (2007) on organizational research, I conclude that the premise of different conditions combining rather than competing to create an outcome makes the approach well suited for studying causal heterogeneity and equifinality.

7.2 Determinants of marketing performance

Increasing demands for marketing accountability (Rust et al., 2004; Stewart, 2009) call for new tools and comprehensive analysis processes to increase our understanding of the determinants of marketing performance (Lilien and Rangaswamy, 1998). In contrast to seeking general explanations for marketing phenomena (Anderson, 1986; Tadajewski, 2004), research into contextual causal mechanisms (Morgan, Clark, and Gooner, 2002) can provide explanations that explicitly consider the use and interaction of specific resources, capabilities, assets, and structures in the marketing context of an organization (Srivastava, Fahey, and Christensen, 2001). If the marketing performance determinants of a specific context can be explicated in a managerially relevant manner, these solutions have a valuable role in improving marketing management and marketing performance.

Vorhies and Morgan (2003) point to a lack of adequate methodologies as the main reason for the low volume of configurational research in marketing. The strongly multidimensional and contextual role of marketing (Morgan, Clark, and Gooner, 2002; Wierenga 2010, p. 7), as embodied in the resource-based view (Srivastava, Fahey, and Christensen, 2001), is a direct call for investigating that broad and complex range of interconnected marketing activities and performance outcomes (Walker and Ruekert, 1987; Homburg, Jensen, and Kromer, 2008).

The conceptual framework (Chapter 2) used to relate the ontological assumptions with the resource-based view in marketing provides a basic typology of causal conditions in marketing contexts. Interactions between causal conditions, heterogeneous path to one outcome and asymmetric causal relationships between resources, capabilities, and assets are framed as complex changes to the marketing context, brought on by managerial decision-making in the form of marketing actions. The focus is on discovering how arrangements of causal factors connect to outcomes (Fiss, 2009). CEMO provides the process structure to apply FS/QCA for the

purpose of exposing patterns in how outcomes are related to 'higher level' causal conditions and 'lower level' causal conditions (Pajunen, 2008).

7.3 Empirical applications of CEMO analysis

The fieldwork that led to the CEMO analysis process specification presented in this dissertation comprised 12 empirical studies. Each had a formative role for defining the process aspects of research that FS/QCA had to be encased in to be a viable marketing performance assessment role in explaining causal mechanisms. The analysis process was specified in Chapter 4 with respect to the conceptual framework developed previously. The resulting CEMO process is, thus, an adaption of the general FS/QCA process to a microcomparative analysis level concerned with the causal mechanisms of value creation in marketing.

Two complete empirical studies traversing the CEMO process were related in Chapters 5 and 6. I explore the application of the CEMO analysis process on original case data from the air travel and fast-moving consumer goods industries. The empirical studies demonstrate how CEMO can be used as a marketing research process to extract managerially meaningful causal knowledge that contributes to a qualitative understanding of an underlying causal dynamic, specific to the focal marketing context.

In both empirical studies, the substantive results had immediate managerial appeal at the respective organizations, as they form concise narratives about the nature of causal mechanisms. With due consideration regarding the restricted generalizability of the configurations, they form an accessible basis for knowledge-driven marketing management decision support. Furthermore, the systematic inspection and examination encourages configurational experimentation and the use of diverse qualitative and quantitative methods to learn more about the marketing context.

7.3.1 Analytical aspects of CEMO

The introduction to this dissertation laid a range of claims relating to analytical aspects of FS/QCA that could be valuable for marketing performance assessment. My intent has been to demonstrate the relevance and use of these aspects in applying the CEMO process in two empirical studies (**Table 7-1**). The analytical aspects discussed here reflect the ontological challenges discussed above. These challenges were met in fieldwork by applying a qualitative comparative approach. However, the

nature of the empirical case contexts and data meant that it was not possible to demonstrate every analytical aspect of FS/QCA within the scope of this study.

Table 7-1. Success in empirical demonstrations of FS/QCA analytical aspects.

Analytical aspect		**Blue1 Weekend Boosts**	**Valio functional dairy product**
(1)	*Extending analytical scope to small-N populations*	Fully demonstrated: configurational causal interactions were studied among 27 cases.	Partially demonstrated. A sample of 87 weeks is analyzable with quantitative modeling methods such as PLS (Abdi, 2003). However, the number of possible causal conditions (independent variables) is starkly restricted in contrast to QCA.
(2)	*Qualitative reflection*	Demonstrated through the inclusion of a range of qualitative causal conditions, empirically grounded calibration of fuzzy membership scores, and the resulting causal narratives.	Demonstrated through the empirically grounded calibration of fuzzy membership scores, and the resulting causal narratives. There were deficiencies in in-depth qualitative knowledge of case weeks on an individual level.
(3)	*Complex interactions*	Qualitatively interpretable and managerially relevant interactions going beyond the three-way models attainable with quantitative tools were discovered.	
(4)	*Causal heterogeneity*	Multiple paths to both positive and negative outcomes were discovered among the case populations, empirically demonstrating diverse causal heterogeneity.	
(6)	*Alternative to linear-additivity*	The calibration process rested on the assumption that conditions do not impact linearly. The evidence for causal heterogeneity further suggests that an alternative to linear-additive approaches in the form of CEMO is a valid and valuable complement to existing methods.	
(7)	*Flexible populations and causal asymmetry*	The final populations for positive and negative outcomes are overlapping but distinct. The final populations are defined by the conditions and associated outcomes, and only emerged in the course of the analysis process.	
(8)	*Transient nature of causality*	The temporal development of the causal mechanisms was not explicitly targeted in this study. No conclusive evidence emerged independently to make empirical conclusions about temporal changes in causality.	

(9)	*Context-specificity*	The Weekend Boost context is unique in terms of target consumer population and sales logic. The analysis is built on conditions that are not found outside the context. The results are found highly relevant for Blue1 managers, but not generalizable outside the specific marketing context.	In terms of conditions, the marketing context for the Valio functional dairy product is not unique – many products share the environment. The configurational mechanisms identified, however, give insight into a dynamic that is strongly context-specific. The configurational findings are not generalizable to other brands.
(10)	*Holistic approach*	Individual cases can be directly identified from the result configurations covering them, providing immediate access to further information on their nature.	

This dissertation has successfully demonstrated some, but not all analytical aspects of FS/QCA that were introduced as responses to challenges faced by common marketing modeling approaches.

In the literature, QCA has often been referred to specifically as a small-N approach. Indeed, the dimensionality (cf. number of independent variables) that is possible to include even with 10-50 cases contrasts directly with the analytical nature of many quantitative modeling approaches. Both empirical studies demonstrated this ratio in practice, Blue1 the most explicitly with 27 cases and 11 conditions. In addition to the small-N label, Ragin (1987) and subsequent authors position QCA as a primarily qualitative approach, emphasizing the role of qualitative consideration in carrying out the research process, and especially with regard to using distinct and well-justified qualitative anchors to calibrate raw data into fuzzy set membership scores. The Blue1 study provided more comprehensive demonstrations of calibrating membership to reflect qualitative anchors crafted during the research process. However, calibrating the price promotion conditions in Valio's case allowed demonstrating the transformation of an organization's internal qualitative assessments (i.e. the three-tier classification of promotional discount campaigns by field sales staff) into membership scores via qualitative anchoring.

The ontological premises of QCA open complex interactions for configurational analysis. The two empirical studies related in this dissertation both offered examples of complex interactions among the causal conditions, which went beyond the number seen to be interpretable with conventional statistical methods (Fiss, 2009). Similarly, causal heterogeneity was readily observed in both marketing contexts. Numerous multiple paths to both negative and positive outcomes are reflected in the minimal solution formulae. In the calibration processes for all conditions in

the empirical studies, it was assumed that conditions can combine in complex- nonlinear ways to produce outcomes, and so that the outcome cannot be represented with net effects due to conditions at an individual level. Both empirical studies demonstrated this to be the case among the data, as conditions and their inverses could both be a part of a causal configuration for the same outcome, combined with given other conditions.

The case-oriented nature of QCA, as opposed to variable-oriented methods, requires that cases are identifiable as discrete wholes throughout the analysis process. Consequently, once causal configurations have been established, the cases that conform to each configuration are directly and explicitly identifiable, and can be studied further to discover additional insights regarding commonalities between them. For a user of CEMO as a marketing management support service, this is advantageous as additional information can be pulled on the activities in question to understand their overall role in the marketing performance process (Rust et al., 2004) and in the value creating core business processes (Srivastava, Shervani, and Fahey, 1999). This prove valuable in practice in allowing marketing manages to immediately form a qualitative narrative of what the situation, according to their interpretation, was during the cases in question.

A further implication of case-orientation is that the population of cases is only fixed at the end of the analysis process, determined by what cases can be explained with the configurations of conditions found among the data. This was reflected in both empirical studies in the final populations of cases for a focal outcome contrasted with the total number of cases in the initial population. In the functional dairy product study, for instance, the final population of high sales volume outcome cases was 51 out of 87 in the initial population. 48 cases comprised the final population for the low sale volume outcome. A configuration of causal conditions may be found to produce an outcome in most, but not all observed instances. Cases matching a configurational description can, however, still be included in the final population for that outcome, even if they do not directly produce exhibit it themselves. This explains the overlap between the population sizes for the two outcomes, and their mutual nonexclusivity.

In QCA, causality is assumed to be transient. The nature, effect, and interactions of conditions are susceptible to change over time even within the same social or organizational context. Thus, researchers are cautioned about generalizing based on past evidence of causal interactions (Ragin, 1987). In both empirical studies discussed here, it was necessary to assume that causal patterns would be comparable longitudinally. However, in practical applications setting CEMO to a continuous MMSS role, observing changes in the causal configurational behavior of the marketing context

could signal a qualitative change in some unassessed 'higher level' conditions and, thus, represent valuable intelligence about changes in the operating environment, regarding, for exmple, customer behavior or unforeseen competition.

Finally, in QCA causality is assumed to be context-specific. Correspondingly, in QCA generalizations beyond the population studied (not to mention the marketing context studied) are viewed with suspicion. Context-specificity ensures 'high currency' analytically (Bonoma, 1985). In the case of both empirical contexts examined, the conditions and causal mechanisms were found to be extremely specific to the marketing context. Although many conditions of the property spaces can be common with other related contexts, their interactions ensure that the solutions provide an accurate descrition of causal machanisms, but only in the final population defined by the solution configurations. For example, although Valio's conditions are largely identical for many diary marketing contexts, the 'functional' brand nature introducted highly specific behavior in how sales responded to competitors' television avertising.

With respect to a context such as those described in this stuy, a natural operative expansion would be adding more cases to the analysis as they become available. At the methodological development and refinement stage, a more active collaboration approach could involve experimentation within the promotional offers by varying the used arguments and marketing mix variables on a greater range that has been used, and dividing the customer base to subgroups presented with different versions of the promotion. While the price itself is difficult to vary under the present scheme, subgroups of consumers could easily be promoted different destinations, different travel periods, conditions, sales arguments, and promotions, given that these experiments do not undermine consumer trust and perception of equal treatment of customers. Thirdly, to deepen the understanding of the consumer decision-making process involved in reacting to the promotions, qualitative interviews should be carried out on samples of buyers to deepen our understanding of the qualitative drivers and motivations behind purchase in the different causal groups of consumer response, and attempt to integrate their interpretations among the causal conditions.

Future studies applying CEMO will focus on not only applying the approach to new types of marketing contexts, but specifically ones where one or more underdeveloped analytical aspects would potentially be developed further. For example, business-to-business sales processes might be an opportunity for comparison of cases, where interpretative qualitative

insight and its calibration using fuzzy metrics could be shown to be especially valuable.

7.3.2 CEMO process validity and reliability

Schneider and Wagemann (2010) provide and extensive list of practical criteria for guiding and evaluating the reliability and validity of QCA and FS/QCA research, specifically to address the lack of established standards. I took advantage of their six categories of criteria to examine analysis goodness in both empirical studies. To a large extent, my application and adaptation for the method resounded well with the criteria. The MMSS context, however, requires some compromises regarding their applicability, discussed next. These can be seen to impact the validity and reliability of the analyses.

