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Customer Profitability Measurement Models

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Their Merits and Sophistication across Contexts

Morten Holm

LIMAC PhD School
Department of Accounting and Auditing

PhD Series 12-2012

CUSTOMER PROFITABILITY MEASUREMENT MODELS

THEIR MERITS AND SOPHISTICATION ACROSS CONTEXTS

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LIMAC PhD School is a cross disciplinary PhD School connected to research communities within the areas of Languages, Law, Informatics, Operations Management, Accounting, Communication and Cultural Studies.

Preface

Although only one name appears at the cover of this dissertation my PhD project could not have been completed without the assistance of a number of people and organizations.

First of all I want to thank my supervisors at CBS, Professors Thomas Plenborg and Carsten Rohde. Your encouragement and guidance has been instrumental throughout the process of completing this dissertation and I truly appreciate the fact that your doors were always open whenever I needed help in dealing with the many issues encountered along the way.

A warm thank also goes to my third-party supervisor from Georgia State University, Professor V. Kumar, for sharing his vast experience and knowledge on the topic of customer profitability management and for inviting me to come and work with him in Atlanta.

In addition to my supervisors a number of other people have provided valuable input on my work. I want to thank all my colleagues at the department of Accounting & Auditing at CBS but particularly the guys who have taken the time to give feedback on my work despite the fact that they were themselves in the middle of a demanding PhD process. So thank you Jeppe C., Kim P. and Christian R. for your highly appreciated feedback and comments.

Other useful input was provided by Professor Robert Scapens from Manchester Business School, Associate Professor Denish Shah from Georgia State University, and Professor Per Nikolaj Bukh who was discussant at my pre-defense. I thank you for taking part in improving previous editions of my research.

During the process several organizations have provided financial support. First of all I want to thank Quartz+Co for co-sponsoring my PhD together with the

Danish Ministry of Science. Thank you Hans Henrik for believing in me; thank you Anders for your everlasting enthusiasm, support and sparring; and thank you Kennet and Jesper for sharing all your practical input and ideas.

For my research stay abroad I want to thank the foundations that supported me financially. I want to pay a special tribute to FSRs Studie- & Uddannelsesfond and to the Fulbright Commission for both contributed generously to my stay.

Furthermore, I received financial support for the collection of survey data from VISMA, LIMAC and the Marketing Science Institute (MSI). I want to thank these organizations for their kind support which, among other things, allowed me to engage with an American market research firm and to hire the Swedish-speaking research assistants Narin and Jacqueline whom I also want to thank for their persistent efforts in contacting survey participants in Sweden.

Twenty people helped pre-test the questionnaire before it was distributed. This effort was crucial in avoiding any misunderstandings beforehand. I thank you for that and I also thank the more than 250 survey participants from large Danish and Swedish companies who returned a completed questionnaire.

At a personal level, my family and friends have encouraged me all the way from the idea of pursuing a PhD to the completion of this dissertation. I thank you all for your great support. However, a very special thanks goes to my dear wife Maria for being by my side throughout this, at times, stormy ride. Thank you for always believing in me, for supporting me and for being the mother of our newborn son Frederik to whom this dissertation is dedicated.

Morten Holm
Copenhagen, March 29, 2012

Summary

The purpose of this dissertation is to expand our understanding of the applicability and performance effects of different Customer Profitability Measurement (CPM) models across contexts.

Customer profitability measurement has attracted increasing interest recently – mainly in the marketing literature. The vast majority of this research has been case-based. Consequently, the evidence in this field consists of a number of case demonstrations indicating that using CPM models can be beneficial in specific industries but only very limited cross-sectional research investigating the general relationships between the CPM model use, context and firm financial performance.

Researching these relationships is expected to contribute to marketing as well as management accounting literatures but also to managers working with or planning to start working with CPM models in practice for two reasons: First, marketing managers are increasingly required to be accountable for the marketing investments they expect to make. A better understanding of which CPM models that are applicable in different contexts will contribute to more efficient resource utilization in firms. Second, the management accounting literature on CPM models is very scarce despite the fact that this area is a key priority in practice. Knowledge on how CPM models are adapted to fit the environment in which the firm operates will contribute to our understanding of how CPM models should be designed but also to the general school of contingency-based management accounting research.

The purpose of this dissertation is three-fold:

1. To compare the different kinds of CPM models in order to identify their mutual differences and collective limitations in different customer environments (Article #1).
2. To investigate the effect of CPM model use on firm financial performance across industries and marketing contexts (Article #2).
3. To investigate how and why firms adapt the degree of sophistication of CPM models to the contingency factors in the customer environment that the firm operates under (Article #1 & Article #3).

The dissertation follows an article-based format and includes three articles in total. In Article #1 a conceptual framework for firms' choice of CPM models is developed alongside a set of research propositions. The framework and the propositions are deducted from an interdisciplinary review of the CPM literatures in marketing and in management accounting.

Article #2 and Article #3 are both based on empirical survey data collected from the largest firms in Denmark and Sweden. In Article #2 the relationship between CPM model use and firm financial performance including whether this effect is the same regardless of the degree of product focus (marketing context) and whether it is sustainable over time.

Finally, Article #3 investigates how selected contingency factors in firms' environments (competitive intensity and complexity) influence how sophisticated a CPM models firms use for resource allocation purposes.

The dissertation's methodological standpoint is positivistic and the fundamental assumption about the social world is therefore that there is an objective reality where causal relationships can be identified and hypotheses about these relationships can be tested based on observations in the empirical world.

This world-view matches the objectives of the dissertation of investigating general relationships between CPM models, context and performance.

The dissertation's empirical data has been collected from primary as well as secondary sources. Primary data was collected via the survey method where a questionnaire was developed, tested and distributed among the 1.545 of the largest firms (based on revenues) in Denmark and Sweden. Three follow-up rounds were carried out by e-mail and a random sub-sample was subsequently contacted by phone in order to maximize the response rate. All this eventually yielded a gross response rate (total completed responses incl. responses with single missing observations) of 17% corresponding to a gross sample of 255 observations. Non-response bias tests showed no systematic deviations between the sample and the total survey population.

Secondary data (annual accounts and industry classifications) were collected from the accounting databases Greens, NNE (Denmark) and Retriever (Sweden).

Theoretically, the dissertation is anchored in the CPM research streams as well as general contingency theory. In the CPM literature a distinction has been made between two main categories of models: Customer Profitability Analysis (CPA) and Customer Lifetime Value (CLV). Whereas CPA models primarily serve the purpose of tracing *all* customer-related revenues and costs to the individual customer in a historical accounting period, CLV models attempt to estimate and discount expected future gross cash flows per customer.

Contingency theory is based on the assumption that no universal solution to firms' organization, strategy and system design exists. Instead, firms seek to adapt to the relevant contingency factors they operate under. In this dissertation two environmental factors were identified as relevant to firms' CPM model sophistication: Competitive intensity and customer complexity.

The three articles in the dissertation make four main contributions to marketing and management accounting research:

1. The environmental factor *complexity* is developed into two customer-related factors: *Customer service complexity* and *customer behavioral complexity* (Article #1). The customer service complexity construct is furthermore validated empirically (Article #3).
2. A contingency-based framework for explaining CPA and CLV model sophistication based on the degree of customer service complexity and customer behavioral complexity is developed (Article #1).
3. Additionally, the CPA sophistication construct was conceptualized and the proposed positive association between customer service complexity and CPA model sophistication was verified empirically although the effect of customer service complexity on CPA sophistication is larger in non-competitive markets (Article #3).
4. Support was found for a general positive association between the use of CPM models and firm financial performance although the effect is less positive when a firm's product focus is high. Furthermore, the positive effect diminishes over time suggesting that firms have trouble institutionalizing the CPM models during the implementation phase and/or that mediating institutions (e.g., consultants) capture the learning economies of scale and transfer these improvements to later adopters (Article #2).

Resumé på dansk (Summary in Danish)

Formålet med denne afhandling er, at bidrage til at øge forståelsen af i hvilke kontekste forskellige metoder til måling og styring af kunders lønsomhed er særligt anvendelige.

Kundelønsomhedsmåling har de senere år været genstand for stigende interesse – primært indenfor marketinglitteraturen. Imidlertid er langt hovedparten af den forskning, der er gennemført, case-baseret. Der er således en række enkeltstående studier, der indikerer, at anvendelse af kundelønsomhedsmåling er fordelagtigt i specifikke industrier, men der er til dato kun meget begrænset forskning, der har beskæftiget sig med, hvorvidt der kan siges, at være generelle sammenhænge imellem de kundelønsomhedsmodeller der anvendes, den kontekst de anvendes i, samt virksomhedens performance.

Forskning indenfor disse sammenhænge forventes at kunne bidrage til såvel marketing- som økonomistyringslitteraturen men også til ledere, der arbejder med, eller planlægger at implementere, kundelønsomhedsmåling i praksis af to årsager: For det første skal marketing funktionen i stigende grad stå til regnskab for de markedsføringsinvesteringer der søges gennemført. En bedre forståelse af, hvilke typer af kundelønsomhedsmodeller der er anvendelige i hvilke kontekste kan bidrage til en mere effektiv ressourceanvendelse i virksomhederne. For det andet er økonomistyringslitteraturen indenfor kundelønsomhedsmåling meget sparsom på trods af, at dette er et højt prioriteret tema i praksis. Viden om, hvordan kundelønsomhedsmodeller tilpasses omverdensfaktorer vil bidrage til forståelsen af, hvordan kundelønsomhedsmodeller bør designes, men også til den generelle forskning indenfor kontingensbaseret økonomistyringslitteratur.

Formålet med denne afhandling er tredelt:

1. At sammenligne forskellige kundelønsomhedsmålingsmodeller med henblik på at identificere deres indbyrdes forskelle og fælles begrænsninger i forskellige kunde-kontekste (behandlet i Artikel #1).
2. At undersøge effekten af kundelønsomhedsmåling på virksomheders finansielle performance på tværs af industrier og marketingkontekste (behandlet i Artikel #2).
3. At undersøge hvordan og hvorfor ledelsen tilpasser sofistikationen af deres kundelønsomhedsmålingsmodeller i forhold til den kundekontekst virksomheden opererer i (behandlet i Artikel #1 & Artikel #3).

Afhandlingen følger et artikel-baseret format og indeholder i alt tre artikler. I Artikel #1 udvikles en konceptuelt referenceramme for virksomheders valg af kundelønsomhedsmodel samt et sæt af propositioner, som fremtidig forskning kan beskæftige sig med. Dette baserer sig på en gennemgang af kundelønsomheds-målingslitteraturen indenfor både marketing og økonomistyring.

Både Artikel #2 og Artikel #3 baserer sig på empiriske spørgeskemadata indsamlet blandt de største virksomheder i Danmark og Sverige. I Artikel #2 testes sammenhængen mellem anvendelse af kundelønsomhedsstyringsmodeller og virksomheders lønsomhed, herunder hvorvidt effekten varierer med virksomhedens grad af produktfokus, samt hvorvidt virksomheder er i stand til at opretholde en overnormal performance-effekt over tid.

Endelig undersøges i Artikel #3, hvorledes udvalgte faktorer i virksomheders omverden (konkurrenceintensitet og kompleksitet) påvirker, hvor sofistikeret en kundelønsomhedsmålingsmodel ledelsen anvender til ressourceallokeringsformål.

Afhandlingens videnskabsteoretiske udgangspunkt er overvejende positivistisk og baserer sig således på en grundlæggende antagelse om, at der

findes en objektiv virkelighed, hvor kausale sammenhænge kan kortlægges, og hypoteser om disse sammenhænge kan testes empirisk. Dette udgangspunkt er i overensstemmelse med afhandlingens formål om at undersøge generelle relationer imellem kundelønsomhedsmodeller, kontekst og virksomhedens performance.

Afhandlingens empiriske datagrundlag er indsamlet både fra primære og sekundære datakilder. Primære data blev indsamlet via survey-metoden, hvor et spørgeskema blev udarbejdet, testet og distribueret blandt 1.545 af de største virksomheder (målt på omsætning) i Danmark og Sverige. Tre opfølgningsrunder blev gennemført, og en tilfældig stikprøve blev endvidere kontaktet telefonisk, for at maksimere svarprocenten. Dette førte i sidste ende til en brutto svarprocent (samlede fuldendte besvarelser i alt inkl. manglende enkeltobservationer) på 17% svarende til en brutto-stikprøve på 255 besvarelser. Test for non-response bias afslørede ingen systematiske afvigelser mellem stikprøve og total population.

Sekundære data (regnskabsdata og industriklassifikation) blev indhentet via regnskabsdatabaserne Greens og NNE i Danmark og Retriever i Sverige.

Afhandlingens teoretiske ståsted er forankret såvel i kundelønsomheds-målingslitteraturen som i kontingensteori. I kundelønsomhedsmålings-litteraturen skelner man mellem to hovedgrupper af modeller: Customer Profitability Analysis (CPA) og Customer Lifetime Value (CLV). Hvor CPA modeller primært har til formål at spore al kunderelateret omsætning og alle kunderelaterede omkostninger til den enkelte kunde i en historisk regnskabsperiode, har CLV modeller til formål at estimere og tilbagediskontere forventede fremtidige pengestrømme pr. kunde.

Kontingensteori baserer sig på antagelsen om, at der ikke findes én universel løsning til virksomheders organisering, strategi og systemdesign. I stedet tilpasser virksomheder sig de relevante kontingensfaktorer, de er underlagt. I afhandlingens litteraturstudium blev virksomhedens omverden identificeret som væsentlig i

forhold til virksomheders design af kundelønsomhedsmodeller. To nøglefaktorer blev efterfølgende identificeret: Konkurrenceintensitet og kunde kompleksitet.

De tre artikler i afhandlingen skaber fire hovedbidrag til forskningen indenfor marketing og økonomistyring:

1. Omverdensfaktoren *kompleksitet* udvikles til to kunderelaterede faktorer: *Kundeservicekompleksitet* og *kundeadfærdskompleksitet* (Artikel #1). Kundeservicekompleksitet valideres endvidere empirisk. (Artikel #3)
2. Et kontingensbaseret framework til forklaring af hhv. CPA og CLV model sofistikation baseret på graden af hhv. kundeservicekompleksitet og kundeadfærdskompleksitet udvikles (Artikel #1).
3. Desuden blev CPA sofistikation konceptualiseret, og det blev eftervist empirisk, at øget kundeservicekompleksitet fører til implementering af mere sofistikerede kundelønsomhedsmodeller, men at denne sammenhæng er stærkere i tilfælde af lav konkurrenceintensitet (Artikel #3).
4. Der påvises en generel positiv sammenhæng mellem anvendelse af kundelønsomhedsmålingsmodeller og finansiel performance, men effekten er mindre i produktfokuserede virksomheder. Desuden aftager effekten over tid, hvilket enten kan skyldes at virksomheder ikke formår at institutionalisere modellen i implementeringsfasen eller at konsulenter opsamler læringsfordele, som de virksomheder der adopterer modellerne på et senere tidspunkt får gavn af (Artikel #2).

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SYNOPSIS

1. Motivation and objective

My inspiration for writing a doctoral dissertation on customer profitability measurement (CPM) models derives from my professional background in management consulting as well as my academic background from finance and accounting.

I worked for four years as a management consultant on engagements mainly concerned with the development of commercial strategies. A pivotal element herein was always to perform segmentations of customers, segments and channels based on profitability. Every time I participated in this type of engagement two things puzzled me: First, I was intrigued by experiencing that most firms seemed to be managing their sales and marketing resources without having a thorough understanding of which customers they made money on and which customers were loss-making. But, equally importantly, it also surprised me that the tools and techniques for determining the financial value of customers that were available to me as a consultant were far from adequate to solve many of the issues encountered.

As a graduate student I was very interested in discounted cash flow valuation of companies which was also the topic for my Master's thesis. Subsequently, during my time as a consultant, I started playing with the idea of incorporating the discounted cash flow valuation technique when determining the financial worth of a customer. This added a whole new perspective to the traditional, single-periodic customer profitability analyses usually performed. Sadly, it also added a lot of complexity. Based on these observations I decided that I wanted to investigate the different methods for measuring customer profitability as well as to what extent these models were applicable in practice

During the initial stage of my PhD I performed 11 semi-structured interviews with business managers mainly from commercial functions in some of the largest Danish companies. These interviews to some extent supported my observations about the mixed focus on customer profitability across firms. However, it was also clear that the benefits of using profitability-based customer management strategies were quite different across industries. Hence, I realized that it might be rewarding to investigate whether some general factors influencing firms' motivation to develop more or less sophisticated CPM models could be identified.

From a research perspective CPM models are receiving increasing attention as a key topic – especially in the marketing literature. Two factors have contributed to this increasing interest. First, an emerging paradigm shift from a product/transaction orientation towards a customer relationship orientation in marketing management has been discussed over the past two Decades (Day 2000; Gronroos 1997; Palmer, Lindgreen, and Vanhamme 2005; Peppers, Rogers, and Dorf 1999; Shah et al. 2006; Sheth and Parvatiyar 2002). An important element in this shift is that customer relationships must be prioritized based on the value they create for the firm (Payne and Frow 2005). Simultaneously, marketers are increasingly encouraged to demonstrate the financial performance effects of marketing investments (Rust et al. 2004; Sherrell and Bejou 2007) and the Marketing Science Institute (MSI) has therefore identified marketing accountability as a prioritized research topic [MSI 2008; 2010]. Consequently, a research stream has emerged concerning how the value of customer relationships can be determined in financial terms, and myriads of models have been developed in the literature (see Gleaves et al. 2008; Gupta et al. 2006; McManus and Guilding 2008; Villanueva and Hanssens 2006 for recent reviews).

In the management accounting literature CPM models have attracted much less attention (Gleaves et al. 2008; Guilding and McManus 2002; McManus and

Guilding 2008). Herein lies a paradox as the measurement and management of customer profitability has been highlighted as a top priority by management accounting practitioners over a decade ago (Foster and Young 1997) and still is high on the agenda in management accounting practice (CIMA 2008). Understanding the merits and limitations of CPM as well as the way management accountants can help develop and use CPM models alongside the rest of the organization are therefore important research areas.

Bringing the disciplines of marketing and management accounting together is in many ways an important next step in CPM model research which was also highlighted in a special issue of Journal of Marketing Management in the Fall 2008 (see Roslender and Wilson 2008). These initial initiatives are promising but at least two important areas need further development. The cost accounting techniques and terminology developed in management accounting would be beneficial to the development of the cost allocation aspect of marketing-based CPM models – an aspect that has largely been ignored in the Customer Lifetime Value stream of CPM literature (Gupta et al. 2006) but has been an integrated part of the Customer Profitability Analysis stream (e.g., Niraj, Gupta, and Narasimhan 2001). Another important area is to study CPM model use and their contextual dependencies via the contingency-approach deployed in management accounting. This approach can enlighten how the customer environment in which a firm operates influences managers' CPM model decisions. The vast majority of CPM research carried out in the marketing literature has been case-based demonstrations of different CPM models. New knowledge based on cross-sectional data could be beneficial not only to marketing theory and practice but also as a more general contribution to contingency-based management accounting research.

The objective of this dissertation is therefore to advance research in the marketing-management accounting interface in three ways:

1. To compare CPA and CLV models in order to identify their mutual differences and collective limitations in different customer environments (Article #1)
2. To investigate the effect of CPA/CLV models on firm financial performance across different industries and marketing contexts (Article #2)
3. To investigate how and why managers adapt CPA/CLV model sophistication to the customer environments in which they operate (Article #1 & Article #3)

2. Methodological position

The way knowledge is created is reliant on the pre-study presumptions embedded in the different methodological views researchers carry with them to the field of investigation (Arbnor and Bjerke 2008). This dissertation mainly relies on the reasoning and presumptions presented in the highly interrelated *functionalist view* as described by Burrell and Morgan (1979), *mainstream positivist view* as described by Chua (1986), and the *analytical view* as described by Arbnor and Bjerke (2008). For practical purposes I will refer to these world-views collectively as ”positivist”.

These three closely related positivist world-views all, to some extent, embrace a set of similar socio-philosophical assumptions about the social world which the results presented in this dissertation should be interpreted with respect to:

First, the *ontological* assumption is that reality is a concrete structure that exists independently of people's perception of it and therefore is given rather than a product of the mind. "The phenomenon of interest is single, tangible and fragmentable, and there is a unique, best description of any chosen aspect of the phenomenon." (Lincoln and Guba 1985, p. 36).

Second, the *epistemological* assumption is that researchers can explain and predict what happens in the social world by searching for patterns and relationships between entities. Knowledge is cumulative and "[t]here exist real, uni-directional cause-effect relationships that are capable of being identified and tested via hypothetic-deductive logic and analysis." (Lincoln and Guba 1985, p. 36).

Finally, the *methodological* assumption is that of nomothetic inquiry stating that the scientific method can be used by deducting hypotheses from theory that are generally accepted as long as they cannot be falsified by observations in the empirical world.

This methodological position is inevitably influenced by my personal world-view which in many ways has been shaped by my prior academic upbringing within the finance and financial accounting disciplines as well as my professional experience from the management consulting profession. Hence, my epistemological point of departure in any aspect of the research process from identifying research questions to conducting the research was positivistic.

Consequently, this positivist perspective is reflected in the issues that are being investigated in this dissertation in terms of general relationships between CPM model use and sophistication, firm performance and factors in firms' environments. Arguably, it only makes sense to test whether using CPM models is generally performance enhancing and whether different degrees of sophistication

fit different customer environments if you assume that there is an objective reality where cause-and-effect relationships and contingency patterns can be identified by an external observer (the researcher).

The positivist world-view is furthermore consistent with most marketing research (Hunt 2010) and it is also in line with the fundamental assumptions underlying the contingency-approach deployed in the investigation of the contextual factors influencing managers' adoption of managerial information systems such as CPM models (Chua 1986).

One limitation of this positivist world-view in the case of CPM models is that the design and use of management systems (like CPM models) in organizations greatly relies on the social context in which the models are implemented (Orlikowski and Baroudi 1991). However, in order to achieve the dissertation's main objective of studying general relationships across contexts one has to accept this limitation and interpret the findings with this in mind.

3. Research method and data

The survey method was selected for the empirical part of this dissertation as the main purpose was to test general causal relationships between CPM use, firm performance, contingency factors and CPM model sophistication across a broad cross-section of firms. However, first a literature review was performed in order to establish a profound understanding of the differences, overlaps and limitations across the different approaches to measuring and managing customer profitability.

3.1 Literature review

The literature review pursued a three-step strategy first identifying the most influential contributions to CPM and subsequently working back and forward in time from these key papers to broaden out the perspective to more specialized journals in the second step whereupon key words could be identified for a key word search.

In step one, six highly rated marketing and management accounting journals were screened from the year 2000 and onwards:

- Management Accounting Research (MAR)
- Journal of Management Accounting Research (JMAR)
- Accounting, Organizations and Society (AOS)
- Journal of Marketing (JM)
- Journal of Marketing Research (JMR)
- Journal of the Academy of Marketing Science (JAMS)

All abstracts in all volumes during this period were studied and all conceptual, empirical and analytical papers concerned with the measurement and management of customer's financial value were included in the review. The purpose of this step was to identify the key contributions within customer profitability management that had made it to the direction-setting mainstream outlets for marketing and management accounting research.

During the second step of the review all relevant references in the papers selected in Step one were identified. Furthermore, Social Sciences Citation Index was used to identify the papers that cited the papers identified in Step one. Hence, after having highlighted some of the most influential contributions that can be expected to be most heavily cited in the first step, the second step broadened out the analysis to a much wider variety of journals taking the total number of journals

represented in the review from 6 to 27. This way relevant references in some of the less heavily cited marketing and management accounting journals were identified (e.g., more specialized customer management journals like Journal of Relationship Marketing, Journal of Database Marketing & Customer Strategy Management and Journal of Interactive Marketing).

The final step was a key word search in the EBSCO database. Three key word searches were performed: "Customer profitability", "Customer Lifetime Value" and "Customer Equity". This search was performed in order to close as many gaps as possible mainly in terms of capturing relevant contributions outside the marketing and management accounting research disciplines – e.g., from operations and general management research.

3.2 Survey

The survey research process was planned and executed with guidance from Van der Stede et al.'s (2005) guidelines for conducting empirical survey research in management accounting. These guidelines were deducted from a review of 130 management accounting survey studies during the period 1982-2001 that was structured around a legal framework that determines whether any given survey study is admissible in court – a framework that has also been used within the marketing discipline (see Morgan 1990).

Van der Stede et al. (2005) divides the process of conducting survey research into three main steps[1]: (1) Determine purpose and design; (2) Define population and sampling; (3) Questions and other method issues.

[1] The fourth and final step of presenting the results is not discussed here as this is not the part of conducting the survey

3.2.1. Purpose and design

The survey was performed to collect data for the two empirical studies in the dissertation. The purpose of both empirical studies was to test cause-and-effect relationships, with the first study investigating the general effect of deploying CPM models on firm performance cross-sectionally (Article #2) and the second study investigating how key environmental factors influence the design choices when firm managers implement and use CPM models (Article #3). For feasibility reasons, dictated by the restricted time frame at my disposal to conduct the research, a cross-sectional design was adopted. A general consideration when performing explanatory survey studies based on a cross-sectional design will always be whether the hypothesized direction of causality is "right" – i.e., whether A in fact causes B (as hypothesized) or it is the other way around. Merely identifying correlations is rarely interesting from a theoretical perspective. When investigating the relationship between environmental factors and CPM model sophistication (Article #3) this issue is presumably not a major concern as it is rather unlikely that individual managers' CPM model design decisions will influence contingency factors in their environments. However, in the study of performance effects of CPM model use (Article #2) this issue is potentially more critical even though the hypotheses tested were rooted in theory deducted from prior research on CPM models' relationship with performance. Therefore, a robustness check in was performed in Article #2 comparing the change in performance during a four-year period (2006-09) of firms adopting CPM in this period with non-adopters. The results of this analysis rather convincingly supported the hypothesized direction of causality (see Article #2).

In both empirical studies firm or business unit level phenomena are being investigated. Ideally, a broad range of informants from each firm should be invited to participate in the survey since individual respondents rarely possess the required

knowledge to cover all aspects of the topic of the enquiry (Reinartz, Krafft, and Hoyer 2004). However, securing multiple completed and applicable responses from each participating organization was expected to severely jeopardize the size of the sample. Therefore, it was decided to stick with a single informant from each firm. Senior executives were targeted in an attempt to mitigate some of the validity issues encountered by including only a single informant per firm as these Directors were expected to possess the most comprehensive knowledge about the firm's CPM capabilities and the task environment in which the firm operates.

3.2.2. Population definition and sampling

The *target population* that both empirical papers (Article #2 and #3) aim to study consists of all managers involved with customer management decision making. Hence, it is the commercial part of the organization where CPM models are being used for customer prioritization decisions – not the function where the numbers are produced (although there may be overlaps) – that is in focus. This focus was chosen because the purpose is partly to study CPM model use and partly to study CPM model design. Managers involved with customer management decision making are expected to be involved with both.