1. *Criteria concerning the purpose of QCA* — The aim of CEMO is to develop causal hypotheses in specific marketing contexts, meeting one of the original aims of the QCA approach. When developed to a MMSS approach, however, caution should be taken to include other qualitative and quantitative techniques in the decision support system. Methodological triangulation is a practical way to ensure eternal validity, and it is critical especially in first applications of a new approach that has been applied to new marketing contexts and micro-level configurational processes.

2. *Criteria concerning the research strategy* — According to Schneider and Wagemann (2010), QCA should never be used mechanistically or superficially. The specified steps of the CEMO process are designed to ensure that qualitative consideration is maintained throughout analysis and application. However, the effort and motivation for qualitative knowledge of the cases can only come from the researcher.

3. *Criteria concerning the representation of QCA* — The general QCA evaluation criteria state that the raw data matrix, truth table, solution formulae, and the consistency and coverage statistics should always be reported to ensure replicability and transparency. In a managerial setting, the aim of CEMO analysis is to enhance competitive advantage with proprietary knowledge about the causal mechanisms of the marketing context. The requirement for replicability can be leveraged to ensure adequately transparent documentation of the rationale used for calibration et cetera. Graphical representations that are best suited for a particular MMSS will likely be standardized in dashboards if they are used as decision aides.

4. *Criteria for the selection of cases, conditions, set memberships, and truth table algorithm criteria* — Case population definition and the definition of

outcomes and other conditions are expert tasks. In practical CEMO applications, these need close attention and considerable preplanning to develop a working understanding of the marketing context. Restricting the number of conditions can be a formidable practical challenge, as was found in the Valio study. With more CEMO applications in diverse contexts, better general guidelines may be found for reducing dimensionality. Additionally, new 'brute force' methods, taking advantage of increasing raw computing power to process large numbers of configurations, can be developed to automate the testing of property space subsets for causal pattern potential.

5. *Criteria for the 'analytic moment'* — The largest challenge raised by Schneider and Wagemann's (2010) criteria is the reporting of both the parsimonious and complex solutions. Transparency in treating logical remainders and inconsistent truth table rows is important. However, adequately valid and practically relevant managerial insights may be gained even with parsimonious solutions alone, if the analysis context is not conducive for interpretable complex-type solutions to be produced. However, it is clear that positive and negative outcomes would in all instances be examined, and this forms a distinct consideration in CEMO in contrast to approaches seeking a homogeneous and symmetric explanation for all outcome variation.

6. *Criteria for the interpretation of analytic results* — Overinterpretation of the minimal formula is a distinct risk in applying CEMO to MMSS. To minimize the risks of overly liberal narratives and conclusions, managerial users must be provided with explicit guidelines for interpretation, highlighting in particular the ontological difference between fuzzy, configurational solutions and probability estimates. Providing access to the original case material is a way to emphasize the need for comprehensive qualitative reflection on the causal mechanisms, and for taking the logical propositions as suggestions of causal commonalities shared by the identified cases.

The validity and reliability of QCA, FS/QCA, and CEMO reduces on a methodological level to the how well transparence is achieved with respect to meeting the criteria examined above. In addition to serving as guides throughout the empirical research process, the validity and reliability criteria presented by Schneider and Wagemann (2010) can be drawn on to reflect on the managerial application of CEMO in practice.

7.4 Contribution and conclusions

The broader aim of this dissertation was to discover an analytical approach for knowledge-driven marketing management decision support,

which can improve our grasp over multidimensional, complex, and contextual causal interaction in marketing performance. To that end, this study has shown that configurational causality behind marketing actions and their performance effects can be approached with a systematic and contextually relevant process.

The key contribution of this dissertation is the CEMO analysis process, which applies FS/QCA on a resource-based conceptualization of on organization's marketing context. CEMO proceed in five stages to define a research context, integrate qualitative interpretations into the data, and carry out a logical comparison procedure that culminates in the interpretation of minimal causal formulae as causal narratives. Integrated as a part of the CEMO research process specification, this study presents FS/QCA as a novel methodology and system for case-based reasoning (Kolodner, 1992). This analytical contribution is a method for exposing causal mechanisms in marketing contexts and explaining marketing outcomes with configurations.

Analysis using FS/QCA is able to uncover interactions from among case data that are not accessible or interpretable with conventional statistical methods. The integration of qualitative understanding into the analysis process in the course of fuzzy system calibration brings combines the substantial degree of qualitative contextual preunderstanding available at the managerial level with a systematic process for knowledge generation. In all, CEMO has potential to complement the present range of marketing analysis tools and approaches to provide highly relevant and qualitatively insightful answers to common complex configurational questions.

In this study, FS/QCA is applied at a methodologically novel level of microcomparative analysis (Rihoux et al. 2009, pp. 173-4), departing markedly from the method's origins in macrocomparative political and social science. Notwithstanding, the distinguishing qualities of QCA both as an analytical approach and a research methodology are found to contribute towards a better understanding of configurational causation on a micro level. The results are strongly context-bound theoretical explanations of causal mechanisms, and offer a new, rigorous approach to managerial problem solving in general and MMSS in particular. Compared to exclusively qualitative techniques, FS/QCA allows crafting empirical generalizations, expanding the scope of managerial use considerably. In contrast to statistical approaches, the key advantages are in the integration of contextual qualitative knowledge and interpretations, and in the ability to study complex interactions among small empirical populations.

This study has demonstrated that FS/QCA can yield results in a microcomparative marketing response context, with a transparent and

replicable process, and results that provide a managerially meaningful discussion of the causal mechanisms involved. The benefits of allowing for causal heterogeneity and asymmetry, qualitative calibration, can complex configurationality in a moderate-N population are successfully demonstrated. Based on our experiences, we have fair reason to believe that FS/QCA can offer significant competitive advantage in analytical application in marketing contexts.

In summary, In addition to increasing our substantive knowledge of the causal mechanisms operating the two empirically studied marketing context, this study contributes a novel approach to studying marketing response. This approach overcomes many of the analytical challenges related to restricted population size, incorporating qualitative contextual understanding, dealing with causal heterogeneity and asymmetry, and complex configurationality discussed previously. I conclude that using CEMO to study the configurational dynamics of market response and causal mechanisms in marketing can provide better opportunities for staging effective marketing actions and, ultimately, improving marketing performance.

7.5 Limitations

Several analytical limitations to FS/QCA and practical limitations to CEMO have emerged during the development process. Both the analytical limitations and analytical advantages of FS/QCA can juxtaposed against established marketing modeling approaches. For the most part, the debate centers on the perceived validity and configurational power of various approaches. The limitations to the practical CEMO process form a second category of issues to reflect on for assessing the scope of the investigation.

7.5.1 Analytical limitations

As most of the extant research using FS/QCA is on a macro-level, a further analytical question is how well will a macro-scale originating methodology accommodate lower-level social business data and phenomena. Is configurational causality real enough or substantive enough to warrant conclusions on the level of a part of an individual marketing context? A specific industry or market setting, or some even wider context? Perhaps the specificity of cases within one business will serve to offset stability, if property value assessment offered by political phenomena is rooted in human populations. Then again, consumers are the driving force generating

the causal reactions, just as is the case with socio-political ones. Based on the empirical experiences in applying CEMO, there is evidence that the approach was successful in exposing configurational causal mechanisms, among both the market response data at Valio, and in the conditions of the periodic offers made to Blue1's Weekend Boost email recipients.

7.5.2 Limitations of the practical process

On a practical level, the lack of any performance management and assessment tools that are widely recognized as having a substantial effect means, effectively, that marketing managers in general do not use any such tools (Wierenga, Van Bruggen, and Staelin, 1999). Usually, very little data is collected on marketing issues. The situation is even more futile with qualitative marketing metrics, which Ambler, Kokkinaki, and Puntoni (2004) see as an evolved stage in analysis. This has had a direct impact on the empirical part of this study. Out of several dozen companies contacted with an research proposal to develop ad apply CEMO, only Valio was found to have a level of systematic data collection that immediately allowed an adequate property space to be constructed. The other companies selected for analysis have some data, but require substantial additional effort in extracting it and combining multiple primary sources before technical analysis is even attempted. In most cases, companies that immediately declined participation in the study quoted the difficulty in collecting data.

The difficulties encountered in data collection are not as much evidence of the implementability of FS/QCA, or any other analysis method of performance for that matter. Rather, the lack of data tells of the lack of information and control systems in general: the measurement of marketing effort is rarely done systematically or comprehensively. Measures are not comparable over time, information about actions and managerial perceptions about results reside, and often very informally, only within the few minds directly responsible for budget items. Marketing actions are not routinely analyzed with respect to each other or to bigger business goals. Attribution of costs only takes into account things that are linked to a service provide invoice – in other words, most often only media space, research, and advertising planning and production costs.

7.6 Managerial implications

The most significant managerial implication of this study is the CEMO process itself. Deploying it as a marketing management support system

would allow managers in an analytically suitable research context to discover configurational explanations for marketing outcomes.

In conversations with top managers at Valio, a repeatedly expressed concern over typical analytics, both in-house and third party, was the 'qualitative sense' in the findings, of perceived over-simplification of dynamic market phenomena to fit existing response models. The lack of modeling approaches to take into account causal complexity and configurationality was expressed by the CEO and others as 'knowledge about what works together with what' – information beyond marketing conventions, media agency hunches, subjective assumptions, and ingrained practices. FS/QCA, coupled with developing data collection and systematic marketing experimentation, was seen to carry potential to provide models that specifically cater to these concerns.

Significantly, better knowledge of causal conditions and mechanisms in a marketing context can be used as the basis for creating an accurate and relevant marketing metrics system, and used, for instance, to manage the tactical marketing mix. The range of possible or likely actions by competitors is usually rather small in, for example, FMCG contexts. This presents the opportunity to use analytical generalization of known causal mechanisms to develop configurational scenarios for the future that incorporate with internal and external environment conditions. Such scenarios allow detailed expenditure optimization and risk management for the responsible marketing managers.

Perhaps most fundamentally, the CEMO process is able to deliver rich qualitative information on complex contextual dynamics. Further applications will likely see the managerial relevance of result from this form of analysis develop into a key source of information of the operation of a context-specific marketing system. Potentially, developed frameworks will allow managers to focus marketing efforts on specific, empirically verified path of influence, substantially reducing resource waste in promotion and other marketing activities, and improving the efficiency and effectiveness of their marketing system.

Srivastava, Fahey, and Christensen (2001, p. 795) remind that "distinctive economic returns only accrue when an organization identifies and shapes new marketplace opportunities and exploits them faster and more efficiently than rivals," irrespective of how complex the relationships linking resources are, or how these construct are defined. Thus, the more effectively marketing managers are able to construct and deploy accurate causal observations to use as a part of their business processes, the better equipped the managers will be for achieving high marketing performance.

7.7 Further research

Further research into investigating causality in marketing with the FS/QCA methodology is needed both within the context of the individual business case considered here, as well as in developing the CEMO process further by applying it in diverse case contexts or different levels of analysis.

With regard to the advancement of FS/QCA on a methodological level, weekly iterations of readily accessible marketing and sales data provide a convenient opportunity to investigate how a temporal dynamic can be integrated into the process. For managers, observing the changes in the configurational 'landscape' over time would provide potentially valuable clues to changes in the qualitative nature of their marketing context.

For marketing performance research in general, further development and applications of FS/QCA and its variants could offer a considerable degree of new perspective. Arguably, there is much in performance and causality that cannot be rigorously analyzed with the present tools and their inherent assumptions. Adopting a multiple conjectural view into causation and taking advantage of fuzzy sets as a logical and robust interface to reality has distinct benefits and considerable analytical potential for a wide range of applications. The most beneficial applications can only be discovered as qualitative comparative analysis is applied to new contexts and diverse new business cases. This process of practical experimentation to develop the method further for use in marketing performance contexts would not only allow us to discover the best uses for it, but perhaps even discover some regularities in marketing performance that we are presently unaware of.

The operative process visioned for Valio is genetic (Miller and Page, 2007, p. 183–4) in the sense that working solutions are actively sought through configurational experimentation in the marketing mix, thus increasing diversity; the best-working configurations are intentionally reproduced; and variation again induced to find new positive outcome solution configurations, continuously evolving as the marketing context evolves. The potential power of a qualitatively guided managerial process constructed as a well-defined genetic algorithm is enticing. Further research on how insights from complex adaptive systems and computational genetic algorithms could be transferred to a managerial context could certainly lead to diverse new advances in the use of artificial intelligence in management decision support.

7.8 Use and relevance of FS/QCA for MMSS

Adapting QCA to a marketing performance specific context has required relating the components to theoretical and managerial concepts in the marketing discourse. Furthermore, I have had to consider the managerial relevance of the results and the organizatorial practicability of the process as MMSS.

Configurations occur naturally; there can be multiple paths to the same performance outcome. Demonstrating their discovery in a managerially practicable MMSS approach is, in itself, a significant contribution to marketing performance research. Once configurational behavior can be distinguished, and data populations established to reflect heterogeneous causal mechanisms, statistical modeling tools can become increasingly valid and relevant when applied on samples of the subset populations.

A second contribution to marketing management decision-making is the demonstrated ability of CEMO to generate valid and reliable causal configurations in situations where the population size in significantly lower, particularly with regard to dimensionality, than what would be required for statistical analysis. With CEMO, given reliable and valid data of sufficient qualitative depth and breadth to capture the phenomenon, causal mechanisms can be discovered in a systematic procedure that integrates qualitative understanding.

Thirdly, the deductive aspect of QCA leads CEMO to be a practical tool for identifying relevant causal conditions and their combinations. Conditions can be included in the property space in an experimental, iterative fashion to test their outcome relevance and causal role. Instead of finding contextual correspondences to estimate coefficients in a general marketing model, or constructing one *ab initio* from theoretical hypotheses, the relevant terms emerge from the data in analysis, and are explicitly contextual. This gives CEMO powerful potential as a practical tool for deducing causally significant marketing metrics, which take into account configurationality and the overall system performance.

Finally, MMSS need to be designed with marketing performance improvement in mind, paying heed to the inherent tradeoffs in three key marketing performance dimensions of efficiency, effectiveness and adaptability (Morgan, Clark, and Gooner, 2002). Tools that only drive only one or two of these are not comprehensive, and do not offer an adequate long-run solution for decision support. Furthermore, contextual knowledge is critical, as performance determinants depend on specific contingencies (i.e. 'higher level' conditions in the conceptual model for CEMO). Arguably, general models based on abstract or universal typologies do not provide the

level of specificity that would generate competitive advantage by enabling consistently better marketing management decisions. Empirical evidence directly linking the mechanics of a particular internal and external marketing environment has the unique potential of fulfilling this informational role.

8 References

Abbott A. (1992). 'What do cases do? Some notes on activity in sociological analysis', in Ragin, C. C., and H.S. Becker (Eds.) *What is a Case?* Cambridge: Cambridge University Press.

Abraham T., and L. W. Boone (1994). “Computer-based systems and organizational decision making: An architecture to support organizational innovation”, *Creativity Research Journal*, 7 (2), pp. 111-123.

Academy of Management (2010). Academy of Management 2010 Annual Meeting program. Montreal. Available online at <http://program.aomonline.org/2010/pdf/AOM_2010_Annual_Meeting_Program.pdf>

Ambler T., C. B. Bhattacharya, J. Edell, K. L. Keller, K. N. Lemon, and V. Mittal (2002), “Relating Brand and Customer Perspectives on Marketing Management,” *Journal of Service Research*, 5 (1), pp. 13–25.

Ambler T., F. Kokkinaki, and S. Puntoni (2004). "Assessing marketing performance: reasons for metrics selection," *Journal of Marketing Management*, 3 (4), pp. 475–98.

Amoroso L. M., and C. C. Ragin (1999). “Two Approaches to Understanding Control of Voluntary and Involuntary Job Shifts among Germans and Foreigners from 1991 to 1996,” *Quarterly Journal of Economic Research*, 68 (2), pp. 222-229.

Anderson P. F. (1983). “Marketing, Scientific Progress, and Scientific Method,” *Journal of Marketing*, 47 (4), pp. 18-31.

Anderson T. W., and D. A. Darling (1952). "Asymptotic Theory of Certain Goodness of Fit Criteria Based on Stochastic Processes,“ *Annals of Mathematical Statistics,* 23 (2), pp. 193-212.

Barney J. (1991). “Firm resources and sustained competitive advantage,” *Journal of Management*, 17 (1), pp. 99-120.

Barney J., M. Wright, and D. J. Ketchen Jr. (2001). “The resource-based view of the firm: Ten years after 1991,” *Journal of Management*, 27 (6), pp. 625-641.

Bechtel W., and A. Abrahamsen (2005). “Explanation: A mechanist alternative,” *Studies in History and Philosophy of Biological and Biomedical Sciences*, 36 (2), pp. 421–441.

Befani B., S. Ledermann, and F. Sager (2007). “Realistic Evaluation and QCA Conceptual Parallels and an Empirical Application,” *Evaluation,* 13 (2), pp. 171-192.

Berg-Schlosser D. and G. De Meur (2009), "Comparative research design: case and variable selection," in B. Rihoux and C. Ragin (eds) *Configurational Comparative Methods*. Thousand Oaks, CA and London: Sage, pp. 19-32.

Berg-Schlosser D., and S. Quenter (1996). “Macro-Quantitative vs Macro-Qualitative Methods in Political Science - Advantages and Disadvantages of Comparative Procedures using the Welfare-State Theory as an Example,” *Historical Social Research*, 21 (1), pp. 3-25.

Berger P. D, and N. I. Nasr (1998). “Customer lifetime value: Marketing models and applications,” *Journal of Interactive Marketing*, 12 (1), pp. 17–30.

Berk R. (2004). *Regression Analysis. A Constructive Critique*. Sage, London.

Bhargava M., C. Dubelaar, and S. Ramaswami (1994). “Reconciling diverse measures of performance: a conceptual framework and a test of methodology,” *Journal of Business Research*, 31 (2-3), pp. 235–46.

Blattberg, Robert C. and John Deighton (1996), “Manage Market- ing by the Customer Equity Test,” Harvard Business Review, 74 (July–August), 136–44.

Blenkinsop S., and N. Burns (1992). “Performance measurement revisited,” *International Journal of Operations & Production Management,* 12 (10), pp. 16–25.

Bonoma T. V. (1985). “Case Research in Marketing: Opportunities, Problems, and a Process,” *Journal of Marketing Research*, 22 (2), pp. 199-208.

Bonoma T. V. (1985). “Case Research in Marketing: Opportunities, Problems, and a Process,” *Journal of Marketing Research*, 22 (2), pp. 199-208.

Bonoma T. V., and B. H. Clark (1988). *Marketing performance assessment*. Boston: Harvard Business School Press.

Borden N.H. (1964) “The Concept of the Marketing Mix,” *Journal of Advertising Research*, 4 (June), pp. 2-7.

Borden N.H. (1964). “The Concept of the Marketing Mix,” *Journal of Advertising Research*, 4 (June), pp. 2-7.

Box G. E. P., and D. R. Cox (1964). “An Analysis of Transformations,” *Journal of the Royal Statistical Society*, 26 (2), pp. 211-252.

Brito C. Issue-based nets: a methodological approach to the sampling issue in industrial networks research. Proceedings of the 13th IMP Conference, Lyon. Lyon: Groupe ESC, 1997. pp. 87–110.

Burke J. C., S. B. Mackenzie, and P. M. Podsakoff (2003). “A Critical Review of Construct Indicators and Measurement Model Misspecification in Marketing and Consumer Research,” *Journal of Consumer Research*, 30 (September), pp. 199-218.

Burnham T. A., J. K. Frels, and V. Mahajan (2003). “Consumer Switching Costs: A Typology, Antecedents, and Consequences,” *Journal of the Academy of Marketing Science*, 31 (2), pp. 109-126.

Byrne D., C. C. Ragin. (Eds.). *The SAGE Handbook of Case-Based Methods*. Los Angeles/London: SAGE.

Cicourel A. V. (1964). *Method and Measurement in Sociology*. New York: Free Press.

Clark B. H. (1999). “Marketing Performance Measures: History and Interrelationships,” *Journal of Marketing Management*, 15 (8), pp. 711-732.

Clark B., and T. Ambler (2001). “Marketing Performance Measurement: Evolution of Research and Practice,” *International Journal of Business Performance Management*, 3 (Winter), pp. 231–44.

Constantinides E. (2006). “The Marketing Mix Revisited: Towards the 21st Century Marketing,” *Journal of Marketing Management*, 22 (3-4), pp. 407-438.

Cooper B. (2005). “Applying Ragin's Crisp and Fuzzy Set QCA to Large Datasets: Social Class and Educational Achievement in the National Child Development Study,” *Sociological Research Online*, 10 (2).

Cooper B., and J. Glaesser (2011). “Using case-based approaches to analyse large datasets: a comparison of Ragin’s fsQCA and fuzzy cluster analysis,” *International Journal of Social Research Methodology*, 14 (1), pp. 31-48.

Cramer D., and D. L. Howitt, (2005). The SAGE Dictionary of Statistics: A Practical Resource for Students in the Social Sciences (Third ed.). London, U.K.: SAGE.

Cuvier G. (1798). Tableau élémentaire de l'histoire naturelle des animaux. Paris: Baudouin, imprimeur.

Day G. S., and D. B. Montgomery (1999). “Charting New Directions for Marketing,” *The Journal of Marketing*, 63 (Special Issue), pp. 3-13.

Day G.S., and R. Wensley (1988). “Assessing Advantage: A Framework for Diagnosing Competitive Superiority,” *Journal of Marketing*, 52 (2), pp. 1-20.

Dekimpe, M. G., and D. M Hanssens (2000). “Time-series models in marketing: Past, present and future,” *International Journal of Research in Marketing*, 17 (2–3), pp. 183–193.

Dickson P. R. (1996). “The Static and Dynamic Mechanics of Competition: A Comment on Hunt and Morgan's Comparative Advantage Theory,” *The Journal of Marketing*, 60 (4), pp. 102-106.

Drass K. A., and J. W. Spencer (1987). “Accounting for Pre-sentencing Recommendations: Typologies and Probation Officers' Theory of Office,” *Social Problems*, 34 (3), pp. 277-293.

Drazin R., and A. H. Van de Ven (1985). “Alternative Forms of Fit in Contingency Theory,” *Administrative Science Quarterly*, 30 (4), pp. 514-539.

Drucker P. (1974). *Management: Tasks, Responsibilities, Practices*, Harper and Row, New York.

Dusa A. (2007a) “Enhancing Quine-McCluskey”. Available online at <http://www.compasss.org/files/WPfiles/Dusa2007a.pdf>.

Dusa A. (2010b). “A mathematical approach to the boolean minimization problem,” *Quality & Quantity,* 44 (1), pp. 99-113.

Dusa A. (2007c). “User manual for the QCA(GUI) package in R,” *Journal of Business Research*, 60 (5), pp. 576–586.

Eisenhardt K. M. (1989). "Building theories from case study research," *Academy of management review*, 14 (4), pp. 532-550.

Feder R. A. (1965). “How to measure marketing performance,” *Harvard Business Review*, 43 (May–June), pp. 132–142.

Fiss P. C. (2007). “A set-theoretic approach to organizational configurations”, *Academy of Management Review*, 32 (4), pp. 1180–1198.

Fiss P. C. (2008), "Configurations of Strategy, Structure and Environment: A Fuzzy Set Analysis of High Technology Firms," Forthcoming, permission to cite pending.

Fiss P. C. (2009). “Case studies and the configurational analysis of organizational phenomena” in Byrne, D., Ragin, C. C. (Eds.). *The SAGE Handbook of Case-Based Methods*. Los Angeles/London: SAGE, pp. 415–431.