Identifying the relevant commercial executives can be challenging, as the titles of the relevant informants may vary depending on the type of firm investigated. Based on input from the group of people who helped testing the questionnaire the following prioritization was established:

1. Commercial Director
2. Sales & Marketing Director
3. Sales Director
4. Marketing Director
5. CEO / General Manager / Country Manager

A *survey population* of large Scandinavian companies was selected. Originally, the idea was to collect data in the US. However, as we did not manage to achieve support from a sponsoring organization in the US the process of gaining access to commercial directors in large US companies proved to be too cumbersome. Hence, neither the attempt to engage a market research bureau nor the purchase of contact data for 3,500 large US companies and the subsequent hiring of a research assistant yielded any usable results mainly due to legal issues and corporate policies not allowing target respondents to participate in surveys.

Instead, Swedish and Danish companies were approached. The decision to pool Swedish and Danish data was made in order to include more large firms in the population. Large firms were targeted as larger firms are expected to be more exposed to new management practices and be more inclined to experiment with adopting these practices (Bjørnenak 1997; Malmi 1999). Hence, in order to ensure a sufficient representation of CPM-adopters the 1.000 largest firms in Denmark and the 1.000 largest firms in Sweden (based on revenues) were identified yielding a total survey population of 2.000 firms.

Rather than drawing a random sample from this survey population it was decided to contact commercial managers from the entire population of large firms. This decision was made in order to retrieve as large and diverse a sample as possible and due to the fact that an online questionnaire was developed so the marginal cost of increasing the sample beyond the first contact person was negligible. Out of the 2.000 firms in the total survey population 455 were not approachable either due to lack of interest, a non-disclosure policy regarding e-mail addresses or due to a corporate policy prohibiting survey participation. Consequently, 1.545 hyperlinks to the online questionnaires were distributed accompanied by a cover e-mail.

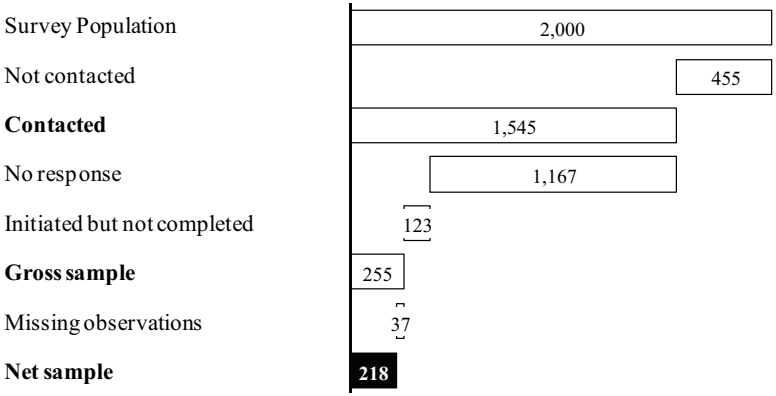
In retrospect this approach was probably not ideal. During this first round of contact where a hyperlink to the online questionnaire was distributed by e-mail without prior contact to potential respondents we only received 150 completed responses corresponding to a response rate of only 10%. This low response rate was achieved despite the fact that three rounds of follow-up e-mailings were performed over a four week period. Therefore, a couple of months later it was decided to pursue a more personal approach by re-contacting a random sample of 350 mangers from the survey population by phone. This strategy yielded an additional 105 completed questionnaires taking the total gross sample to 255 observations. Hence, the personal approach in isolation secured a response rate of 30% taking the total response rate for the gross sample from 10% to 17%. In future survey research I think it will be worthwhile to consider pursuing this more personal approach even though it can be very time consuming.

An overview of the way the gross and net samples for the two empirical studies (Article #2 and Article #3) were established is provided in Figure 1.

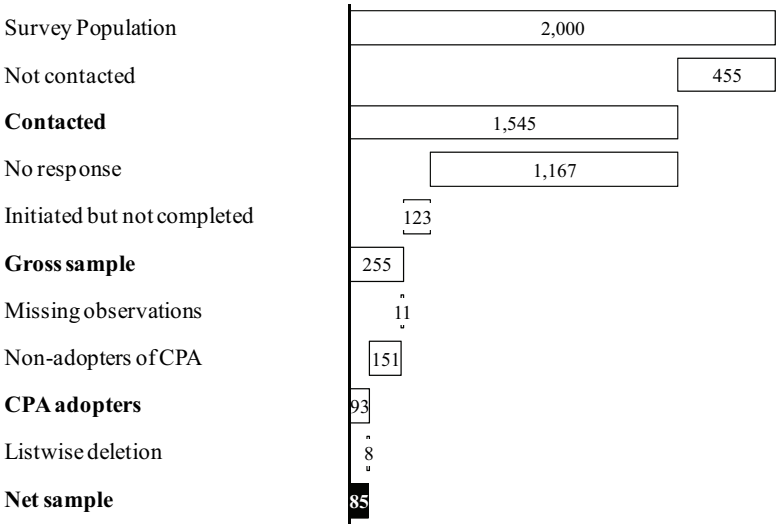
A total of 378 questionnaires were initiated but only 255 informants made it to the final question. For the CPM-performance study (Article #2) 37 responses were ineligible due to missing observations leaving a net sample of 218 observations. For the study of environmental factors' influence on CPM sophistication (Article #3) 11 responses were ineligible due to missing observations regarding the control variables and 151 observations were excluded as these firms had not adopted CPM. This leaves 93 CPM adopters eligible for the study (38% adoption rate) of which 8 were excluded via listwise deletion (missing items for one or more of the focal constructs) leaving a net applicable sample of 85 observations.

FIGURE 1
Survey population and sample

A: Article #2: CPM performance effects



B: Article #3: CPA sophistication



The size of the net sample applied for the first empirical study (Article #2) is within the recommended range of 2-300 observations (Van der Stede, Young, and Chen 2005). The size of the net sample for Article #3 is not within this range (85). However, this sample was derived from a total sample of 245 CPM adopters and non-adopters – a total sample that is large enough to be representative of the survey population as a whole. Therefore, the sample of CPA-adopters is considered representative as well although there may be some issues with gaining sufficient statistical power with a sample of this size.

3.2.3. Questions and other method issues

The complete questionnaire including all questions applicable to the two empirical papers in the dissertation is available in Appendix A. The questions in the first section of the questionnaire are to some extent internally dependent in the sense that some of the questions were only presented to the informants if relevant. An overview of these internal dependencies is also provided in Appendix A (Figure at final page of the Appendix).

The relationship between the questions in the questionnaire and the variables and constructs applied in the two studies is outlined in Table 1 alongside the data that was collected from secondary sources such as annual reports and financial accounting databases (Greens and NNE in Denmark and Retriever in Sweden). As is evident from Table 1, the two studies draw on different parts of the questionnaire. It is also worth noting that that Questions Q10 (CLV sophistication) and Q13 (behavioral complexity) marked with *n.a.* were never used as the number of CLV adopters in the sample (21) was too small to infer statistical generalizations. Hence, it was not possible to accomplish the original plan of investigating both CPA and CLV sophistication and it was therefore decided to focus on CPA sophistication in Article #3.

TABLE 1
Relationship between questions and variables/constructs

Data		*Article #2*	*Variable/Construct*	*Article #3*	*Variable/Construct*
Survey	Question - Q1	**x**	CPM use		
	Question - Q2	**x**	CPM use		
	Question - Q3	**x**	CPM use		
	Question - Q4	**x**	CPM age		
	Question - Q5			**x**	CPA Sophistication
	Question - Q6	**x**	CPM use		
	Question - Q7	**x**	CPM use		
	Question - Q8	**x**	CPM use		
	Question - Q9	**x**	CPM age		
	Question - Q10			*n.a.*	CLV Sophistication
	Question - Q11 (6 items)			**x**	Competitive intensity
	Question - Q12 (7 items)			**x**	Service complexity
	Question - Q13 (6 items)			*n.a.*	Behavioral complexity
	Question - Q14	**x**	Industry (backup)		
	Question - Q15	**x**	Product focus		
	Question - Q16	**x**	Product focus		
	Question - Q17	**x**	Backup (validity)	**x**	Backup (validity)
Secondary sources	Revenues	**x**	Size + Growth	**x**	Size
	Operating profit	**x**	Performance (ROA) + Risk		
	Total assets	**x**	Performance (ROA) + Risk	**x**	Operating leverage
	Fixed assets			**x**	Operating leverage
	Industry Code	**x**	Industry		

Two new multi-item constructs were developed as part of the process: Customer behavioral complexity and customer service complexity. First, the items were developed based on the literature review (Article #1). Subsequently, the constructs were further calibrated as part of the pre-testing of the questionnaire. During this process the entire questionnaire went through a testing across different groups as suggested by Dillman (1999): Six academic colleagues in marketing and management accounting departments; Nine business managers across different industries (FMCG, industrial products (2), financial services, shipping, public

transportation, media, pharmaceuticals and real estate); and five former colleagues from management consulting (two managers and three partners). This testing served the dual purpose of assessing construct validity (especially for the newly developed constructs) as well as ensuring that the other questions as well as the questionnaire as a whole were "correctly understood and easy to answer by respondents" (Morgan 1990, p 64) hereby increasing clarity of questions and avoiding misunderstandings.

The third multi-item construct (competitive intensity) was adapted from Jaworski and Kohli (1993) – a construct that has been thoroughly tested throughout the market orientation literature (e.g., Cui, Griffith, and Cavusgil 2005; Grewal and Tansuhaj 2001; Kumar et al. 2011) and is relevant due to the central position of customer relationships in a market orientation (Kohli and Jaworski 1990). All multi-item constructs were measured on five-point Likert scales. Five-point scales were chosen as this was the interval originally proposed by Jaworski and Kohli (1993) in their empirically validated competitive intensity construct.

The response rate of 17% for the gross sample (255/1,545) is low compared to the standards accepted in court as well as the average response rates achieved in management accounting research (Van der Stede, Young, and Chen 2005). However, response rates in the 10-20% range are far from uncommon in related disciplines such as finance (e.g., Graham and Harvey 2001; Graham, Harvey, and Rajgopal 2005) but also in marketing where Reinartz et al. (2004) recently reported an effective response rate of ~21%, Palmatier et al. (2006) reported an effective response rate of ~11% and Homburg et al. (2008) reported an effective response rate of ~16% – all in highly rated journals. These different requirements in the marketing discipline may reflect recognition that marketing executives (the target population for this survey) are more difficult to persuade into completing research questionnaires than their management accounting counterparts.

However, the data was naturally carefully analyzed for non-response bias and no systematic patterns that suggested significant differences between participating firms and non-participating firms were found. All the results of these non-response analyses are reported in the research method section in Article #2 and Article #3 respectively.

Finally, objective data from secondary sources were collected for use in both studies (see Table 1). In Article #2 the objective measure (ROA) was chosen as the dependent measure in order to mitigate the risk of common method bias often encountered in survey research. Furthermore, the control variables in both studies are also from secondary sources. In Article #3 both the dependent and the independent focus variables derive from the survey. However, as the dependent measure in this study (CPA sophistication) is not measured on a Likert scale and is largely objective rather than perceptual the risk of common method bias in this study is expected to be limited as well.

4. Theoretical position

The topic of this dissertation is the category of models developed to measure the profitability of customer relationships collectively referred to as Customer Profitability Measurement (CPM) models. The theoretical frame of reference applied in most of the empirical work is contingency-based research.

4.1. Customer Profitability Measurement models

The literature review revealed that two distinct classes of CPM models have been researched simultaneously in the CPM literature: Customer Profitability Analysis (CPA) and Customer Lifetime Value (CLV). Although both approaches aim at aiding resource allocation decision making (incl. pricing) across customers they are fundamentally different in terms of their time and profitability

perspectives. Hence, whereas CPA models incorporate net profitability including all customer-related costs and revenues in a single period in the past, CLV models incorporate gross cash flows / profits from products net of direct marketing costs from a forward-looking perspective estimating these profits over multiple future time periods.

The following sections provide an introduction to CLV and CPA models respectively.

4.1.1. Customer Profitability Analysis (CPA)

The idea of keeping track of revenues and costs at customer or segment level is not new. Customer profitability was already a topic of interest half a century ago (e.g., Sevin 1965) even though CPA was rarely applied in practice (Mellman 1963). Through the 1970s and the early 1980s the merits of customer profitability analysis were outlined (Dunne and Wolk 1977; Reich and Neff 1972) and examples of customer profitability analysis emerged – particularly in financial services (e.g., Ahern and Bercher 1982; Dominguez and Page 1984; Dunkelberg and Bivin 1978; Knight 1975; Lee and Masten Sr. 1978; Morgan 1978) where increasing turbulence in the US financial sector urged banks to develop account profitability analyses in order to ensure adequate compensating balances and that the needs of the most profitable customers were served well (Knight 1975).

Around 1990 the concept of CPA was rejuvenated, being proposed as an important approach to dealing with increasingly diverse cost-to-serve across customers in many industries (Bellis-Jones 1989; Foster and Gupta 1994; Howell and Soucy 1990; Shapiro et al. 1987; Ward 1992). Simultaneously, the advent of Activity-Based Costing (ABC), where resource costs are consolidated in activity cost pools and assigned to cost objects (e.g., customers) via activity cost drivers like the number of purchase orders or the number of sales calls per customer

(Cooper and Kaplan 1988; Cooper and Kaplan 1991), was adopted as a useful technique for assigning overhead costs to customer relationships. Smith and Dikolli (1995) were among the first to suggest that some form of ABC is required to determine many customer-related overhead costs at customer level and Goebel, Marshall, and Locander (1998) argue that only with ABC information can companies fully determine if market-related activities provide the desired benefits.