Fiss P. C. (2011). “Building Better Causal Theories: A Fuzzy Set Approach to Typologies in Organization Research,” *Academy of Management Journal*, 54 (2), pp. 393-420.

Frambach R. T., P. C. Fiss, and P. T. M. Ingenbleek (undated). When does customer orientation pay off? A configurational analysis of the performance effects of orientations, strategies, and market conditions. Available online at <http://faculty.fuqua.duke.edu/oswc/2010/Proposals/Frambach%20Fiss%20Ingenbleek.pdf>.

Frösén J., M. Jaakkola, and A. Vassinen (2008), "Use and Perceived Importance of Marketing Metrics in Different Business Settings." Proceedings of: ANZMAC2008, Australian and New Zealand Marketing Academy Conference 2008, 1-3 December 2008, Brisbane, Australia.

Glaser B. G., and A. L. Strauss (1967). *The discovery of grounded theory: Strategies for qualitative research*. London: Wiedenfield and Nicholson.

Goldenberg J., D. Mazursky, and S. Solomon (1999). "Toward Identifying the Inventive Templates of New Products: A Channeled Ideation Approach," *Journal of Marketing Research*, 36 (2), pp. 200-210.

Gorman C. (1998). "A review of Fuzzy Logic and its Applications". *ITDepartment NUIG Technical Report*. Israel.

Govindarajan V. (1988). "A Contingency Approach to Strategy Implementation at the Business-Unit Level: Integrating Administrative Mechanisms with Strategy," *The Academy of Management Journal*, 31 (4), pp. 828-853.

Greckhamer T., V. F. Misangyi, H. Elms, and R. Lacey (2008). "Using Qualitative Comparative Analysis in Strategic Management Research - An Examination of Combinations of Industry, Corporate, and Business-Unit Effects," *Organizational Research Methods*, 11 (4), pp. 695-726.

Grewal, D., G. R. Iyer, W. A. Kamakura, A. Mehrotra, and A. Sharma (2009). "Evaluation of subsidiary marketing performance: combining process and outcome performance metrics," *Journal of the Academy of Marketing Science*, 37 (2), pp. 117-129.

Gupta S., and V. A. Zeithaml (2006). "Customer Metrics and Their Impact on Financial Performance," *Marketing Science*, 25 (6), pp. 718–739.

Häge F. M. (2007). "Constructivism, Fuzzy Sets and (Very) Small-N: Revisiting the Conditions for Communicative Actions," *Journal of Business Research*, 60 (5), pp. 512-521.

Halinen A. and J. Törnroos (2005)."Using case methods in the study of contemporary business networks," *Journal of Business Research*, 58 (9), pp. 1285-97.

Henseler J., C. M. Ringle, and R. R. Sinkovics (2009). "The use of partial least squares path modeling in international marketing," *Advances in International Marketing*, 20, pp. 277–319.

Hogarth R. M., and S. Makridakis (1981). “Forecasting and Planning: An Evaluation,” *Management Science*, 27 (2), pp. 115-138.

Homburg C., J. P. Workman, and H. Krohmer (1999). “Marketing's Influence Within the Firm,” *Journal of Marketing*, 63 (2), pp. 1–17.

Homburg C., O. Jensen, and H. Krohmer (2008). “Configurations of Marketing and Sales: A Taxonomy,” *Journal of Marketing*, 72 (2), pp. 133-154.

Huang, R. (2011). QCA3: Yet another package for Qualitative Comparative Analysis.R package version 0.0-4. URL http://asrr.r-forge.r-project.org/.

Hudson L. A., and J. L. Ozanne (1988). “Alternative Ways of Seeking Knowledge in Consumer Research,” *Journal of Consumer Research*, 14 (4), pp. 508-521.

Hunt S. D. (2002). *Foundations of marketing theory: Toward a general theory of marketing*. Armonk, NY: M. E. Sharpe.

Ishida A., M. Yonetani, and K. Kosaka (2006). “Determinants of Linguistic Human Rights Movements: An Analysis of Multiple Causation of LHRs Movements Using a Boolean Approach,” *Social Forces*, 84 (4), pp. 1937-1955.

Järvinen J., J.-A. Lamberg, J.-P. Murmann, and J. Ojala (2009). "Alternative Paths to Competitive Advantage: A Fuzzy-Set Analysis of the Origins of Large Firms,” *Journal of Industry and Innovation*, 16 (6), pp. 545-574.

Jaworski B. J., and A. K. Kohli (1993). “Market orientation: Antecedents and consequences,” *Journal of Marketing*, 57 (3), pp. 53-70.

Kent R. (2009). “Case-Centred Methods and Quantitative Analysis” in Byrne D., and C. C. Ragin (Eds.) *The SAGE Handbook of Case-Based Methods*. Los Angeles/London: SAGE.

Kent R. A., and P. C. Argouslidis (2005). "Shaping Business Decisions Using Fuzzy-Set Analysis: Service Elimination Decisions," *Journal of Marketing Management*, 21 (5-6), pp. 641-658.

King G., R. O. Keohane, and S. Verba (1994). *Designing social inquiry: Scientific inference in qualitative research*. Princeton, NJ: Princeton University Press.

Kogut B., J. P. MacDuffie and C. C. Ragin (2004). "Prototypes and Strategy: Assigning Causal Credit Using Fuzzy Sets," *European Management Review*, 1 (2), pp. 114-131.

Kogut B., J. P. MacDuffie, and C. Ragin (2004). "Prototypes and strategy: Assigning causal credit using fuzzy sets," *European Management Review*, 1 (2), pp. 114-31.

Kolodner J. L. (1992). “An introduction to case-based reasoning,” *Artificial Intelligence Review*, 6 (1), pp. 3-34.

Kotler P. (1977). “From sales obsession to marketing effectiveness,” *Harvard Business Review*; 55 (Nov-Dec), pp. 67–75.

Kotler P., W. Gregor, and W. Rodgers (1977). “The marketing audit comes of age,” *Sloan Management Review*, 18 (2), pp. 25–43.

Kosko B. (1992) “Fuzzy systems as universal approximators.” IEEE Int. Conf. onFuzzy Systems. San Diego. CA. March. 1992. pp. 1153-1 162.

Laurent G. (2000). “Improving the external validity of marketing models: A plea for more qualitative input,” *International Journal of Research in Marketing*, 17 (2-3), pp. 177–182.

Lawrence P. R., and J. W. Lorsch (1967). “Differentiation and Integration in Complex Organizations,” *Administrative Science Quarterly*, 12 (1), pp. 1-47.

Leeflang, P. S. H., and D. R. Wittink (2000). “Building models for marketing decisions: Past, present and future,” *International Journal of Research in* Marketing, 17 (2-3), pp. 105–126.

Leone R. P., and R. L. Schultz (1980). “A Study of Marketing Generalizations,” *Journal of Marketing*, 44 (1), pp. 10-18.

Lewin A.Y., and J. W. Minton (1986). “Determining Organizational Effectiveness: Another Look, and an Agenda for Research,” *Management Science*, 32 (5), pp. 514-538.

Lilien G. L., A. Rangaswamy, G. H. van Bruggen, and B. Wierenga (2002). “Bridging the marketing theory–practice gap with marketing engineering,” *Journal of Business Research*, 55 (2), pp. 111-121.

Lilien G. L., and A. Rangaswamy (1998). Marketing engineering: computer-assisted marketing analysis and planning reading. Reading, MA: Addison- Wesley.

Linnaeus C. (1753). *Species plantarum*. Stockholm: Impensis Laurentii Salvii.

Louvière J., and H. Timmermans (1999). “Stated preference and choice models applied to recreation research: A review," *Leisure Sciences: An Interdisciplinary* Journal, 12 (1), pp. 9-32.

Luconi F. L., T. W. Malone, and M. S. Morton (1986). “Expert systems: the next challenge for managers,” *Sloan Management Review*, 27 (4), pp. 3-14.

Malhotra N. K. (1984). “The Use of Linear Logit Models in Marketing Research,” *Journal of Marketing Research*, 21 (February 1984), pp. 20-31.

Marketing Science Institute (2008). 2008–2010 Research Priorities. Cambridge, MA.

Marketing Science Institute (2010). 2010–2012 Research Priorities. Cambridge, MA.

Mattila, J. K. (2007). *Sumean logiikan oppikirja. Johdatusta sumeaan matematiikkaan*. Helsinki: Art House.

Maxwell J. A. (1992). "Understanding and validity in qualitative research," *Harvard Educational Review*, 62 (3), pp. 279 - 300.

Maxwell J. A. (2005). Qualitative research design: An interactive approach (2nd Ed.). Thousand Oaks, CA: Sage.

McCluskey E. J. (1956). "Minimization of Boolean Functions," *The Bell System Techical Journal*, C-20 (8), pp. 925-929.

Miethe T.D., and K. A. Drass (1999). "Exploring the Social Context of Instrumental and Expressive Homicides: An Application of Qualitative Comparative Analysis," *Journal of Quantitative Criminology*, 15 (1), pp. 1-21.

Miles M. B., and A. M. Huberman (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks, CA: Sage.

Mill J. S. (1967). *A system of logic: Ratiocinative and inductive*. Toronto, ON: University of Toronto Press.

Mills M., G. G. van de Bunt, and J. de Bruijn (2006). "Comparative research: Persistent problems and promising solutions," *International Sociology*, 21 (5), pp. 619-631.

Mizik N., and R. Jacobson (2003). "Trading Off Between Value Creation and Value Appropriation: The Financial Implications of Shifts in Strategic Emphasis," *Journal of Marketing*, 67 (1), pp. 63–76.

Möller, K. (2006). "The Marketing Mix Revisited: Towards the 21st Century Marketing by E. Constantinides," Journal of Marketing Management, 22 (3), 439-450.

Morgan N. A., B. H. Clark, and R. Gooner (2002). "Marketing productivity, marketing audits, and systems for marketing performance assessment: integrating multiple perspectives," *Journal of Business Research*, 55 (5), pp. 363-75.

Nokelainen T. (2010). *A typology of competitive actions*. Ph.D. dissertation, Tampere University of Technology.

Novák V., I. Perfilieva, J. Močkoř (1999). *Mathematical Principles of Fuzzy Logic*. Boston/Dordrecht: Kluwer.

O'Sullivan D., and P. Butler (2010). "Marketing accountability and marketing's stature: An examination of senior executive perspectives," *Australasian Marketing Journal*, 18 (3), pp. 113–119.

O'Sullivan D. and A. V. Abela (2007). "Marketing Performance Measurement Ability and Firm Performance", *Journal of Marketing*, 71 (2), pp. 79-93.

Olson E. M., S. F. Slater and G. T. M. Hult (2005). “The Performance Implications of Fit among Business Strategy, Marketing Organization Structure, and Strategic Behavior,” *Journal of Marketing*, 69 (3), pp. 49-65.

Ordanini A., and P. P. Maglio (2009). "Market Orientation, Internal Process, and External Network: A Qualitative Comparative Analysis of Key Decisional Alternatives in the New Service Development," *Decision Sciences*, 40 (3), pp. 601-625.

Ostroff C., and N. Schmitt (1993). “Configurations of Organizational Effectiveness and Efficiency,” *The Academy of Management Journal*, 36 (6), pp. 1345-1361.

Ostroff C., and N. Schmitt (1993). “Configurations of organizational effectiveness and efficiency,” *Academy of Management Journal*, 36 (6), pp. 1345–1362.

Pajunen K. (2008a). “Institutions and inflows of foreign direct investment: a fuzzy-set analysis,” *Journal of International Business Studies*, 39, pp. 652–669.

Pajunen K. (2008b). “The Nature of Organizational Mechanisms,” *Organization Studies*, 29 (11), pp. 1449-1468.

Pfeffer J. (1982). *Organizations and organization theory*. Marshfield, MA: Pitman.

Quine W.V. (1952). “The Problem of Simplifying Truth Functions,” *The American Mathematical Monthly*, 59 (8), pp. 521-531.

Quine W.V. (1955). “A Way to Simplify Truth Functions,” *The American Mathematical Monthly*, 62 (9), pp. 627-631.

Ragin C. C. (2000). *Fuzzy-set social science*. Chicago: University of Chicago Press.

Ragin C. C. (2003). *Recent advances in fuzzy-set methods and their application to policy questions*. Available online at <http://www.compasss.org/Ragin2003.PDF>.

Ragin C. C. (2006). “Set Relations in Social Research: Evaluating Their Consistency and Coverage,” *Political Analysis,* 14 (3), pp. 291-310.

Ragin C. C. (2008). *Redesigning social inquiry: Fuzzy sets and beyond*. Chicago: University of Chicago Press.

Ragin C. C., and P. Fiss (2008). “Net effects versus configurations: An empirical demonstration” in C. C. Ragin (Ed.) *Redesigning social inquiry: fuzzy sets and beyond*, Chicago: University of Chicago Press, p.. 190-212.

Ragin C. C., K. A. Drass, and S. Davey (2006). Fuzzy-Set/Qualitative Comparative Analysis 2.0. Tucson, Arizona: Department of Sociology, University of Arizona.

Ragin, C. C. (1987). The comparative method: Moving beyond qualitative and quantitative strategies. Berkeley: University of California Press.

Rangaswamy A., J. Eliashberg, R. R. Burke, and J. Wind (1989). "Developing Marketing Expert Systems: An Application to International Negotiations," *Journal of Marketing*, 53 (4), pp. 24-39.

Rao R. K. S., and N. Bharadwaj (2008). "Marketing Initiatives, Expected Cash Flows, and Shareholders' Wealth," *Journal of Marketing*, 72 (1), pp. 16-26.

Rappaport A. (1986). *Creating Shareholder Value: The New Standard for Business Performance*. New York: Free Press.

Reinartz W., M. Krafft, and W. D. Hoyer (2004). "The customer relationship management process: Its measurement and impact on performance," *Journal of Marketing Research*, 41 (3), pp. 293–305.

Rihoux B. and C. C. Ragin (2009). *Configurational Comparative Methods*. Thousand Oaks, CA and London: Sage.

Rihoux B., C. C. Ragin, S. Yamasaki, and D. Bol (2009). "Conclusion – The Way(s) Ahead", in Rihoux B., and C. C. Ragin (Eds.), *Configurational Comparative Methods: Qualitative Comparative Analysis (QCA) and Related Techniques*. Los Angeles, CA: Sage, pp. 167-177.

Romme A. G. L. (1995). "Self-Organizing Processes in Top Management Teams: a Boolean Comparative Approach," *Journal of Business Research*, 34 (1), pp. 11-34.

Ruekert R. W., O. C. Walker Jr., and K. J. Roering (1985). "The Organization of Marketing Activities: A Contingency Theory of Structure and Performance," *Journal of Marketing*, 49 (1), pp. 13-25.

Rust R. T., K. N. Lemon, and V. A. Zeithaml (2004). "Return on Marketing: Using Customer Equity to Focus Marketing Strategy," *The Journal of Marketing*, 68 (1), pp. 109-127.

Rust R. T., T. Ambler, G. S. Carpenter, V. Kumar, and R. K. Srivastava (2004). "Measuring Marketing Productivity: Current Knowledge and Future Directions," *Journal of Marketing*, 68 (4), pp. 76–89.

Rust R.T., K. N. Lemon, and V. A. Zeithaml (2004). "Return on Marketing: Using Customer Equity to Focus Marketing Strategy," *Journal of Marketing*, 68 (1), pp. 109-127.

Schneider C., and C. Wagemann (2010). "Standards of Good Practice in Qualitative Comparative Analysis (QCA) and Fuzzy-Sets," *Comparative Sociology*, 9 (3), pp. 397-418.

Schneider M. R., C. Schulze-Bentrop, and M. Paunescu (2010). "Mapping the institutional capital of high-tech firms: A fuzzy-set analysis of capitalist variety and export performance," *Journal of International Business Studies*, 41, 246–266.

Scholz F. W., and M. A. Stephens (1987). “K-Sample Anderson-Darling Tests,” *Journal of the American Statistical Association*, 82 (399), pp. 918- 924.

Schrodt P. (2006). “Beyond the linear frequentist orthodoxy,” *Political Analysis*, 14 (3), pp. 335- 339.

Sevin C. H. (1965). *Marketing productivity analysis*. New York: McGraw-Hill.

Sheth J. N. (1971). “The Multivariate Revolution in Marketing Research,” *The Journal of Marketing,* 35 (1), pp. 13-19.

Shuchman A. The marketing audit: its nature, purposes and problems. Analyzing and improving marketing performance (vol. 31). New York: American Management Association, 1959. pp. 1–11.

Slater S. F., and J. C. Narver (1995). “Market Orientation and the Learning Organization,” *Journal of Marketing*, 59 (3), pp. 63-74.

Smith R. A., and D. S. Lux (1993). “Historical Method in Consumer Research: Developing Causal Explanations of Change,” *Journal of Consumer Research*, 19 (4), pp. 595-610.

Srivastava R. K., L. Fahey, and H. K. Christensen (2001). "The resource-based view and marketing: The role of market-based assets in gaining competitive advantage," *Journal of Management*, 27 (6), pp. 777-802.

Srivastava R. K., T. A. Shervani, and L. Fahey (1998). “Market-Based Assets and Shareholder Value: A Framework for Analysis,” *Journal of Marketing*, 62 (1), pp. 2–18.

Srivastava R. K., T. A. Shervani, and L. Fahey (1999). “Marketing, Business Processes, and Shareholder Value: An Organizationally Embedded View of Marketing Activities and the Discipline of Marketing,” *Journal of Marketing*, 63 (Special Issue), pp. 168-179.

Stathakopoulos V. (1998) "Enhancing the performance of marketing managers: Aligning strategy, structure and evaluation systems," *European Journal of Marketing*, 32 (5/6), pp. 536 – 558.

Stephens M. A. (1974). “EDF Statistics for Goodness of Fit and Some Comparisons,” *Journal of the American Statistical Association*, 69 (347), pp. 730- 737.

Stephens M. A. (1986). "Tests Based on EDF Statistics," in d'Agostino R. B., and M. A. Stephens (Eds.), *Goodness-of-Fit Techniques,* New York: Marcel Dekker, pp. 97-193.

Stewart D. W. (2006). “Putting Financial Discipline in Marketing: A Call to Action”, *Corporate Finance Review*, 11 (2), pp. 14-21.

Stewart D. W. (2009). “Marketing accountability: Linking marketing actions to financial results,” *Journal of Business Research*, 62 (6), 636–643.

Strauss A. and J. Corbin (1990). Basics of qualitative research. Grounded theory procedures and techniques. Newbury Park: Sage Publications.

Tadajewski M. (2004). “The Philosophy of Marketing Theory: Historical and Future Directions,” *The Marketing Review*, 4 (3), pp. 307-340.

Tellis G. J. (2006). “Modeling Marketing Mix” in R. Grover and M. Vriens (Eds.) *The handbook of marketing research: uses, misuses, and future advances*. Thousand Oaks, CA: SAGE.

Tellis G.J. (2006). "Modeling Marketing Mix" in R Grover, M Vriens "The handbook of marketing research: uses, misuses, and future advances" Thousand Oaks CA

Tikkanen H., and A. Vassinen (2009). *StratMark – Suomalainen markkinointi-osaaminen*. Talentum: Helsinki, 156 pp.

Tikkanen H., J. A. Lamberg, P. Parvinen, and J. P. Kallunki (2005). "Managerial cognition, action and the business model of the firm," *Management Decision*, 43 (6), pp. 789 – 809.

Velleman P. F., and L. Wilkinson (1993). “Nominal, Ordinal, Interval, and Ratio Typologies Are Misleading,” *The American Statistician*, 47 (1), pp. 65-72.

Venables W. N., B. D. Ripley (2002). *Modern Applied Statistics with S,* New York, NY: Springer.

Vis B., J. Woldendorp, and H. Keman (2007). "Do Miracles Exist? Analysing Economic Performance Comparatively," *Journal of International Business Studies*, 39, 652–669.

Vorhies D. W., and N. A. Morgan (2003). “A Configuration Theory Assessment of Marketing Organization Fit with Business Strategy and Its Relationship with Marketing Performance,” *Journal of Marketing*, 67 (1), pp. 100-115.

Walker Jr. O. C., and R. W. Ruekert (1987). “Marketing's Role in the Implementation of Business Strategies: A Critical Review and Conceptual Framework,” *Journal of Marketing*, 51 (3), pp. 15-33.

Wallace, E.R. IV (1988), “What is ‘truth’? some philosophical contributions to psychiatric issues”, *The American Journal of Psychiatry,* 145 (2), pp. 137-47.

Wernerfelt B. (1984). “A resource-based view of the firm,” *Strategic Management Journal*, 5 (2), pp. 171–180.

Wierenga B., G. H. van Bruggen, and R. Staelin (1999). “The success of marketing management support systems,” *Marketing Science*, 18 (3), pp. 196-207.

Wierenga, B. (2010). “Marketing intelligent systems using soft computing,” in J. Casillas and F.J. Martinez-Lopez (Eds.) *Marketing Intelligent*

Systems using Soft Computing: Managerial and Research Applications, Springer, pp. 1-8.

Wilkinson I. F., and L. C. Young (2005). "Toward a normative theory of normative marketing theory," *Marketing Theory*, 5, pp. 363-396.

Williams M., and W. Dyer (2004). "Realism and probability" in Carter, B. & New, C. (Editors) *Making Realism Work: Realist Social Theory and Empirical Research*. London & New York: Routledge.

Winter, L. and Kron, T. (2009). "Fuzzy Thinking in Sociology". Seising, R. (Ed.) *Views on Fuzzy Sets and Systems from Different Perspectives*, Springer, Berlin. Pp 301-320.

Yarger H. R. (2006). *Strategic Theory For The 21st Century: The Little Book On Big Strategy*. Carlisle Barracks, PA: US Army War College.

Yin R. K. (1989). *Case Study Research: Design and Methods, volume 5 of Applied Social Research Methods Series*. London, U.K.: Sage Publications Ltd, pp. 47, 48, 52.

Yin R. K. (1994). *Case study research: design and methods*. Thousand Oaks, CA: Sage.

Young R. A., A. M. Weiss, and D. W. Stewart (2006). Marketing champions: practical strategies for improving marketing's power, influence, and business impact. New York, NY: Wiley Interscience; 2006.

Zadeh L. A. (1965). "Fuzzy sets," *Information and Control*, 8 (3), pp. 338–353.

Zadeh L. A. (2008) "*Is there a need for fuzzy logic?"* Information Science, 178, pp. 2751–2779.

Zeithaml C.P., and V. A. Zeithaml (1984). "Environmental Management: Revising the Marketing Perspective," *Journal of Marketing*, 48 (2), pp. 46-53.

Appendix A: Fuzzy Logic and Fuzzy Sets

> "More truth resides in the middle than at either extreme."
> (Wallace, 1988, p. 137)

This appendix is brief introduction to fuzzy logic and fuzzy sets, intended as theoretical background material for relating the concepts as they are introduced with the core methodology.

6.1 Fuzzy logic as a perspective

There are many misconceptions regarding fuzzy logic, many attributable in part to the term "fuzzy," taken to signify imprecision. Fuzzy logic, however, is not fuzzy. Instead, fuzzy logic is a precise logic of imprecision and approximate reasoning (Zadeh, 2008).

This factor-analytical simplification of reality has its uses, but it is not enough: there's always more dimensions and always more eigenvectors to figure in the analysis. Empirical evidence of social situations cannot directly measure (psycographical etc.) eigenvectors. And, there is still the assumption of linearity that is highly disturbing and nonwarranted by evidence of stranger things in the mind and in the quantum world. There is no evidence to assume that the rules that hold for mechanics in the physical world (eigenvectors of vibrating bodies) hold as more than mathematically valid constructs in analyzing psychometric (and thus also social) phenomena, when they in fact do not hold even for the entire physical world. Factor analysts believe that the many correlated and noisy observations that we make are a combination of a few fundamental entities, which cannot be observed directly but which are nevertheless real.