Empirical work on CPA is case specific. Hence, the implementation and use of CPA for strategic resource allocation purposes has been explored in selected industry contexts. A few approaches for assigning costs to customers that are not based on ABC have been demonstrated (e.g., Mulhern 1999; Storbacka 1997; Worre 1991, pp 24-27). In these models overhead costs are ignored, allocated via a single cost driver (e.g., sales volume) in a one-stage model or attempted measured and traced directly to customers.

Most empirically demonstrated CPA-models apply some variation of a two-stage ABC-model. The first step in this approach traces resource expenses to activity cost pools and the second step traces activity costs to customers via activity cost drivers (Kaplan and Cooper 1998).

Different variations of this two-stage ABC-model have been deployed across a number of industries including industrial products (Kaplan and Cooper 1998, pp 183-89) hotels (Noone and Griffin 1999), supply chain distributors (Niraj, Gupta, and Narasimhan 2001), B2B order-handling industries (Helgesen 2006; Helgesen 2007), telecom (McManus 2007) and food manufacturers (Guerreiro et al. 2008).

One common finding across these CPA case demonstrations is that a small fraction of the customer base generates the vast majority of firm profits and that there is a ”tail” of unprofitable customers ranging from 15% (van Raaij, Vernooij, and van Triest 2003) to 40% (Guerreiro et al. 2008) of the customer base. It is this

identification of attractive and unattractive customers that is highlighted as a key merit of CPA.

The progression in the CPA model literature merely demonstrates that CPA can provide valuable customer management insights in different industries. Apart from the variation in the number of activity cost pools and cost drivers deployed there are no substantial modeling differences across the identified studies. Hence, CPA models have apparently undergone little evolution since the time when they were first demonstrated (e.g., in terms of the type of cost drivers deployed as all identified studies solely use transaction cost drivers). Additionally, there is only very limited discussion of the practical issues encountered after having implemented ABC-based CPA. ABC-models have been criticized for being too time consuming to implement and very resource heavy to update and maintain on a regular basis (Kaplan and Anderson 2004). Understanding how firms adopting CPA handle these implementation issues would be useful as the inability to update or maintain ABC-based CPA models makes the continuous measurement of customer profitability difficult and reduces CPA to an ad hoc exercise rather than a dynamic management tool.

4.1.2. Customer Lifetime Value (CLV)

The concept of estimating the financial worth of a customer over his or her life of doing business with a firm has been used for some time in specific industries like life insurance (see Dwyer 1989; Jackson 1989a; Jackson 1989b). However, with the emergence of the broad Customer Equity (CE) management concept, where CE, defined as the sum of lifetime values of extant and future customer relationships, is measured and managed (Blattberg and Deighton 1996), more generally applicable CLV approaches emerged (e.g., Berger and Nasr 1998).

Two distinct approaches to the estimation of model parameters in CLV models have been developed: A deterministic approach where retention rates, customer margins and other behavioral input are entered directly into mathematical formulas and a stochastic approach where probabilistic determination of customer choice is incorporated (Villanueva and Hanssens 2006).

The early developments towards a general approach to measuring CLV all deploy deterministic estimation of model parameters (e.g., Berger and Nasr 1998; Dwyer 1997). CLV-modeling is in later empirical demonstrations of deterministic models generally aggregated at either firm-level (Gupta and Lehmann 2003; 2006) or segment level (Berger, Weinberg, and Hanna 2003). A recent contribution has taken the deterministic approach to the individual customer level. Ryals (2005) demonstrates what she refers to as a "simple" approach to strategic Customer Relationship Management (CRM) in a longitudinal case study in the key account organization of a B2B insurer. In this study a decision calculus similar to the one proposed by Blattberg and Deighton (1996) as a method for estimating model parameters is applied.

Other developments of CLV-models have inaugurated more probabilistic forecasting approaches. Pfeifer and Carraway (2000) adopted Markov Chain Modeling as a method for stochastic modeling of switching probabilities between recency/frequency states. This approach not only introduces flexibility in customer relationship modeling. Its probabilistic nature also allows more individualized CLV measurement. The MCM switching-approach has since been taken to the micro-segment level (Libai, Narayandas, and Humby 2002) and developed further through cases in the financial sector where new variations of the "state dimension" such as product mix and profitability have been explored (Aeron et al. 2008; Donkers, Verhoef, and de Jong 2007; Haenlein, Kaplan, and Beeser 2007).

Venkatesan and Kumar (2004) pioneered another probabilistic approach to CLV-modeling. Based on earlier works by Reinartz and Kumar (2000; 2003) they predict purchase frequency per individual customer in a generalized gamma-model originally proposed by Allenby, Leone and Jen (1999) and predict contribution margin for individual customers based on panel-data regression methods. Kumar and colleagues have subsequently advanced this model in retailing (Kumar, Shah, and Venkatesan 2006; Kumar and Shah 2009) and high-tech manufacturing contexts (Kumar et al. 2008; Kumar and Shah 2009; Venkatesan, Kumar, and Bohling 2007) and have simultaneously proposed a set of normative customer management strategies for improving financial performance based on CLV-management (Kumar, Ramani, and Bohling 2004; Kumar and Petersen 2005; Kumar 2008).

CLV-based models have evolved from a basic to a highly sophisticated level having incorporated covariates of customer behavior over and above past spending (Kumar and George 2007), enabling the modeling of non-linear patterns of customer lifetimes (Villanueva and Hanssens 2006) and reducing bias related to subjective estimation of parameters as experienced in the deterministic models. However, sophistication comes at the cost of complexity in terms of data collection/management, and longitudinal transaction databases are a prerequisite (Berger et al. 2006). One practical implication of the data issue is that establishing reliable predictions of CLV with scarce data availability can be a challenge (Villanueva and Hanssens 2006). However, a more severe implication of the sole reliance on longitudinal transaction databases that is widely acknowledged as a challenge in predicting future customer behavior in a CLV-context is their inside-out scope ignoring customers' relationships with competitors (Berger et al. 2006; Gupta and Zeithaml 2006; Gupta et al. 2006; Lemon and Mark 2006). Taking competitor reactions into consideration could improve CLV-models by linking

customer expansion potential and retention/acquisition probabilities to customer share of wallet and/or to competitor activities.

4.2. Contingency thinking

Contingency thinking originates from the organization literature where it first emerged in the early to mid-1960s (Otley 1980). The fundamental premise of contingency thinking is that organizations tend to adopt a structure that fits the contingencies under which the organization operates (Donaldson 2001).

Contingency-based research within customer profitability measurement models is still in its infancy. Little is therefore known about how different environmental, organizational and technological contingency factors are expected to influence the implementation and use of CPM models for decision making purposes. During the literature review I discovered that different CLV and CPA models had been demonstrated and developed in different environmental contexts and I specifically identified two aspects of complexity as important determinants of CLV/CPA model sophistication. In order to prioritize my efforts I decided to focus on complexity alongside other potential environmental contingency factors' impact on CPM model use. Future research can build on these findings by adding more insights on organizational and technological contingency factors hereby gradually building a more comprehensive contingency theory of customer accounting.

4.2.1. A classification of environmental factors

Dess and Beard (1984) and Sharfman and Dean (1991) were among the first to synthesize organization research to come up with multidimensional conceptualizations of the organizational task environment. They identify three environmental dimensions that can be considered important for organizations to

consider when fitting structures within organizations: Complexity, dynamism, and competitive threat. Sharfmann and Dean (1991) define *complexity* as the level of complex knowledge that understanding the environment requires corresponding to constructs like *heterogeneity* (Aldrich 1979; Thompson 1967) and *diversity* (Mintzberg 1979). *Dynamism* is defined as the rate of unpredictable environmental change corresponding to constructs like *instability* (Emery and Trist 1965; Tung 1979) and *turbulence* (Aldrich 1979). And *competitive threat* is defined as the level of competition for available resources in the environment corresponding to constructs like *munificence* (Dess and Beard 1984; March and Simon 1958) and *hostility* (Mintzberg 1979).

In the marketing literature complexity, dynamism and competition have been investigated in diverse contingency-based marketing studies examining topics such as these factors' influence on marketing control (e.g., Jaworski 1988), decision making uncertainty in marketing channels (e.g., Achrol and Stern 1988) and sales force effectiveness (e.g., Sohi 1996). However, one area that has attracted particular interest over the past two decades is market orientation's effect on performance and the influence of environmental factors (e.g., Day and Wensley 1988; Grewal and Tansuhaj 2001; Jaworski and Kohli 1993; Kumar et al. 2011; Narver and Slater 1990; Voss and Voss 2000). Within the market orientation research stream interest has mainly been on environmental factors' moderating role on the performance effects of a market orientation. Competitive intensity and Turbulence (Dynamism) in particular have been thoroughly studied empirically albeit with mixed results (Greenley 1995; Grewal and Tansuhaj 2001; Jaworski and Kohli 1993; Kumar et al. 2011; Slater and Narver 1994).

Market orientation is closely linked to CPM model research due to the central role a customer focus plays within the market orientation concept (Kohli and Jaworski 1990; Narver and Slater 1990). Therefore, the operationalization of the

environmental constructs in the empirical part of this dissertation were largely inspired by this stream of research and the competitive intensity construct was directly adapted from Jaworski and Kohli (1993).

In the management accounting literature Khandwalla's (1977) conceptualization of a firm's environment has played an imperative part. Complexity, dynamism and competition are all important elements in this conceptualization denoted by Khandwalla as: Diversity/heterogeneity, turbulence and hostility respectively. However, prior research on cost system sophistication has mainly focused on complexity (diversity/heterogeneity) and competition (hostility) as key contextual factors both in studies of the determinants of Activity-Based Costing adoption for product costing (Bjørnenak 1997; Cagwin and Bouwman 2002; Krumwiede 1998; Malmi 1999) as well as more recent contributions concerning the relationship between contextual determinants of cost system sophistication in general (Al-Omiri and Drury 2007; Drury and Tayles 2005) whereas dynamism has not been considered as a relevant environmental factor influencing cost system sophistication.

Therefore, focus is on complexity and competition as the two key environmental determinants of cost system sophistication.

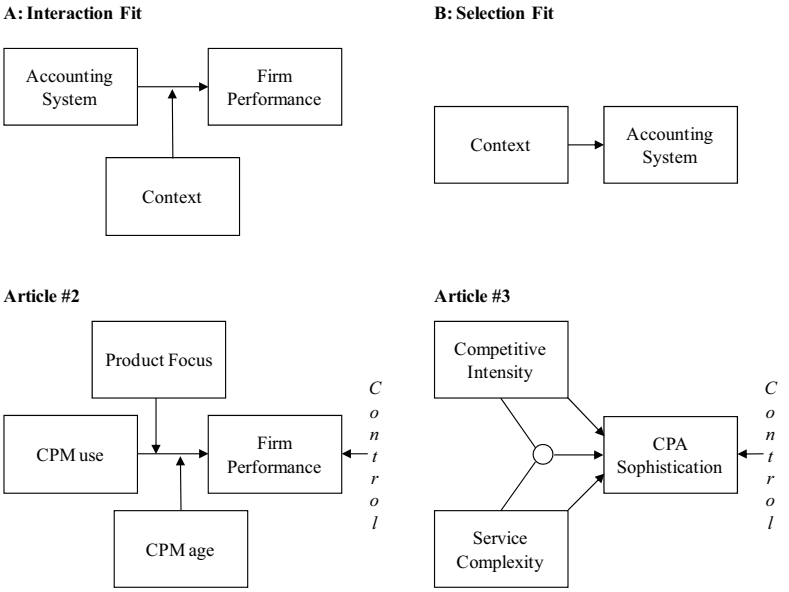
4.2.2. The concept of contingency fit

The concept of *fit* is a central element in contingency thinking. The key notion in contingency-based management accounting research is that specific aspects of accounting systems must be demonstrated to fit certain circumstances in a firm's context (Otley 1980). Contingency thinking is therefore an approach within which theoretical relationships between accounting system design and use and contingency variables can be formulated and tested rather than a theory per se.

Contingency fit can be conceptualized in different ways (Drazin and Van de Ven 1985; Venkatraman 1989), however two conceptualizations in particular have dominated contingency-based management accounting research: *Selection fit* and *Interaction fit.* According to the selection concept of fit accounting systems are designed to fit the environment in which the firm operates (Hartmann 2005). Hence, features of the accounting system constitute the dependent variable and the relevant contingency factors represent a set of independent variables. Embedded in this definition is the implicit assumption that context and accounting systems are always in a state of equilibrium where all firms have optimal system designs and performance given their situation (Chenhall 2003). This equilibrium is reached through an evolutionary process where optimization occurs through the selection of the proper accounting system features in any given context and where performance differences are therefore not expected to be a result of accounting system differences (Hartmann 2005).

According to the interaction concept of fit firms do not necessarily adapt their accounting systems to fit the context in which they operate – instead certain configurations between accounting system features and context are hypothesized to outperform others (Hartmann 2005). Consequently, performance differences are expected across firms within the same context depending on the kind of accounting system deployed. In this conceptualization of fit organizational performance is the dependent variable whereas accounting system features and their interaction with contextual variables are the independent variables.

FIGURE 2
Different concepts of contingency fit



Adapted from Hartmann (2005)

The two concepts of fit are illustrated in Figure 2 alongside the theoretical models that are tested in the two empirical papers in this dissertation. As can be seen from the figure the two studies adopt different conceptualizations of fit. In the study of the performance effects of CPM use across marketing contexts and over time (Article #2) the concept of interaction fit is adopted whereas the study of CPA sophistication (Article #3) adopts the selection concept of fit.

The underlying reasoning for this differentiated approach is that the decision whether to adopt CPM models or not is expected to be different from the design

decisions regarding which degree of sophistication that is to be implemented. Adoptions of new managerial innovations in organizations are restrained by barriers e.g., in the form of constrained financial, technological, and/or human resources, as well as the uncertainty surrounding the future benefits of adoption and general organizational resistance to change. Additionally, institutional or political reasons that are inconsistent with rational economic arguments may influence adoption decisions (Chenhall 2003). All these conditions suggest that optimization is restrained and that managers therefore not necessarily select systems such as CPM even though these systems may be optimal in a specific context. Therefore, an interaction fit rather than a selection fit approach is pursued for the CPM-performance study (Article #2) hereby expecting to find performance differences across users and non-users of CPM with the magnitude of the difference being influenced by certain contextual factors.

However, after the decision to adopt CPM models has been made managers are expected to act rationally and configure CPM model sophistication with the contextual factors under which the firm operates. Therefore, the selection concept of fit has been chosen for the study of CPM model sophistication (Article #3).

5. Contributions to knowledge and future research directions

This dissertation makes four distinct contributions to marketing and management accounting research.

First, the environmental contingency factor complexity is developed into two customer-related constructs: Customer service complexity and customer behavioral complexity (Article #1) and the customer service complexity construct is furthermore validated empirically (Article #3). This way a contribution is made to general contingency-based research and future studies centered on customer-

related issues within marketing and management accounting can build on the developed constructs.

Second, a contingency framework for explaining the degree of CPA and CLV model sophistication in different customer environments characterized by different degrees of customer behavioral and service complexity is proposed (Article #1) and a set of research propositions are derived from the framework. Furthermore, suggestions for how CPA and CLV models can be improved and integrated are proposed as well.

Third, the CPA sophistication construct is conceptualized and its association with customer service complexity is further supported empirically (Article #3). Additionally, competitive intensity is found to have a negative moderating effect on this positive association suggesting that customer service complexity plays a greater part when it comes to CPA sophistication design decisions in non-competitive environments than in environments characterized by more fierce competition. These findings contribute to the different branches within the general CPM research area as well as to the general contingency-based school of accounting research. Moreover, the contingency framework can be expanded to include organizational contingency factors such as technology, size, organizational structure, strategy and culture (Chenhall 2003). Field study research would be a valuable first step to establish a profound understanding of different organizational factors and develop propositions for their influence on CPM model sophistication. Subsequently, these propositions can be tested empirically.

Finally, CPM models are found to be performance enhancing cross-sectionally although the size of the effect varies across marketing contexts and although the effect appears to diminish over time (Article #2). This demonstration of a general effect across industries adds to the existing case-based research on the performance enhancing effect of CPM models performed in selected industries.

However, the findings also emphasize the difficulties of transferring extant CPM models to industries where brand investments and new product development are key value drivers. Researching how CPM models are best implemented in a product/brand focused context is therefore an interesting area for future research. Furthermore, the findings suggest that firms are generally not successful in implementing, maintaining, updating and using CPM models in ways that enable them to sustain the financial benefits these models provide when first implemented. Longitudinal case-studies investigating the CPM adoption process from the implementation stage to the confirmation stage (Rogers 1995) would be a beneficial way of pursuing some of the proposed explanations why the competitive edge originally provided by the implementation of CPM models deteriorates over time.

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Article #1

Measuring Customer Profitability in Complex Environments: An Interdisciplinary Contingency Framework

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Abstract

Customer profitability measurement is an important element in customer relationship management and a lever for enhanced marketing accountability. Two distinct measurement approaches have emerged in the marketing literature: Customer Lifetime Value (CLV) and Customer Profitability Analysis (CPA). Myriad models have been demonstrated within these two approaches across industries. However, limited efforts have been made to compare the approaches in order to explain *when* sophisticated CLV or CPA models will be most useful. This

paper explores the advantages and limitations of sophisticated CLV and CPA models and proposes that the degree of sophistication deployed when implementing customer profitability measurement models is determined by the type of complexity encountered in firms' customer environments. This gives rise to a contingency framework for customer profitability measurement model selection and five research propositions. Additionally, the framework provides guidance in designing customer profitability measurement models for managers seeking to implement such models for resource allocation purposes.

Key words: Marketing Accountability; Customer Lifetime Value (CLV); Customer Profitability Analysis (CPA); Customer Relationship Management (CRM); Contingency Theory

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1. Introduction

Marketing accountability is growing in importance as marketing managers are increasingly expected to demonstrate the financial consequences of marketing activities [see "MSI Research Priorities" 2008-2010 (MSI 2008); 2010-12 (MSI 2010)]. The ability to predict and measure marketing activities' impact on cash flows and thus ultimately firm value has also been acknowledged as an opportunity by marketers to achieve more influence in boardrooms and a Marketing Accountability Standards Board (MASB) has risen to support this ambition [see "MASB Year II Overview & Report (2010)]. To succeed on this the marketing discipline must look beyond its conventional boundaries and strive for an integrated interdisciplinary accountability perspective across the disciplines of marketing, finance and accounting (e.g., Srivastava, Shervani, and Fahey 1998) where the measurement of financial outcomes is the focus (Berger et al. 2006).

One element of marketing accountability is the measurement of the financial value of customer assets for decision making purposes. Determining the financial value of customers facilitates the allocation of marketing resources in accordance with customers' contribution to firm value creation. This philosophy is not only at the core of customer relationship management (Boulding et al. 2005; Payne and Frow 2005) – it is also a way of identifying where marketing strategies and tactics potentially generate the highest return on investment hereby making the financial impact of these strategies and tactics measurable (Rust et al. 2004). Approximating the financial value of customer assets satisfactorily thus becomes a critical element in the chain of marketing productivity.

Two fundamentally different approaches to measuring the financial value of customer relationships prevail: Customer Profitability Analysis (CPA) and Customer Lifetime Value (CLV). Whereas CLV deploys a *prospective* perspective on customer profitability, predicting future customer behavior and discounting derived lifetime cash flows, CPA deploys a *retrospective* profitability perspective,

measuring costs and revenues per customer in a specific accounting period in the past (Pfeifer, Haskins, and Conroy 2005). Despite the fact that both approaches share a common purpose of identifying the most valuable customers for resource allocation decision making, CPA and CLV models have been researched remarkably autonomously in the marketing and management accounting literatures. Although a few recent reviews have explored the marketing/accounting interface between CPA and CLV models (Gleaves et al. 2008; McManus and Guilding 2008) no previous study has, to the best of our knowledge, investigated CPA and CLV models' strengths and limitations from an integrated perspective.

This is puzzling as both the relevance of deploying CLV and CPA models for profitability-based resource allocation across customers has been demonstrated in a series of case studies. However, whereas most CLV models have been investigated in direct marketing settings mainly in consumer industries (e.g., retailing and catalog sales), CPA models have mainly been demonstrated across different B2B-industries (e.g., supply-chain distribution) and in settings with intermediary channels of distribution between vendors and end-users (e.g., consumer product manufacturing). Furthermore, both approaches apparently have some kind of use in financial services. These discrepancies lead to an important unaddressed issue: *In which customer environments will sophisticated CLV and CPA models be more useful to support resource allocation decision making across customer relationships?* Recent calls have been made for exploring the boundaries and limitations of CLV models (Gupta and Lehmann 2006; Gupta et al. 2006). Such inquiry is important both to marketing science and practice as a contingency theory of this kind can be used to explain as well as to prescribe the degree of sophistication required of CPA and CLV models for resource allocation decision making in different customer environments. This way marketers can focus on the specific drivers of customer value that are relevant in their specific business context. This, in turn, leads to better utilization of marketing resources and enhanced marketing productivity.

We therefore seek to explore this issue by investigating extant research in CLV and CPA measurement. We argue that selecting between sophisticated CLV and CPA models is a matter of establishing a proper fit between CLV and CPA model sophistication and the complexity faced in firms' customer environments. We hereby make two research contributions: First, we contribute to marketing research on customer profitability measurement models (CLV/CPA) by introducing a framework proposing how firms will adjust the degree of customer profitability measurement model sophistication depending on the type of customer complexity encountered in their task environments. We furthermore highlight some collective limitations in terms of neglected tax effects and customers' contribution to portfolio risk that may bias both CLV and CPA estimates of customer value in certain business contexts. Second, we contribute to contingency-based research by introducing two customer complexity constructs: Customer behavioral complexity and customer service complexity. Both constructs may be useful for inquiries in other areas of contingency-based research. Additionally, we contribute to marketing practice by proposing a three-step guideline for how customer profitability measurement models should be developed and implemented in different business contexts based on the proposed framework.

The rest of the paper is organized as follows: First, we define the scope of CLV and CPA models and the determinants of CLV and CPA model sophistication, hereby identifying these modeling approaches' individual and collective strengths and limitations. We then propose a contingency framework for adapting CLV/CPA sophistication to the complexity encountered in a firm's customer universe and subsequently derive five research propositions from this framework. All this leads to three avenues for future research whereupon we discuss the managerial implications of our findings followed by a conclusion.

2. Customer Profitability Measurement Model Scope and Sophistication

Customer profitability measurement models are means of quantifying an individual customer's or a group of customers' contribution to the financial performance of the firm. Hence, any customer metric incorporating financial outcomes such as profits or cash flows at customer or segment level are to be included in this categorization.

Research on customer profitability measurement models has emerged along the lines of the prospective Customer Lifetime Value (CLV) approach and the retrospective Customer Profitability Analysis (CPA) approach. The CLV approach is by definition aligned with the forward-looking nature of resource allocation decision-making. However, as stated by Jacobs, Johnston, and Kotchetova (2001, p. 355-56): "[T]he primary value of historical data lies in prediction, which then aids the decision-making process about the future". Hence, the retrospective CPA approach is also potentially useful for decision support.

Customer profitability measurement model sophistication is not to be interpreted as a normative guideline per se, inferring that more sophisticated models are always better. Instead, model sophistication merely reflects the degree to which advanced techniques are being used by managers when estimating model parameters.

2.1 Customer Lifetime Value (CLV) Model Scope and Sophistication

Customer Lifetime Value (CLV) is conceptually defined as: the present value of all future cash flows obtained from a customer over his or her life of relationship with the firm (Gupta et al. 2006). A range of models for estimating CLV have been advanced in the literature either conceptually or via case demonstrations. Examples of these contributions are outlined in Table 1 (see Gupta et al. 2006; Villanueva and Hanssens 2006 for CLV model reviews).

Table 1 shows how the techniques for estimating model parameters have been gradually developed throughout the evolution of CLV models. This journey has taken CLV models from their deterministic point of departure (e.g., Berger and Nasr 1998; Berger, Weinberg, and Hanna 2003; Dwyer 1997) where retention rates, customer margins and other input related to customer behavior are entered directly into mathematical formulas (Villanueva and Hanssens 2006) towards stochastic models (e.g., Haenlein, Kaplan, and Beeser 2007; Kumar, Shah, and Venkatesan 2006) where probabilistic determination of customer choice is incorporated (Villanueva and Hanssens 2006).

Whereas the early contributions mainly discuss how to develop a CLV model that can be generalized later approaches have demonstrated how the implementation of CLV models improve customer marketing strategies which in turn may enhance firm financial performance via empirical case studies (Kumar et al. 2008; Ryals 2005). Some studies have even taken the financial performance link one step further and demonstrated how CLV-based analysis can predict firm value (Gupta, Lehmann, and Stuart 2004) and that customer strategies targeted at maximizing CLV can increase a firm's stock price (Kumar and Shah 2009).

TABLE 1
Examples of Customer Lifetime Value (CLV) Cases

Data and References	*Method*	*Industry*	*Customer Relation-ship*	*Estimation / Measurement Technique*	*Level of Analysis*	*Key conclusions*
Dwyer (1997)	Illustrative Example	Catalog Retail	B2C	Deterministic / Stochastic (migration)	Firm Average	CLV can be estimated via a "retention model" for "lost-for-good" buyer-seller relationships and a "migration model" for "always-a-share" relationships
Berger & Nasr (1998)	Illustrative Examples	N.a.	N.a.	Deterministic	Firm Average	Five general models are applicable for determining CLV in "lost-for-good" and "always-a-share" relationships
Gupta, Lehmann & Stuart (2004)	Empirical Cases	Internet Companies & Financial Services	B2C	Deterministic	Firm Average	Customer Equity (the sum of CLVs across extant and future customers) approximates firm value well and can be estimated based on publicly available data
Berger, Weinberg & Hanna (2003)	Empirical Case	Cruise Ship Company	B2C	Deterministic	Segment Average	Generating data for CLV estimation can be demanding but the insights developed improve marketing strategy decision making
Ryals (2005)	Empirical Cases	Financial Services	B2B & B2C	Deterministic	Segments/ Individual Customers	The implementation of CLV changes customer management strategies which can lead to improved firm performance
Ryals (2008)	Empirical Cases	Financial Services	B2B & B2C	Deterministic	Individual Customer w/referrals	Indirect value (e.g., referrals) has a measurable monetary impact that must be considered in CLV-based customer management strategies
Pfeifer & Carraway (2000)	Illustrative Example	Catalog Retail	B2C	Stochastic (MCM)	Firm Average	Markov chain modeling (MCM) is a useful technique for estimating CLV in a "migration model" due to its flexible and probabilistic nature
Libai, Narayandas & Humby (2002)	Illustrative Example	Retailing	B2C	Stochastic (MCM)	Segment Average	CLV should be managed at individual customer level. But a segment-level approach yields sufficient insights more cost efficiently than an individual-level CLV model
Haenlein, Kaplan & Beeser (2007)	Empirical Case	Financial Services	B2C	Stochastic (MCM)	Segment Average	The specific requirements of the retail banking industry from a CLV perspective can be fulfilled by combining MCM with Classification And Regression Tree (CART) analysis
Aeron et al. (2008)	Simulation Example	Financial Services	B2C	Stochastic (MCM)	Individual Customer	The stages in a credit card company's customer relationships can be modeled in a MCM model based on historical data to come up with CLV per customer