Past research carried out using fuzzy methodologies in a variety of distinct disciplines, from engineering to sociology, serves as a pool from which to draw parallels to epistemological challenges faced in marketing,

management, and business science, and identify corresponding potential methodological correspondences to answer those research problems.

In general, the assessment and control of dynamic systems has relied on heuristics and artificial intelligence (AI) rooted in traditional logical empiricism (Kosko, 1993, p. 188). The use of fuzzy logic for approximation in dynamic control first took root in the development of new electronic control systems, for example for helicopter stabilizers, video recording, and digital imaging (Kosko, p. 185). The Fuzzy Approximation Theory ('FAT'; Kosko, 1992) posits that a fuzzy system can act as a universal approximator of *any* system. According FAT, the approximation of a situation is geometrically analogous to covering or overlaying a function (curve) with a series of overlapping faces. These faces are based on a series of fuzzy rules based on qualitatively relevant statements. The better the rules and faces cover the complex function, the better the approximation. The less fuzzy the rules are, the smaller the faces get, and thus, the smaller the proportion of the function covered by the rules. Fuzzy logic allows rapid, dynamic modeling of diverse, vague, and contradictory rules and expectations (Winter and Kron, 2009). Computationally efficient fuzzy systems can rapidly be developed to model non-linear relations, because any curve in any dimension can be covered with fuzzy faces.

The three key features of fuzzy systems that have paved their success in engineering are fuzzy rules paralleling linguistic/qualitative descriptions, the ease of building a complex system from simple rules, and computational efficiency of fuzzy systems compared to traditional machine intelligence. These features also make fuzzy logic systems a good candidate for executing/developing large actor-based simulations with qualitatively controlled attributes.

Not all of the discussion in this section is direct theoretic antecedent to the adoption of FS/QCA for marketing problem solving. Rather, the discussion portends to expound on the possibilities of applying fuzzy logic, and exemplifying one application of a fuzzy method into a new area of theory. The intent is to spur further research into how fuzzy methods can be adapted for marketing science from other disciplines.

The approach involved in using fuzzy logic for control systems and modeling complex nonlinear systems in the engineering sciences bears great resemblance to marketing models. In marketing performance, and economics in general, a great deal of research effort goes into crafting advanced mathematical representations of very similar phenomena. The typical finding involves numerous assumptions, error terms, and (sometimes) a disclaimer admitting the limited usability of the equation system beyond the data in question. Generalizing into a wider discussion on

financial crisis, Paul Krugman saw that "the economics profession went astray because economists, as a group, mistook beauty, clad in impressive-looking mathematics, for truth“ [1].

FAT and other fuzzy approaches to control and analysis allow applications far beyond the conventional scope of marketing models, as represented in the academic discourse.

In contrast with "hard" sciences, economics, marketing and other fields within the domain of human and social action involve perspectives, interpretations, imprecision and vagueness instead of rigid facts (Winter and Kron, 2009). The Aristotelian tradition of scientific discovery prevalent in the Western world (Kosko, 1993, p. 92) emphasizes bivalence: statements are true or they are false; things either are, or they are not.

From the perspective of strategic analysis, fuzzy logic reveals more of the alternatives, helps explain ambiguity and uncertainty, and qualify expectations (Yarger, p. 44). Causation is treated as contingent, not categorical (Yarger, p. 45), which coincides with the dominant approaches in contemporary strategic management discourse.

6.2 Fuzzy logic and fuzzy set theory

The term and concept of fuzzy sets were initially proposed by Lofti A. Zadeh (1965), then as now a professor at Berkeley. Zadeh built his formalization of a multi-valued logic on work by earlier modern scholars (notably, Jan Lukasiewicz on multi-valued logics [1920] and Max Black [1937] on membership functions), but its foundations go back to antiquity (Mattila, 1997, p. 10). The abstraction of a black-and-white into infinite, continuous shades of gray allows for logical analysis to be carried out on linguistic variables with imprecise values and other complex, nonlinear systems that cannot be controlled with precise mathematical models (Mattila, p. 11). Arguably and despite continued efforts implying contrasting assumptions, marketing systems are good examples of these types of systems.

The outline of fuzzy set theory and fuzzy logic operations presented here is an amalgamation of those by Zadeh (1965), Mattila (1997, pp. 9), Gorman (1998), and Novák, Perfilieva and Močkoř (1999). The last of these provides a thorough, formal review of the mathematics involved for interested readers.

---

[1] ” How Did Economists Get It So Wrong?”, New York Times, 2 September, 2009, available online at <http://www.nytimes.com/2009/09/06/magazine/06Economic-t.html>.

Fuzzy logic and fuzzy sets are respective generalizations of classical logic and classical set theory (Mattila 1997, p 9). The two fundamental principles of classical logic (Winter and Kron; Restall, 2001) are:

1. The principle of *non-contradiction:* no statement can be true and false simultaneously, i.e. $A \vdash \neg(A \wedge \neg A)$.
2. The principle of *the excluded middle:* every statement is either true or false, i.e. $A \vdash A \vee \neg A$.

These two principles define truth as something that is either wholly present or wholly absent, nothing else being possible. Classical logic thus deals with black and white, whereas social reality comes in shades of grey. A bivalent approach is not adequate to deal with social and human phenomena, as the underlying dichotomization is inconsistent with how social reality is organized (Winter and Kron). Fuzzy logic and fuzzy set theory are a candidate for mitigating inherent incongruence between bivalent thinking and reality. With fuzzy thinking, the logical approach is polyvalent instead of bivalent, and truth a matter of degree between polar extremes.

Fuzzy set theory posits that classical sets are a special case of fuzzy sets, where the membership function only takes the values 0 or 1. In a fuzzy context, these are referred to as *crisp* sets. The characteristic function

$$f_A : X \rightarrow \{0,1\} \qquad (1)$$

of crisp sets maps elements of a basic set X to binary values. With fuzzy sets, the axiom of set theory that an object is either a member or a nonmember of a set is relaxed. The atomic relation holding elements to the set is no longer bivalent, but instead, elements have *degrees* of membership (nonmembership) in the set. The set-theoretic extension

$$\mu_A : X \rightarrow [0,1] \quad (2)$$

provides elements $x \in X$, that can belong to a fuzzy set A in any degree. The degree of membership of an element x in a fuzzy set A is defined by a *membership function* μ_A that may take real values in the unit interval [0,1]. This represents the degree of truth of a statement: fuzzy logic is not restricted to the two truth-values of classic propositional logic.

Just like sets in classical set theory consist of individual elements, fuzzy sets are groups of elements that belong to the set to a degree. As a consequence of (2), an element x is a member of a fuzzy set A with a degree of membership μ_A, and all members of A have a nonzero degree of membership. The fuzzy set thus comprises all pairs such that

$$x \in (A, \mu_A) \Leftrightarrow \left(x \in A\right) \wedge \left(\mu_A(x) \neq 0\right). \quad (3)$$

Fuzzy logic is a multi-valued logic that allows formal reasoning with fuzzy truth-values. The ordered pairs defined by (3) are the basic units on which fuzzy logic formally operates.

Before we deal with logical operations on fuzzy sets, fuzzy analogues to classical union, inclusion and complements of sets must be defined. Two fuzzy sets are equal if and only if

$$\forall x \in U : \mu_A(x) = \mu_B(x). \quad (4)$$

A fuzzy set A is a subset of B if and only if

$$\forall x \in U : \mu_A(x) \leq \mu_B(x). \quad (5)$$

Zadeh (1965) proposed the following definitions to correspond to the well-defined semantics of classical propositional logic:

$$\begin{aligned} &\forall x \in X : \mu_{A \cap B}(x) = \min\left(\mu_A(x), \mu_B(x)\right); \\ &\forall x \in X : \mu_{A \cup B}(x) = \max\left(\mu_A(x), \mu_B(x)\right); \\ &\forall x \in X : \mu_{\bar{A}}(x) = 1 - \mu_A(x). \end{aligned} \quad (6)$$

These are the operators are used in FS/QCA. Other (more complex) T and S-norms are possible and used in other applications (Gorman, 1998).

The power if fuzzy sets lies in their calibrability to a fine, continuous measure of a phenomenon. They are explicitly infused with theoretical and practical knowledge of their context. Qualitative information can be translated into quantified information without losing substantive distinctions. For example, a marketing action may be characterized as "more targeted towards segment X than Y," instead of a Boolean "belongs to X *OR* Y." With fuzzy sets, variation in degrees of membership between two qualitative states can be combined into a single instrument. Furthermore, since qualitative distinctions are not lost on calibration to a standard scale, multiple interpretations of the same situation can be undertaken simultaneously. The most powerful feature of fuzzy sets, however, is that they enable the assessment of set-theoretic relationships. This explicitly answers to concerns over questions of demonstrating causality faced when working with conventional methods.

Appendix B: Blue 1 Correlations and Truth Tables

Pearson product-moment correlations matrix of Blue1 case conditions:

Please refer to Chapter 5 for descriptions of the causal conditions.

	revgain_log	buynow	citydestn	travellate_log
revgain_log	1.0000000	-0.55116579	-0.52084388	0.18222712
buynow	-0.5511658	1.00000000	0.32282869	-0.08715932
citydestn	-0.5208439	0.32282869	1.00000000	0.08158078
travellate log	0.1822271	-0.08715932	0.08158078	1.00000000
destntold	-0.2333457	0.26444294	-0.18496783	0.30252338
emailvisits_log	0.2832351	-0.35745639	0.22199690	-0.01669009
expensive	-0.1050347	-0.32761898	0.09837806	-0.18525644
nordic	0.3027966	0.06570138	-0.59479712	0.19479583
seasondestn	0.2248673	-0.19096397	-0.50089526	-0.05544872
longsale	-0.6300692	0.75076788	0.27628631	0.08091505
travelsoon_log	0.1138514	-0.28303205	-0.10908258	-0.58001282

	destntold	emailvisits_log	expensive	nordic	seasondestn
revgain_log	-0.2333457	0.28323512	-0.10503472	0.30279665	0.22486733
buynow	0.2644429	-0.35745639	-0.32761898	0.06570138	-0.19096397
citydestn	-0.1849678	0.22199690	0.09837806	-0.59479712	-0.50089526
travellate	0.3025234	-0.01669009	-0.18525644	0.19479583	-0.05544872
destntold	1.0000000	-0.51348118	0.14747462	0.24845200	0.36927447
emailvisits_log	-0.5134812	1.00000000	0.20340477	-0.40712875	-0.25511976
expensive	0.1474746	0.20340477	1.00000000	-0.64316755	0.49842192
nordic	0.2484520	-0.40712875	-0.64316755	1.00000000	0.20795982
seasondestn	0.3692745	-0.25511976	0.49842192	0.20795982	1.00000000
longsale	0.3489817	-0.41011784	-0.09139975	-0.11714560	-0.11422151
travelsoon_log	-0.1744147	0.15925984	0.41479175	-0.23134725	0.12306199

	longsale	travelsoon_log
revgain_log	-0.63006919	0.1138514
buynow	0.75076788	-0.2830321
citydestn	0.27628631	-0.1090826
travellate	0.08091505	-0.5800128
destntold	0.34898174	-0.1744147
emailvisits_log	-0.41011784	0.1592598
expensive	-0.09139975	0.4147918
nordic	-0.11714560	-0.2313472
seasondestn	-0.11422151	0.1230620
longsale	1.00000000	-0.4032570
travelsoon_log	-0.40325699	1.0000000

Truth table for Blue1 (positive outcome):

```
    A: destntold
    B: expensive
    C: buynow
    D: longsale
    E: travelsoon_log
    F: travellate_log
    G: emailvisits_log
    H: seasondestn
    I: citydestn
    J: nordic
  OUT: OUT (outcome)

freq0: frequency of outcome equal to 0
freq1: frequency of outcome equal to 1
cases: case names
```

	A	B	C	D	E	F	G	H	I	J	OUT	freq1	freq0	N_Cases	Consistency
31	1	0	0	0	0	1	1	1	1	1	0	-	1	1	0.42478361
211	1	0	1	1	0	1	0	0	1	1	0	-	4	4	0.65517537
287	1	0	0	0	0	1	1	1	0	1	1	1	-	1	1.00000000
351	1	0	0	0	0	1	0	1	0	1	1	1	-	1	1.00000000
367	1	0	0	0	1	0	0	1	0	1	1	4	-	4	1.00000000
525	1	1	0	0	1	1	1	1	1	0	1	2	-	2	1.00000000
541	1	1	0	0	0	1	1	1	1	0	1	1	-	1	0.97964004
557	1	1	0	0	1	0	1	1	1	0	1	1	-	1	1.00000000
561	1	1	1	1	0	0	1	1	1	0	0	-	1	1	0.15706122
577	1	1	1	1	1	1	0	1	1	0	0	-	1	1	0.14819364
581	1	1	0	1	1	1	0	1	1	0	0	-	1	1	0.46655906
597	1	1	0	1	0	1	0	1	1	0	0	-	1	1	0.18834792
609	1	1	1	1	1	0	0	1	1	0	0	-	2	2	0.06013556
643	1	0	1	1	1	1	1	0	1	0	0	-	1	1	0.21699126
653	1	1	0	0	1	1	1	0	1	0	0	-	2	2	0.69268566
659	1	0	1	1	0	1	1	0	1	0	0	-	1	1	0.57976836
661	1	1	0	1	0	1	1	0	1	0	0	-	1	1	0.26450893
672	0	0	0	0	0	1	1	0	1	0	1	1	-	1	1.00000000
675	1	0	1	1	1	0	1	0	1	0	0	-	1	1	0.11666521
686	0	1	0	0	1	0	1	0	1	0	1	1	-	1	0.93380140
687	1	0	0	0	1	0	1	0	1	0	1	1	-	1	1.00000000
688	0	0	0	0	1	0	1	0	1	0	1	3	-	3	0.89420514
709	1	1	0	1	1	1	0	0	1	0	0	-	1	1	0.23195581
735	1	0	0	0	0	1	0	0	1	0	1	1	-	1	0.83547488
749	1	1	0	0	1	0	0	0	1	0	1	1	-	1	0.96417263
755	1	0	1	1	0	0	0	0	1	0	0	-	1	1	0.14894637
853	1	1	0	1	0	1	0	1	0	0	1	1	-	1	1.00000000

```
cases
31  2009-11-OSL
211 2009-18-TKU-STO,2009-18-TMP-STO,2009-18-VAA-STO,2009-18-HEL-STO
287 2009-4-IVL
351 2009-4-KAO
367 2009-9-KAO,2009-9-IVL,2009-9-KTT,2009-9-RVN
525 2009-6-BCN,2009-16-ATH
541 2009-11-ATH
557 2010-4-BCN
561 2009-42-ZRH
577 2009-45-NCE
581 2009-37-ATH
597 2009-26-ZRH
609 2009-43-NCE,2009-43-ATH
643 2009-45-CDG
653 2009-6-CDG,2009-23-CDG
659 2010-9-TXL
661 2009-26-CDG
672 2010-5-TXL
675 2009-43-CDG
686 2010-1-MXP
687 2010-4-CDG
688 2010-1-LHR,2010-1-CDG,2010-5-LHR
709 2009-37-CDG
```

```
735 2010-12-LHR
749 2010-4-MIL
755 2009-42-MXP
853 2010-13-BIQ
```

Truth table for Blue1 (positive outcome, without buynow, emailvisits, nordic):

```
    A: destntold
    B: expensive
    C: splength
    D: travelsoon_log
    E: daysuntilend_log
    F: seasondestn
    G: citydestn
  OUT: OUT (outcome)

freq0: frequency of outcome equal to 0
freq1: frequency of outcome equal to 1
cases: case names

    A   B   C   D   E   F   G  OUT freq1 freq0 N_Cases Consistency
1   1   1   1   1   1   1   1   0     -     2       2     0.2957337
5   1   1   0   1   1   1   1   1     2     -       2     0.8528698
9   1   1   1   0   1   1   1   0     -     1       1     0.2098909
13  1   1   0   0   1   1   1   0     -     1       1     0.6804233
15  1   0   0   0   1   1   1   0     -     1       1     0.4726627
17  1   1   1   1   0   1   1   0     -     2       2     0.1128909
21  1   1   0   1   0   1   1   0     -     1       1     0.6160333
25  1   1   1   0   0   1   1   0     -     1       1     0.1631554
33  1   1   1   1   1   0   1   0     -     1       1     0.2380135
35  1   0   1   1   1   0   1   0     -     1       1     0.3547619
37  1   1   0   1   1   0   1   0     -     2       2     0.6319620
41  1   1   1   0   1   0   1   0     -     1       1     0.3920411
43  1   0   1   0   1   0   1   0     -     5       5     0.6046964
47  1   0   0   0   1   0   1   0     -     1       1     0.7624822
48  0   0   0   0   1   0   1   1     1     -       1     1.0000000
51  1   0   1   1   0   0   1   0     -     1       1     0.2109066
53  1   1   0   1   0   0   1   0     -     1       1     0.7234102
54  0   1   0   1   0   0   1   1     1     -       1     0.9338014
55  1   0   0   1   0   0   1   0     -     1       1     0.7519490
56  0   0   0   1   0   0   1   1     3     -       3     0.8942051
59  1   0   1   0   0   0   1   0     -     1       1     0.2736190
73  1   1   1   0   1   1   0   1     1     -       1     1.0000000
79  1   0   0   0   1   1   0   1     2     -       2     1.0000000
87  1   0   0   1   0   1   0   1     4     -       4     1.0000000

cases
1  2009-37-ATH,2009-45-NCE
5  2009-6-BCN,2009-16-ATH
9  2009-26-ZRH
13 2009-11-ATH
15 2009-11-OSL
17 2009-43-NCE,2009-43-ATH
21 2010-4-BCN
25 2009-42-ZRH
33 2009-37-CDG
35 2009-45-CDG
37 2009-6-CDG,2009-23-CDG
41 2009-26-CDG
43 2009-18-TKU-STO,2009-18-TMP-STO,2009-18-VAA-STO,2009-18-HEL-STO,2010-9-TXL
47 2010-12-LHR
48 2010-5-TXL
51 2009-43-CDG
53 2010-4-MIL
54 2010-1-MXP
```

```
55 2010-4-CDG
56 2010-1-LHR,2010-1-CDG,2010-5-LHR
59 2009-42-MXP
73 2010-13-BIQ
79 2009-4-IVL,2009-4-KAO
87 2009-9-KAO,2009-9-IVL,2009-9-KTT,2009-9-RVN
```

Truth table for Blue1 (negative outcome, without buynow):

```
    A: destntold
    B: expensive
    C: splength
    D: travelsoon_log
    E: daysuntilend_log
    F: emailvisits_log
    G: seasondestn
    H: citydestn
    I: nordic
  OUT: OUT (outcome)

freq0: frequency of outcome equal to 0
freq1: frequency of outcome equal to 1
cases: case names
```

	A	B	C	D	E	F	G	H	I	OUT	freq1	freq0	N_Cases	Consistency
15	1	0	0	0	1	1	1	1	1	1	1	-	1	1.000000e+00
107	1	0	1	0	1	0	0	1	1	0	-	4	4	6.744365e-01
143	1	0	0	0	1	1	1	0	1	0	-	1	1	1.373468e-01
175	1	0	0	0	1	0	1	0	1	0	-	1	1	1.176188e-01
183	1	0	0	1	0	0	1	0	1	0	-	4	4	1.933074e-01
261	1	1	0	1	1	1	1	1	0	0	-	2	2	3.048375e-01
269	1	1	0	0	1	1	1	1	0	0	-	1	1	4.462205e-01
277	1	1	0	1	0	1	1	1	0	0	-	1	1	6.008780e-01
281	1	1	1	0	0	1	1	1	0	1	1	-	1	1.000000e+00
289	1	1	1	1	1	0	1	1	0	1	2	-	2	9.064161e-01
297	1	1	1	0	1	0	1	1	0	1	1	-	1	1.000000e+00
305	1	1	1	1	0	0	1	1	0	1	2	-	2	1.000000e+00
323	1	0	1	1	1	1	0	1	0	1	1	-	1	1.000000e+00
325	1	1	0	1	1	1	0	1	0	1	2	-	2	8.287539e-01
329	1	1	1	0	1	1	0	1	0	1	1	-	1	1.000000e+00
331	1	0	1	0	1	1	0	1	0	1	1	-	1	8.098882e-01
336	0	0	0	0	1	1	0	1	0	0	-	1	1	3.870115e-01
339	1	0	1	1	0	1	0	1	0	1	1	-	1	1.000000e+00
342	0	1	0	1	0	1	0	1	0	0	-	1	1	5.037248e-01
343	1	0	0	1	0	1	0	1	0	1	1	-	1	9.390903e-01
344	0	0	0	1	0	1	0	1	0	0	-	3	3	5.033848e-01
353	1	1	1	1	1	0	0	1	0	1	1	-	1	1.000000e+00
367	1	0	0	0	1	0	0	1	0	1	1	-	1	1.000000e+00
373	1	1	0	1	0	0	0	1	0	1	1	-	1	9.620555e-01
379	1	0	1	0	0	0	0	1	0	1	1	-	1	1.000000e+00
425	1	1	1	0	1	0	1	0	0	0	-	1	1	1.811801e-09

```
cases
15  2009-11-OSL
107 2009-18-TKU-STO,2009-18-TMP-STO,2009-18-VAA-STO,2009-18-HEL-STO
143 2009-4-IVL
175 2009-4-KAO
183 2009-9-KAO,2009-9-IVL,2009-9-KTT,2009-9-RVN
261 2009-6-BCN,2009-16-ATH
269 2009-11-ATH
277 2010-4-BCN
281 2009-42-ZRH
289 2009-37-ATH,2009-45-NCE
297 2009-26-ZRH
305 2009-43-NCE,2009-43-ATH
323 2009-45-CDG
325 2009-6-CDG,2009-23-CDG
329 2009-26-CDG
331 2010-9-TXL
```

```
336 2010-5-TXL
339 2009-43-CDG
342 2010-1-MXP
343 2010-4-CDG
344 2010-1-LHR,2010-1-CDG,2010-5-LHR
353 2009-37-CDG
367 2010-12-LHR
373 2010-4-MIL
379 2009-42-MXP
425 2010-13-BIQ
```

Appendix C: Valio Correlations and Truth Tables

Pearson product-moment correlations matrix of Valio functional dairy product case conditions:

Please refer to Chapter 6 for descriptions of the causal conditions.