TABLE 1 (cont.)
Examples of Customer Lifetime Value (CLV) Cases

Data and References	*Method*	*Industry*	*Customer Relation-ship*	*Estimation / Measurement Technique*	*Level of Analysis*	*Key conclusions*
Venkatesan & Kumar (2004)	Empirical Case	High-Tech	B2B	Stochastic (Antecedents)	Individual Customer	A customer selection model based on nonlinear drivers of CLV outperforms other customer-based metrics in identifying the most profitable customers in future periods. Hence, designing ressource allocation rules that maximize CLV will improve firm financial performance
Reinartz, Thomas & Kumar (2005)	Empirical Case	High-Tech	B2B	Stochastic (Antecedents)	Individual Customer	Both the amount of investment and how it is invested in a customer relate directly to the acquisition, retention and profitability of that customer. A CLV framework must therefore integrate these dimensions to manage the embedded trade-offs optimally
Kumar, Shah & Venkatesan (2006)	Empirical Case	Retailing	B2C	Stochastic (Antecedents)	Individual Customer	CLV can be estimated at individual customer level even in a dynamic retail context with millions of customers. CLV is useful for retention and acquisition decisions as well as for store performance management
Kumar et al. (2008)	Empirical Case	High-Tech (IBM)	B2B	Stochastic (Antecedents)	Individual Customer	CLV-based reallocation of marketing resources yielded a $20 million revenue increase without any additional ressource investment
Kumar & Shah (2009)	Empirical Cases	High-Tech & Retailing	B2B & B2C	Stochastic (Antecedents)	Individual Customer	A CLV-based framework can reliably predict firm value and marketing strategies targeted at maximizing CLV can increase firm value and thus ultimately stock price
Kumar, Petersen & Leone (2010)	Empirical Cases	Retailing & Financial Services	B2C	Stochastic (Antecedents)	Individual Customer w/referrals	To maximize firm profitability it is critical to understand both drivers of CLV and "Customer Referral Value (CRV)" and manage customers accordingly

These cases are convincing but they are merely demonstrations performed in direct marketing settings across a couple of service-oriented industries. In order to determine whether the findings can be generalized to other business contexts it is necessary to explore the scope of CLV models and the determinants of CLV models sophistication.

A common trait in CLV model evolution is the strong focus on developing a forecasting mechanism that captures the dynamics of customer behavior. Generally, this concerns the estimation of three key drivers of CLV (Venkatesan and Kumar 2004): (1) The propensity for a customer to purchase from the company in the future; (2) The predicted product contribution margin from future purchases and (3) The direct marketing resources allocated to the customer in future periods. Hence, CLV models are means of quantifying the expected gross cash flows generated by the firm's offerings in future transactions with customers after accounting for the direct marketing costs invested in generating these transactions and cash flows. Recently, arguments have been raised for expanding the scope of CLV measurement to incorporate the indirect value of customer referrals and models for estimating referral value have been demonstrated (e.g., Kumar, Petersen, and Leone 2010; Ryals 2008). Such an expanded scope yields a more holistic forecast of the future benefits derived from customer relationships.

An implication of their prospective forecasting focus is that CLV models will always provide some indication of the future growth potential embedded in servicing any given customer or segment. A less obvious implication is that CLV models, by ignoring all other SG&A costs except direct marketing, make two implicit assumptions: First, it is assumed that the firm's service capacity is fixed (and therefore cannot be adapted to customers' potentially different demands for service activities in future periods). Second, it is assumed that service resource requirements are homogeneous across customer relationships. In contexts where these assumptions are violated CLV estimates will provide a biased approximation of customer relationship value as the cash flow component for customers that

draw heavily on the firm's service capacity (e.g., due to frequent sales visits, frequent, small-scale deliveries to distant locations, time demanding technical service calls etc.) will be overvalued while cash flows from customers that are less demanding to serve will be undervalued. The severity of this bias will depend on the diversity of customer service requirements as well as the flexibility of service capacity resources, i.e., the degree to which capacity can be adjusted to reflect the demand for service activities in future periods.

Important determinants of CLV model sophistication are the technique used for estimating model parameters and the level of aggregation at which the analysis is carried out (segment or individual customers). Whereas deterministic models rely on qualitative input via decision calculus or similar techniques (e.g., Blattberg and Deighton 1996; Ryals 2005) for predicting the components of CLV, stochastic models deploy quantitative statistical modeling techniques (e.g., Haenlein, Kaplan, and Beeser 2007; Venkatesan and Kumar 2004). Consequently, deterministic CLV-modeling introduces subjectivity that could potentially have an impact on predictive accuracy of forecasts and potentially over-simplifies the causal relationships between marketing efforts and customer behavior (Kumar and George 2007). Additionally, stochastic CLV-approaches allow modeling of complex customer relationship situations where algebraic solutions are not possible (Pfeifer and Carraway 2000). Consequently, CLV-modeling based on probabilistic forecasting of CLV-components can be considered more sophisticated than deterministic CLV-modeling.

Moreover, model parameters can be estimated either at aggregate or disaggregate level with the aggregate approach estimating retention rates, customer margins and other behavioral input as averages across a cohort of customers (firm-/segment-level) and the disaggregate approach estimating model parameters at individual customer level (Kumar and George 2007). In an aggregate approach (firm or segment) deployed in most of the earlier work on CLV (e.g., Berger and Nasr 1998; Berger, Weinberg, and Hanna 2003; Blattberg,

Getz, and Thomas 2001; Dwyer 1997; Gupta and Lehmann 2003) it is assumed that the underlying distribution of customer value across the customers in the cohort remains unchanged in future periods (Kumar and George 2007). The individual approach (e.g., Donkers, Verhoef, and de Jong 2007; Kumar, Shah, and Venkatesan 2006; Kumar and Shah 2009; Reinartz, Thomas, and Kumar 2005; Venkatesan and Kumar 2004) by definition captures such heterogeneities and can thus be considered more sophisticated than aggregate, average firm-/segment-level approaches.

2.2 Customer Profitability Analysis (CPA) Model Scope and Sophistication

Customer profitability is defined as: The difference between the revenues earned from and the costs associated with a customer relationship during a specified period (Pfeifer, Haskins, and Conroy 2005). Hence, as opposed to CLV's asset valuation approach focusing on future cash flows, Customer Profitability Analysis (CPA) is based on accrual accounting profits earned in the past.

The advent of Activity-Based Costing (ABC), where resource costs are consolidated in activity cost pools and related to cost objects (products, customers, transactions, etc.) via activity cost drivers (Cooper and Kaplan 1988; Cooper and Kaplan 1991), introduced a novel framework that facilitated the assignment of a broader range of costs and assets to customers (Goebel, Marshall, and Locander 1998; Smith and Dikolli 1995). Consequently, the more recent literature on CPA has involved the ABC technique as can be seen in the examples of CPA case studies outlined in Table 2 (see Gleaves et al. 2008; McManus and Guilding 2008 for reviews of CPA models).

TABLE 2

Examples of Customer Profitability Analysis (CPA) Cases

Data and References	Application	Industry	Customer Relation-ship	Estimation / Measurement Technique	Level of Analysis	Key conclusions
Bellis-Jones (1989)	Illustrative Examples	Consumer Product Manufacturing	B2B2C	Not Discussed	Individual Customers	CPA facilitates a mutually advantageous dialogue between vendors and their present and future customers by focusing on all the activities and derived costs associated with serving customer relationships
Storbacka (1997)	Empirical Case	Financial Services	B2C	Not Discussed	Segments	CPA-based customer segmentation forms a good starting point for the formulation of marketing strategies
Mulhern (1999)	Empirical Case	Pharmaceutical Products	B2B2C	Direct Costing	Individual Customers	CPA serves two key purposes: market segmentation and marketing ressource allocation
van Raaij, Vernooij & van Triest (2003)	Empirical Case	Professional Cleaning Products	B2B	Full Costing	Individual Customers	Firms implementing CPA face a number of issues. These barriers can be dealt with through a six-step process
Kaplan & Cooper (1989, 1998)	Empirical Case	Industrial Manufacturing (Kanthal)	B2B	Activity-Based Costing (ABC)	Individual Customers	CPA can deliver customer profitability information that facilitates fact based negotiation of price and service levels with customers. This, in turn, improves firm financial performance
Noone & Griffin (1999)	Empirical Case	Hotels	B2B & B2C	Activity-Based Costing (ABC)	Segments	The issues faced by firms implementing an activity-based costing approach to CPA can be dealt with through a ten-step process
Niraj, Gupta & Narasimhan (2001)	Empirical Case	Supply Chain Distributor	B2B	Activity-Based Costing (ABC)	Individual Customers	Many purchase characteristics can have opposing effects on gross margins and cost-to-serve which makes revenue a misleading driver of customer profitability

TABLE 2 (cont.)
Examples of Customer Profitability Analysis (CPA) Cases

Data and References	Application	Industry	Customer Relation-ship	Estimation / Measurement Technique	Level of Analysis	Key conclusions
Kaplan & Narayanan (2001)	Illustrative Examples	Multiple	B2B & B2B2C	Activity-Based Costing (ABC)	Individual Customers	Understanding the drivers of net profitability per customer allows suppliers to take actions that transform unprofitable customers to profitable ones
Andon, Baxter & Bradley (2003)	Empirical Case	Financial Services	B2C	Activity-Based Costing (ABC)	Segments / Individual Customers	Insights from CPA changed the management of customer relationships. The process was anchored in marketing with limited involvement of the accounting department
Helgesen (2007)	Empirical Case	Order-Handling Industry	B2B	Activity-Based Costing (ABC)	Segments / Individual Customers	CPA is a mandatory marketing performance metric for decision makers that are going to manage customer relationships in ways that benefit the organization and its stakeholders
McManus (2007)	Empirical Case	Telecom	B2C	Activity-Based Costing (ABC)	Segments	A segment-based CPA model showed how differences in profitability exist between customers living in different geographical regions
Guerreiro et al. (2008)	Empirical Case	Consumer Product Manufacturing	B2B2C	Activity-Based Costing (ABC)	Individual Customers	The measurement of cost-to-serve provides specific customer information that enables a more comprehensive CPA than when only measuring gross profit from products

CPA based on the ABC technique has highlighted that substantial variation in customer service activities (in the broadest possible sense) makes the incorporation of cost-to-serve important when evaluating customer profitability (Guerreiro et al. 2008; Helgesen 2007; McManus 2007; Niraj, Gupta, and Narasimhan 2001; Noone and Griffin 1999). These insights generated by CPA have enabled firms to improve the management of customer relationships (Andon, Baxter, and Bradley 2003; Helgesen 2007; Kaplan and Narayanan 2001; Storbacka 1997) leading to improved firm performance (Kaplan and Cooper 1998).

Hence, CPA modeling has demonstrated the same advantages as CLV albeit in different industries (with the exception of financial services where both approaches have been demonstrated as being a valuable resource allocation mechanism). Whereas CLV has been shown to add value in service-oriented direct marketing settings, CPA models have mainly been demonstrated in product-based industries in a direct B2B relationship (Helgesen 2007; Kaplan and Cooper 1998; van Raaij, Vernooij, and van Triest 2003), in supply chain distribution (Niraj, Gupta, and Narasimhan 2001) or in a consumer product channel setting (Guerreiro et al. 2008).

Again, this raises the issue whether some general determinants of CPA model effectiveness can be identified and again we turn to the scope and sophistication of the models.

As is evident from the case studies outlined in Table 2, the key idea of CPA is that all revenues, costs, assets and liabilities relevant to servicing customers should be assigned to the customer relationships that cause them. This wider scope of the profitability component in CPA models vis-à-vis CLV models implies that CPA models do capture the profitability effects of heterogeneous service capacity requirements across customers in flexible service resource settings that CLV models ignore. However, the retrospective nature of CPA models embeds the implicit assumption that customer behavior does not change radically over time.

Hence, retention patterns are assumed to be homogeneous across customers and purchasing amounts are assumed to be stable over time (i.e., limited expansion potential). In contexts where customer behavior is dynamic rather than static CPA models will provide biased approximations of customer relationship value as the growth dimension for customers with substantial expansion potential and/or high loyalty (as reflected in long expected retention durations) will be undervalued whereas disloyal customers with no expansion potential will be overvalued.

By adopting a frame of reference from product costing, CPA sophistication can be determined by the range of costs included in the estimate across the value chain (Brierley 2008) and the level of detail deployed when accounting for cause-and-effect relationships between customers, activities, subsequent resource consumption and derived costs and investments at individual customer level (Al-Omiri and Drury 2007; Drury and Tayles 2005). Hence, CPA sophistication is mainly a function of the accuracy at which overhead resource costs that cannot be traced entirely to customers on a one-to-one basis are assigned to the individual customer level. The effort invested in estimating these cause-and-effect relationships more accurately is determined by the process at which overhead resource costs are first divided into activity cost pools and then driven to cost objects (Al-Omiri and Drury 2007). Hence, the greater a range of total SG&A costs, the more cost pools and cost drivers applied to account for SG&A costs at customer level, and the more extensively resource drivers and duration drivers are being applied in this process, the more sophisticated can the CPA model of the firm be considered to be.

2.3 Collective limitations of CLV and CPA models

Two areas that impact firm value creation are severely underdeveloped in CLV as well as in CPA research. First, incorporating the tax effects on customer cash flows is beyond the scope of both approaches. Hence, firms operating under

heterogeneous tax regulations, as would often be the case in multinational sales/marketing organizations, will undervalue customers in low-tax regimes and overvalue customers in high-tax regimes. Furthermore, different tax repatriation regulations across countries may have an impact on the timing of cash flows from customers across these geographies. All this in turn may lead to suboptimal resource allocation in multinational customer environments.

Second, most CLV and CPA models ignore customers' contribution to firm portfolio risk. All CLV models take the time value of money into consideration, as all models discount predicted future contributions from customers at some cost of capital. However, the treatment of risk associated with expected future cash flows across customer relationships has received limited attention. Based on the notion that customer level risk is determined by the volatility and vulnerability of customer cash flows (Srivastava, Shervani, and Fahey 1998), Kumar and Shah (2009) provide a rare attempt of incorporating customer level risk by combining the standard deviation of CLV estimates when randomly simulating CLV model parameters (volatility) and the average share of wallet per customer (vulnerability) into an individual customer risk estimate. Although an important extension this method does not account for any diversification effects across the customer portfolio.

3. A Contingency Framework for Customer Profitability Measurment Model Sophistication

Customer profitability measurement model sophistication addresses different dimensions of firm value creation. Whereas CPA model sophistication is determined by the level of detail by which service capacity resource consumption is approximated at customer level, CLV model sophistication reflects how advanced expected future gross cash flows from customers can be predicted. Hence, although both CPA and CLV models can be useful for resource allocation

purposes, the respective models will not be equally useful to deploy in different customer settings. This context specificity where the appropriateness of sophisticated management techniques may be dependent on the circumstances where they are deployed calls for a contingency approach (Tillema 2005).

Insights generated by sophisticated customer profitability measurement models increase transparency regarding the financial attractiveness of different customer relationships. The models will therefore be increasingly valuable as managers' information-processing requirements concerning customers' behavior and demand for service activities increases. Environments where managers face substantial information-processing requirements can be characterized as complex (as opposed to simple) (Duncan 1972; Pennings 1975; Tung 1979). Decision making among high degrees of environmental complexity entails that manager must possess more knowledge and consider more options than in simpler environments (Sharfman and Dean 1991). Hence, a great variety of factors are perceived as relevant by managers making decisions in complex environments (Miller and Friesen 1983; Smart and Vertinsky 1984; Tan and Litschert 1994).

Complexity is one of three key dimensions in organizational task environments (e.g., Castrogiovanni 2002; Dess and Beard 1984; Emery and Trist 1965; Miller and Friesen 1978; Sharfman and Dean 1991) and can formally be defined as the level of complex knowledge that understanding the environment requires (Sharfman and Dean 1991). Cannon and John (2007) have recently argued that environmental complexity is a multidimensional construct composed by (1) the number of environmental components with which the firm must interact (following Aldrich 1979; Duncan 1972; Kabadayi, Eyuboglu, and Thomas 2007; Tung 1979); (2) the heterogeneity, dissimilarity, or diffusion among the environmental components (following Castrogiovanni 2002; Child 1972; Dess and Beard 1984; Duncan 1972; Kabadayi, Eyuboglu, and Thomas 2007; Simsek, Veiga, and Lubatkin 2007; Thompson 1967; Tung 1979); (3) the sophisticated or technical knowledge required to interact effectively with the particular

components that are present in a firm's environment (following Aldrich 1979; Mintzberg 1979; Sharfman and Dean 1991).

Since customers constitute one of the main components that give rise to complexity in firms' environments (Bourgeois 1980; Duncan 1972; Kabadayi, Eyuboglu, and Thomas 2007) customer complexity can be characterized as one important element in the general environmental complexity faced by firms. Based on the multidimensional conceptualization of complexity a complex customer environment consists of many different customers with heterogeneous needs and where high technical intricacy is required to interact effectively with the customers and other stakeholders involved in the customer relationship management process. In order to serve a complex customer environment firms must deploy different customer strategies and utilize multiple channels of distribution/communication to satisfy different customer tastes and needs across markets (Miller and Friesen 1983). It is this differentiation of efforts that in turn makes the deployment of sophisticated managerial systems and processes necessary for managers in order for them to cope with increasingly complex decision making environments. This adaptation of decision making system sophistication to fit environmental complexity has found empirical support e.g., for strategic planning systems (Rhyne 1985), and general cost management techniques (Cagwin and Bouwman 2002).

Whereas the number of customers in a firm's environment is a rather unambiguous variable, customer diversity/heterogeneity and customer interaction intricacy may have different meanings depending on which dimensions of the customer relationship are in scope. Two distinct dimensions can be identified: Customer behavior and customer service requirements.

Customer behavior reflects the length, depth and breadth of customer relationships (Bolton, Lemon, and Verhoef 2004). Hence, *customer behavioral complexity* can be defined as the degree of variation in retention durations (relationship length), transaction frequency and value of transactions (relationship

depth) and cross-buying behavior (relationship breadth) across the total number of customer relationships a firm serves. The larger the variation in relationship length, depth and breadth, and the larger a customer base firms serve, the higher customer behavioral complexity is faced by firms. Examples of industries with high customer behavioral complexity would be retailers and mass service providers such as telecommunication companies that serve very large and dynamic customer bases.

Customer behavior is not necessarily correlated with customers' service requirements. Resource consumption in marketing, sales, order-handling, distribution, technical service departments, customer support functions etc. is caused by the amount and nature of activities performed to serve customers, and these activities may or may not be related to retention duration, transaction size and cross buying behavior. Hence, *customer service complexity* is the degree of variation in service needs and requirements that invoke differential activities on the organization across customer-facing functions in terms of the number of activities performed as well as the time spent on each activity. The larger the variation in customers' service needs and requirements, and the larger a customer base a firm serves, the higher will customer service complexity be. Examples of industries with high customer service complexity would be manufacturers operating full supply chains and deploying large sales forces and/or large technical service forces.

Both customer behavioral complexity and customer service complexity should be measured through multi-item Likert scales. However, whereas customer service complexity can be measured as a first-order construct, customer behavioral complexity is best measured as a second-order construct consisting of three components: (1) Variation in relationship length; (2) Variation in relationship depth; (3) Variation in relationship breadth. Table 3 provides a set of items for each of the two constructs.

TABLE 3
Likert Scale Items for Measuring Customer Behavioral Complexity and Customer Service Complexity

Customer Behavioral Complexity

1. Variation in relationship length

1.1 "In our markets customers switch between suppliers all the time."
1.2 "Some customers stay with our company for a long time while others prefer to shop around"

2. Variation in relationship depth

2.1 "In our markets some customers perform only a couple of transactions per year while others trade all the time."
2.2 "The variation in customer spending/use per transaction is large from transaction to transaction in our markets."

3. Variation in relationship breadth

3.1 "In our markets some customers buy from an extensive range of product categories while others buy from only one."
3.2 "The variation in cross-buying across categories is large in our markets."

Customer Service Complexity

1. *"Sales & marketing resource usage is different from customer to customer in our markets."*
2. *"Core offerings (products/services) are customized to match the needs of individual customers in our markets."*
3. *"Different customers are offered different commercial terms (i.e., price, rebates/discounts, credit terms etc.) in our markets."*
4. *"Delivery/distribution resource requirements vary from customer to customer in our markets."*
5. *"After-sale service resource requirements vary from customer to customer in our markets."*

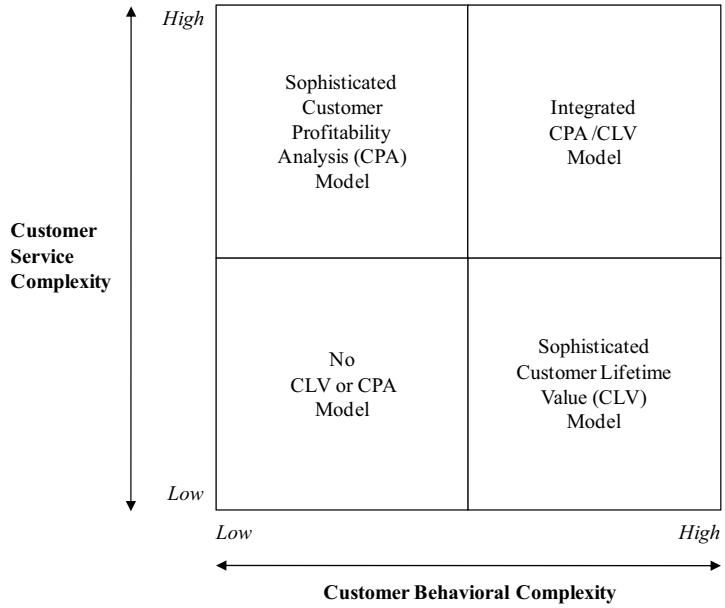
The items for measuring customer behavioral complexity are examples of items that reflect the three conceptual components of customer behavior which should increase construct validity. The items for measuring customer service complexity reflect the impact service complexity has on different elements in a firm's value chain ranging from pre-transaction activities (item 1) over activities

related to the transaction (items 2-4) to post-transaction activities (item 5). This way all aspects of a firm's operations that are expectedly influenced by the service complexity encountered in customer environments are included in the measure. Marketing managers should be able to make an informed judgment regarding all of these items which furthermore enhances the reliability of the measures.

3.1 Framework and Propositions

By linking up the two distinct customer complexity constructs with customer profitability measurement model sophistication we propose a contingency framework for customer profitability measurement model selection (see Fig. 1). The key notion is that firms will increase model sophistication only if the benefits of this increase outweigh the costs (Cooper 1988). Hence, in a customer environment characterized by low customer behavioral complexity and low customer service complexity the costs of implementing sophisticated CLV/CPA models are too high compared with the benefits that such measures produce. As complexity increases along the two dimensions of customer complexity the benefits of increasing sophistication will rise which in turn will motivate firms to start implementing increasingly sophisticated customer profitability measurement models.

FIGURE 1
A Framework for Customer Profitability Measurement Model Sophistication in Environments Characterized by Different Degrees of Customer Complexity



The framework for selecting a customer profitability measurement model that fits the complexity in the customer environment in which a firm operates has a range of implications for the kinds of sophisticated CLV/CPA models that will be advantageous to deploy. First, as *service complexity* increases, the differentiated demand for service activities across customer-facing functions leads to increasing variation in the share of service resource consumption that is to be attributed to different customers. The cost-differences that arise as a consequence of differentiated service levels can be substantial (e.g., Helgesen 2007; Niraj, Gupta, and Narasimhan 2001) which in turn yields highly differentiated impact on firm

net profitability across the customer base. Allocating resources according to customers' financial attractiveness in environments characterized by high *service complexity* therefore requires highly sophisticated CPA techniques. Higher degrees of sophistication are required to achieve better approximations of the resource consumption and the related costs associated with performing the heterogeneous range of customer service activities across all customer-facing functions. This leads to the first proposition:

> *P1: The greater customer service complexity an organization faces the more sophisticated CPA models will managers deploy when estimating customers' financial attractiveness.*

Along the customer *behavioral complexity* dimension increasingly diverse retention duration, purchase frequency, transaction size and cross-buying behavior yields differential gross profit contribution from products/services across customers over time. Consequently, the evaluation of customers' financial attractiveness becomes a matter of understanding the profitability effects of individual customers' behavior over their lifetime. Therefore, the predictive, multi-periodic perspective on customer profitability embedded in sophisticated CLV models will be beneficial in environments characterized by high customer *behavioral complexity* as the key strength of these models is their ability to predict individual customer behavior in future periods and convert such predictions to a stream of expected gross customer cash flows. As customer behavioral complexity increases it will therefore be attractive for firms to adopt increasingly sophisticated CLV models. Hence, the second proposition:

> *P2: The greater customer behavioral complexity an organization faces the more sophisticated CLV models will managers deploy when estimating customers' financial attractiveness.*

Failing to account for the diversity in service resource consumption encountered in customer environments characterized by high *service complexity* makes approximations of customers' financial attractiveness increasingly biased.

This is because the total costs of serving the most demanding customers in such environments will generally be undervalued whereas the total costs of serving customers that draw less extensively on firm service resource capacity than the average customer will be overvalued. Consequently, customers that generate large gross profits by design receive preferential treatment even though they may potentially be causing significant service resource consumption which in turn makes these accounts unprofitable to serve. CLV models generally ignore service capacity resource consumption and derived cost-to-serve. Hence, deploying CLV models in customer environments characterized by high *service complexity* introduces bias to estimates of customers' financial attractiveness. All this leads to the third proposition:

> *P3: The greater customer service complexity an organization faces the larger bias will be introduced when managers use CLV models for estimating customers' financial attractiveness.*

If firms neglect the time dimension when estimating customers' financial attractiveness in environments characterized by high *behavioral complexity* their estimates will ignore the differences in future gross profit potential across customers. Hence, by deploying single-periodic, retrospective customer profitability measurement models in such environments firms will undervalue customers that currently spend little money on the firm's offerings but that could potentially be turned into a loyal, frequent buyer across multiple categories. Similarly, the customers that currently generate high gross profits due to extensive current spending but where high propensity to defect and/or stagnant or even declining demand for the firm's offerings across categories limits future spending potential will be overvalued in a single-periodic, retrospective customer profitability model. Subsequently, this customer will be allocated disproportionately high resource investments from the firm. Given CPA models' single-periodic nature these models will ignore customer dynamics in future periods and will therefore deliver increasingly biased estimates of customers'

financial attractiveness as customer *behavioral complexity* increases. This takes us to the fourth proposition:

> *P4: The greater customer behavioral complexity an organization faces the larger bias will be introduced when managers use CPA models for estimating customers' financial attractiveness.*

When operating in environments that are concurrently characterized by high customer *service complexity* and high customer *behavioral complexity* individual CLV and CPA models will, if deployed in their current form, not capture all dimensions of customers' financial attractiveness satisfactorily. Hence, the bias introduced by CLV (CPA) models in customer environments characterized by high *service (behavioral) complexity* will reduce the benefits of using even sophisticated CLV or CPA models in isolation. Such customer environments therefore call for an *integrated* customer profitability measurement approach where resource requirements and derived cost-to-serve are projected into the future. Sophisticated CLV techniques for estimating retention patterns, gross profits per transaction and direct marketing costs must therefore be integrated with sophisticated CPA techniques for estimating the amount of service activities required to fulfill the future customer demands that the CLV technique predicts. This can be achieved by converting CLV estimates of future customer behavior into predicted service activity demands in future periods that, in turn, can be translated into cost estimates by utilizing the service activity cost drivers from the CPA technique. Only via this kind of integration the customer profitability measurement model will capture the full spectrum of customer relationship heterogeneities encountered in environments characterized by high *customer service complexity* and high *customer behavioral complexity*. Hence, the final proposition:

> *P5: In organizations that concurrently face high customer service complexity and high customer behavioral complexity managers will deploy*

highly integrated CPA/CLV models when estimating customers' financial attractiveness.