	sales_kg	tv_comp	pricepromo_comp
sales_kg	1.00000000	0.2379060622	-0.37170634
tv_comp	0.23790606	1.0000000000	0.07543602
pricepromo_comp	**-0.37170634**	0.0754360231	1.00000000
pricepromo_valio	**0.47740578**	0.0003505543	-0.09686280
pricepromo_prod_b	-0.06511753	0.1989346487	-0.11000181
unitprice	-0.03067351	0.0099698835	-0.19661137
newspaper	0.20094066	0.1283136226	0.15864115
non-tv	0.23795699	0.2676947638	0.15525938
outdoor	0.16955971	0.1609540368	0.12151499
total_adex	0.11311195	0.1845749937	0.20148895
tv	0.03526086	0.1091259966	0.30605873

	pricepromo_valio	pricepromo_prod_b
sales_kg	**0.4774057802**	-0.06511753
tv_comp	0.0003505543	0.19893465
pricepromo_comp	-0.0968627961	-0.11000181
pricepromo_valio	1.0000000000	**-0.30895907**
pricepromo_prod_b	-0.3089590720	1.00000000
unitprice	**-0.4147063072**	0.23006251
newspaper	-0.0967954236	-0.13706643
non-tv	-0.1149954494	-0.17196002
outdoor	-0.0649942511	-0.10251098
total_adex	-0.1955947671	-0.18133712
tv	-0.1187348722	-0.19061079

	unitprice	newspaper	non-tv
sales_kg	-0.030673513	0.20094066	0.23795699
tv_comp	0.009969884	0.12831362	0.26769476
pricepromo_comp	-0.196611372	0.15864115	0.15525938
pricepromo_valio	**-0.414706307**	-0.09679542	-0.11499545
pricepromo_prod_b	0.230062511	-0.13706643	-0.17196002
unitprice	1.000000000	0.04196487	0.05693312
newspaper	0.041964867	1.00000000	**0.70045730**
non-tv	0.056933123	**0.70045730**	1.00000000
outdoor	0.003594176	**0.40907497**	**0.71265082**
total_adex	0.079241506	**0.42466084**	**0.62120748**
tv	-0.008036720	**0.34091492**	**0.40014480**

	outdoor	total_adex	tv
sales_kg	0.169559706	0.1131120	0.03526086
tv_comp	0.160954037	0.1845750	0.10912600
pricepromo_comp	0.121514990	0.2014889	0.30605873
pricepromo_valio	-0.064994251	-0.1955948	-0.11873487
pricepromo_prod_b	-0.102510981	-0.1813371	-0.19061079
unitprice	0.003594176	0.0792415	-0.00803672
newspaper	**0.409074968**	**0.4246608**	**0.34091492**

non-tv	**0.712650817**	**0.6212075**	**0.40014480**
outdoor	1.000000000	**0.5062065**	**0.36963657**
total_adex	**0.506206454**	1.0000000	**0.90575892**
tv	**0.369636575**	**0.9057589**	1.00000000

Truth table for positive outcome:

```
    A: total_adex
    B: newspaper
    C: tv
    D: outdoor
    E: non-tv
    F: tv_comp
    G: pricepromo_valio
    H: pricepromo_prod_b
    I: pricepromo_comp
    J: unitprice
  OUT: OUT (outcome)

freq0: frequency of outcome equal to 0
freq1: frequency of outcome equal to 1
cases: case names
```

cases	A	B	C	D	E	F	G	H	I	J	OUT	freq1	freq0	N_Cases	Consistency
64	0	0	0	0	0	0	1	1	1	1	1	1	-	1	0.8774100
67	1	0	1	1	1	1	0	1	1	1	1	1	-	1	0.8886784
91	1	0	1	0	0	1	0	1	1	1	1	1	-	1	0.8623365
160	0	0	0	0	0	1	1	0	1	1	0	-	2	2	0.7980626
187	1	0	1	0	0	0	1	0	1	1	1	1	-	1	0.8775053
193	1	1	1	1	1	1	0	0	1	1	1	1	-	1	0.9969673
225	1	1	1	1	1	0	0	0	1	1	1	1	-	1	0.9915040
251	1	0	1	0	0	0	0	0	1	1	0	-	1	1	0.8396219
283	1	0	1	0	0	1	1	1	0	1	1	1	-	1	0.9968106
288	0	0	0	0	0	1	1	1	0	1	1	4	-	4	0.9662384
320	0	0	0	0	0	0	1	1	0	1	1	3	-	3	0.9271749
323	1	0	1	1	1	1	0	1	0	1	1	1	-	1	0.9940630
327	1	0	0	1	1	1	0	1	0	1	1	2	-	2	0.9973845
329	1	1	1	0	1	1	0	1	0	1	1	1	-	1	0.9967525
333	1	1	0	0	1	1	0	1	0	1	1	1	-	1	0.9968909
343	1	0	0	1	0	1	0	1	0	1	1	1	-	1	0.9972819
347	1	0	1	0	0	1	0	1	0	1	1	1	-	1	0.9586312
352	0	0	0	0	0	1	0	1	0	1	1	3	-	3	0.9012322
379	1	0	1	0	0	0	0	1	0	1	1	2	-	2	0.9503403
384	0	0	0	0	0	0	0	1	0	1	0	-	5	5	0.7361627
448	0	0	0	0	0	0	1	0	0	1	1	4	-	4	0.9371465
461	1	1	0	0	1	1	0	0	0	1	1	1	-	1	0.9962806
463	1	0	0	0	1	1	0	0	0	1	1	1	-	1	0.9480086
507	1	0	1	0	0	0	0	0	0	1	1	1	-	1	0.9854617
512	0	0	0	0	0	0	0	0	0	1	0	-	1	1	0.8192711
544	0	0	0	0	0	1	1	1	1	0	1	2	-	2	0.9974397
576	0	0	0	0	0	0	1	1	1	0	1	1	-	1	0.8884167
608	0	0	0	0	0	1	0	1	1	0	0	-	4	4	0.6593497
635	1	0	1	0	0	0	0	1	1	0	1	1	-	1	0.8602393
640	0	0	0	0	0	0	0	1	1	0	0	-	2	2	0.6984078
641	1	1	1	1	1	1	1	0	1	0	1	1	-	1	0.9975414
651	1	0	1	0	1	1	1	0	1	0	1	1	-	1	0.9973787
673	1	1	1	1	1	0	1	0	1	0	1	1	-	1	0.9923290
731	1	0	1	0	0	1	0	0	1	0	1	1	-	1	0.9016414
763	1	0	1	0	0	0	0	0	1	0	0	-	2	2	0.8061401
800	0	0	0	0	0	1	1	1	0	0	1	5	-	5	0.9983144
827	1	0	1	0	0	0	1	1	0	0	1	2	-	2	0.9897670
832	0	0	0	0	0	0	1	1	0	0	1	4	-	4	0.9855768
864	0	0	0	0	0	1	0	1	0	0	1	1	-	1	0.8597630
891	1	0	1	0	0	0	0	1	0	0	1	1	-	1	0.9016664
896	0	0	0	0	0	0	0	1	0	0	0	-	3	3	0.7149145
899	1	0	1	1	1	1	1	0	0	0	1	1	-	1	0.9970551

919	1	0	0	1	0	1	1	0	0	0	1	1	-	1	0.9968556
923	1	0	1	0	0	1	1	0	0	0	1	2	-	2	0.9826781
928	0	0	0	0	0	1	1	0	0	0	1	1	-	1	0.9983974
951	1	0	0	1	0	0	1	0	0	0	1	1	-	1	0.9914159
960	0	0	0	0	0	0	1	0	0	0	1	3	-	3	0.9691431
1024	0	0	0	0	0	0	0	0	0	0	0	-	4	4	0.7239225

Truth table for negative outcome:

```
    A: total_adex
    B: newspaper
    C: tv
    D: outdoor
    E: non-tv
    F: tv_comp
    G: pricepromo_valio
    H: pricepromo_prod_b
    I: pricepromo_comp
    J: unitprice
  OUT: OUT (outcome)

freq0: frequency of outcome equal to 0
freq1: frequency of outcome equal to 1
cases: case names
```

	A	B	C	D	E	F	G	H	I	J	OUT	freq1	freq0	N_Cases	Consistency
cases															
64	0	0	0	0	0	0	1	1	1	1	1	1	-	1	1.0000000
67	1	0	1	1	1	1	0	1	1	1	1	1	-	1	1.0000000
91	1	0	1	0	0	1	0	1	1	1	1	1	-	1	1.0000000
160	0	0	0	0	0	1	1	0	1	1	1	2	-	2	1.0000000
187	1	0	1	0	0	0	1	0	1	1	1	1	-	1	1.0000000
193	1	1	1	1	1	1	0	0	1	1	1	1	-	1	0.9345872
225	1	1	1	1	1	0	0	0	1	1	1	1	-	1	0.9114780
251	1	0	1	0	0	0	0	0	1	1	1	1	-	1	0.9106396
283	1	0	1	0	0	1	1	1	0	1	1	1	-	1	0.9250733
288	0	0	0	0	0	1	1	1	0	1	0	-	4	4	0.7508756
320	0	0	0	0	0	0	1	1	0	1	0	-	3	3	0.7243122
323	1	0	1	1	1	1	0	1	0	1	1	1	-	1	0.8839561
327	1	0	0	1	1	1	0	1	0	1	0	-	2	2	0.7863064
329	1	1	1	0	1	1	0	1	0	1	0	-	1	1	0.8344897
333	1	1	0	0	1	1	0	1	0	1	0	-	1	1	0.7890497
343	1	0	0	1	0	1	0	1	0	1	0	-	1	1	0.8144438
347	1	0	1	0	0	1	0	1	0	1	0	-	1	1	0.8114909
352	0	0	0	0	0	1	0	1	0	1	0	-	3	3	0.6830129
379	1	0	1	0	0	0	0	1	0	1	0	-	2	2	0.8179394
384	0	0	0	0	0	0	0	1	0	1	0	-	5	5	0.8235934
448	0	0	0	0	0	0	1	0	0	1	0	-	4	4	0.7910449
461	1	1	0	0	1	1	0	0	0	1	1	1	-	1	0.8941309
463	1	0	0	0	1	1	0	0	0	1	0	-	1	1	0.8290736
507	1	0	1	0	0	0	0	0	0	1	1	1	-	1	0.9101000
512	0	0	0	0	0	0	0	0	0	1	0	-	1	1	0.8423007
544	0	0	0	0	0	1	1	1	1	0	0	-	2	2	0.7374188
576	0	0	0	0	0	0	1	1	1	0	1	1	-	1	0.8708455
608	0	0	0	0	0	1	0	1	1	0	1	4	-	4	0.9465325
635	1	0	1	0	0	0	0	1	1	0	1	1	-	1	0.9619798
640	0	0	0	0	0	0	0	1	1	0	1	2	-	2	0.9563018
641	1	1	1	1	1	1	1	0	1	0	0	-	1	1	0.7531599
651	1	0	1	0	1	1	1	0	1	0	0	-	1	1	0.7639746
673	1	1	1	1	1	0	1	0	1	0	0	-	1	1	0.8105918
731	1	0	1	0	0	1	0	0	1	0	1	1	-	1	0.9586293
763	1	0	1	0	0	0	0	0	1	0	1	2	-	2	0.9688517
800	0	0	0	0	0	1	1	1	0	0	0	-	5	5	0.5447316
827	1	0	1	0	0	0	1	1	0	0	0	-	2	2	0.8269910
832	0	0	0	0	0	0	1	1	0	0	0	-	4	4	0.6104587
864	0	0	0	0	0	1	0	1	0	0	1	1	-	1	0.8914237
891	1	0	1	0	0	0	0	1	0	0	1	1	-	1	0.9633956

896	0	0	0	0	0	0	0	1	0	0	1	3	-	3	0.8824568
899	1	0	1	1	1	1	1	0	0	0	0	-	1	1	0.8305176
919	1	0	0	1	0	1	1	0	0	0	1	1	-	1	0.9103097
923	1	0	1	0	0	1	1	0	0	0	0	-	2	2	0.8271615
928	0	0	0	0	0	1	1	0	0	0	0	-	1	1	0.6203359
951	1	0	0	1	0	0	1	0	0	0	1	1	-	1	0.8895678
960	0	0	0	0	0	0	1	0	0	0	0	-	3	3	0.5663473
1024	0	0	0	0	0	0	0	0	0	0	1	4	-	4	0.9361158

The fundamental questions of marketing performance remain unsatisfactorily answered: What works, when, where, and how? Marketing actions, assets, capabilities, and structures in different organizations and marketing contexts can be examined as configurations approachable with fuzzy-set qualitative comparative analysis. This provides the basis for configurational explanation of marketing outcomes (CEMO), a new analysis approach that provides contextually relevant knowledge about complex causal mechanisms shaping marketing performance. The CEMO process is demonstrated with two original empirical case studies: Blue1's promotional email campaigns and the sales response of Valio's functional dairy product.

Aalto-DD 39/2012

ISBN 978-952-60-4574-0
ISBN 978-952-60-4575-7 (pdf)
ISSN-L 1799-4934
ISSN 1799-4934
ISSN 1799-4942 (pdf)

Aalto University
School of Economics
Department of Marketing
www.aalto.fi

BUSINESS + ECONOMY

ART + DESIGN + ARCHITECTURE

SCIENCE + TECHNOLOGY

CROSSOVER

DOCTORAL DISSERTATIONS