4. Future Research Implications

An important purpose of this article is to guide future research across the marketing and finance/accounting disciplines in establishing a more profound understanding of the contextual factors and boundaries affecting the sophistication of customer profitability measurement models. Three prolific avenues for future research can be identified: The propositions must be validated empirically, an integrated CLV/CPA approach must be developed and the tax and risk limitations of CLV and CPA models must be explored and potentially diminished.

4.1 Validating the contingency propositions

A theory can be defined as: "a statement of relationships between units observed or approximated in the empirical world" (Bacharach 1989, p. 498). Hence, the contingency propositions must be found to be irrefutable on the basis of empirical data in order to be validated. Whether adopting firms adapt the sophistication of customer profitability measurement models to fit the complexity of the customer environments in which they operate is one important issue. A key element herein is the confirmation that the constructs *customer service complexity* and *customer behavioral complexity* are valid empirical constructs. Cross-sectional survey research designs similar to the ones deployed in recent studies on the performance effects of CRM and customer prioritization strategies in general (see e.g., Homburg, Droll, and Totzek 2008; Palmatier, Gopalakrishna, and Houston 2006; Yim, Anderson, and Swaminathan 2004) constitute a good approach to testing the contingency propositions.

Another important issue is the exploration of bias introduced by CLV (CPA) models in customer environments characterized by high service (behavioral)

complexity. Case demonstrations similar to the ones performed on CLV efficiency (e.g., Venkatesan and Kumar 2004) and CPA efficiency (e.g., Niraj, Gupta, and Narasimhan 2001) could be a good design for this kind of inquiry. Hereby, the diverging recommendations provided by CLV and CPA models can be analyzed and the contingency explanation can be explored further.

Finally, other contingencies than complexity that may influence customer profitability is measurement model sophistication. Otley (1980) and Chenhall (2003) have in their review studies of contingency research in management accounting identified six general contextual factors that have been brought up to explain differences in the applicability of different accounting systems: Technology (i.e., how the organization's work processes operate), organization structure (i.e., the formal specification of different roles to ensure that the organization's activities are carried out), environment (e.g., competitive intensity, uncertainty, turbulence etc.), size, strategy and culture. Future research can begin investigating the impact of some or all of these factors on the design of financial customer profitability models across companies. Subsequently, later studies can establish a more comprehensive contingency-based theory for customer profitability measurement model sophistication.

4.2 Developing an Integrated CLV/CPA Approach

Only one customer profitability measurement model study has explored the integration of the CLV and CPA approaches. Ryals (2005) touches upon the issue in a case study of a B2B insurer's implementation of a deterministic CLV model by assigning costs associated with order-handling and key account management activities to key accounts applying a variation of ABC. This is a promising (and pragmatic) approach. However, the link between customer behavioral forecasting and the prediction of service capacity costs (order-handling and key account management) was not explored.

Future research can explore this link in greater detail. A first step could be to pursue analytical research, investigating the relationship between the drivers of customer behavior deployed in CLV models and the cost drivers deployed in CPA models. In this context Activity-Based Budgeting (ABB) (Kaplan and Cooper 1998) and Time-Driven Activity-Based Costing (TDABC) (Kaplan and Anderson 2004) may be useful techniques to explore. Subsequently, case demonstrations similar to the ones carried out throughout the CLV and CPA literatures can be developed. This way a practically applicable integrated CLV/CPA model can be developed and demonstrated.

However, one thing is to develop an integrated customer profitability measurement model. A more daunting task is to handle the issues associated with performing a successful implementation of such a model that offers benefits compelling enough for decision makers in firms to use it. Generally, barriers and resistance to change slow down the diffusion of management innovations (Ax and Bjørnenak 2005). In the case of customer profitability measurement models a key barrier to address is the cross-functional collaboration required across parts of the organization like marketing and finance/accounting departments (Kumar et al. 2008) – departments that have traditionally been far apart (Gleaves et al. 2008).

Cross-functional collaboration presents two main issues. First, firms must successfully integrate cost management systems, transaction databases, CRM systems, other sales management software etc. into an integrated customer profitability measurement platform that delivers insights on the drivers of customer value that are relevant to managers across different functions. E.g., sales/marketing management must be able to monitor realized as well as expected gross profit per customer across offerings as well as the sales, marketing and service activities performed to generate these gross cash flows. Additionally, simulation of different resource allocation strategies' effect on customer profitability in future periods must be facilitated. An important element herein is

to organize data from operational customer service functions like order-handling, delivery and post-transaction service/support around customers.

Second, processes and competences across functions must be aligned with the customer perspective while the overall customer responsibility is anchored in one function. This offers an opportunity for the marketing department to take lead on the entire organization's value creation process. As sales/marketing departments "own" the customer in most organizations cross-functional customer or segment account teams are naturally headed by sales/marketing managers. Such account teams should consist of representatives from customer-related functions (e.g., R&D, logistics, customer service etc.), with finance/accounting departments delivering data and controlling costs per customer. Sales/marketing managers should be in charge of account teams and overall responsible for customer/segment profitability. This kind of reorganization requires capability upgrades across all customer-related departments in order to adopt, implement and use a common financial frame for resource allocation centered on customer profitability. Marketing managers in particular must achieve a much more in-depth understanding of the meaning of and interrelationships between accounting/finance terms. Similarly, accounting/finance managers need to understand the causal relationships between marketing actions and financial outcomes in much greater detail.

Understanding the process of breaking down such inter-functional barriers is a crucial step towards more rapid adoption of an integrated CLV/CPA model across companies. Longitudinal field studies may provide a good research design for exploring the issues associated with breaking down inter-functional barriers in one or more case companies that have adopted and implemented an integrated customer profitability measurement model (see Roslender and Hart 2003).

4.3 Expanding the boundaries of CLV/CPA

CLV and CPA-based allocation of resources across multinational customer bases may suffer from the lack of an income tax perspective in CLV and CPA models. From a marketing perspective tax considerations are part of the macro factors external to companies conducting global customer relationship management practices (Ramaseshan et al. 2006). Tax rate differentials may thus have an impact on optimization of resource allocation decisions in global CRM. If the effective tax rate varies across countries customers with identical pre-tax cash flows do not necessarily contribute equally to firm value creation. On a similar note, different profit repatriation restrictions across countries may postpone the realization of after-tax cash flows across borders hereby reducing net present value due to the time value of money. How severe a bias that is introduced by ignoring tax discrepancies in multinational resource allocation and how any potential bias can be eliminated are interesting areas for future research. Again, case demonstrations comparing the resource allocation approach with and without tax considerations in a multinational marketing organization could be an interesting path to pursue.

The risk perspective of customer-based resource allocation decisions is to some extent captured in a CLV context by estimating the volatility and vulnerability of future customer cash flows (Kumar and Shah 2009). Although this approach is a major first step in accounting for diverse risk exposure across different customer relationships there are still some issues that need to be addressed to advance this thinking.

According to financial portfolio theory, investors in financial markets can eliminate any asset-specific/idiosyncratic risk by holding a well-diversified portfolio of financial assets due to the inter-correlation of these assets' returns (Markowitz 1952). Transferring this logic to a customer portfolio yields two specific areas where the approach to measuring customer risk suggested by Kumar

and Shah (2009) can be expanded: First, considering customer-level risk from a portfolio perspective rather than from the perspective of the individual customer will allow the incorporation of any diversification effects across the customer base. Dhar and Glazer (2003) have proposed a conceptual model for adjusting the cost of capital at individual customer level to reflect different customers' contribution to the volatility of portfolio cash flows. Pursuing this model via case demonstrations would be an interesting way of exploring the impact of deploying a customer portfolio perspective on resource allocation decisions.

Second, a related issue is the reconciliation of customer-level risk to overall firm-level risk and the links between customer cash flow volatility/vulnerability and the weighted average cost of capital (WACC). Given that all sales activity derives from customer relationships the risk differences estimated at individual customer-level provide an exciting micro-level approach to estimating firms' exposure to fluctuations in demand across markets at the macro level. Investigating how to merge this input into the overall estimation of the weighted average cost of capital of the firm will not only advance CLV models but may also provide new input to more macro-level estimation of firms' operational risk in corporate finance research.

5. Managerial Implications

Customer profitability measurement model design is a matter of establishing the right fit between model sophistication and the complexity encountered in customer environments. Customer complexity may vary across industries but may also vary across business units within organizations in specific industries. Hence, the determinants of customer complexity are not industry-specific. Firms serving B2B as well as B2C customers (e.g., utilities, telecommunication firms and financial institutions) may encounter differential customer behavior and service requirements so that firms must measure different elements of customers'

financial attractiveness via more or less sophisticated measurement models. Similarly, firms that deploy different customer service models across different markets (e.g., by outsourcing service activities in some markets and being full-service provider in other markets) will face different degrees of customer service complexity.

Therefore, the first step in developing/adjusting customer profitability measurement models is to diagnose the customer environment across business units along the dimensions of customer service complexity and customer behavioral complexity. This diagnosis can be performed by surveying the sales/marketing organizations across business units using our proposed measures (see Table 3). Subsequently, firms can use the contingency framework to identify how sophisticated a CPA/CLV approach that best fits this environment. Finally, firms must be aware of the limitations of CPA and CLV models in terms of the neglected tax effects and portfolio risk implications and mitigate the bias introduced to estimates of customers' financial attractiveness when developing resource allocation mechanisms wherever possible.

The next step is to develop/adjust the firm's customer profitability measurement model in accordance with the diagnosis of environmental customer complexity. Hence, when facing high degrees of customer service complexity a sophisticated cost assignment exercise must be performed. Efforts must therefore be made to approximate cause-and-effect relationships between customer service activities and service capacity resource requirements in order to determine cost-to-serve per customer. Similarly, firms facing high degrees of customer behavioral complexity must focus on performing sophisticated customer behavior forecasting analysis to estimate retention probabilities, gross profits and direct marketing investments per customer. And if high degrees of service and behavioral complexity are encountered simultaneously an integrated CPA/CLV approach must be developed in a stepwise approach. First customers' service resource requirements and derived cost-to-serve can be determined. Then a model

forecasting future customer behavior and direct marketing investment requirement should be developed. And finally the customer behavior forecasts can be used to estimate future customer service requirements hereby arriving at a stream of net profits per customer that can be discounted to arrive at net value per customer.

A crucial final step is the implementation of the new/adjusted customer profitability measurement approach. In many cases this can potentially be a matter of shifting focus from a product perspective to a customer perspective across the organization (Kumar et al. 2008). Two important barriers to successful implementation include account manager motivation and feedback (Ryals 2006). Account Managers must understand why customers are financially attractive or unattractive and how customers' financial attractiveness can be improved. This can be done by focusing on the drivers of CPA (service activity time consumption and derived resource requirements) and CLV (retention probabilities, depth and breadth of engagements and direct marketing investment requirements) rather than merely managing on financial customer outcomes. This also entails the measurement of account manager performance on the drivers they can influence. Relevant examples of elements that account managers can influence are pricing, the product mix that customers purchase (over time), marketing budgets at customer level, time spent on sales calls, and other service levels that account managers promise customers in terms of e.g., promotion support, deliveries and after-sales support. Examples of elements that are beyond account managers' influence are efficiencies in production (reflected in cost of goods sold per unit), logistics and technical service (reflected in cost-to-serve). However, the implementation of sophisticated customer profitability measurement models is still an important step in highlighting customer service processes that can be optimized internally in firms.

6. Conclusion

No customer profitability measurement approach is universally superior. Instead firms must balance the degree of CPA and CLV sophistication with the customer service complexity and customer behavioral complexity encountered in their task environment. How sophisticated CPA and CLV models can be developed has been demonstrated a number of times in isolation. How the two approaches can be integrated into a unified model is an underdeveloped area that deserves attention in future research on customer profitability measurement. Future research of this nature requires interdisciplinary collaboration between marketing and management accounting scholars just as well as the implementation of sophisticated CPA and CLV models across firms requires higher degrees of inter-functional coordination across marketing/sales and finance/accounting departments.

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Article #2

Are Customer Profitability Measurement Models always worth the effort? A cross-sectional perspective

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Abstract

Prior research on the performance effects of Customer Profitability Measurement (CPM) models like Customer Profitability Analysis (CPA) and Customer Lifetime Value (CLV) have generally focused on the implementation of either CPA or CLV in a specific industry at a specific point in time. This study expands on prior findings by investigating whether a sustainable performance effect of using CPM models can generally be found across different marketing contexts and industries. Based on survey data from a cross-section firms the study contributes to the customer profitability measurement literature by demonstrating that although using CPM models appears to be performance enhancing the link is not straightforward. Hence, investments in CPM model implementations must be aligned with the marketing context in which firms operate in. Furthermore, managers must carefully consider how to continuously refine and develop the models implemented in order to sustain the competitive edge originally obtained.

Key Words: Customer Profitability Analysis (CPA), Customer Lifetime Value (CLV), Customer Relationship Management (CRM), Marketing Strategy, Performance

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1. Introduction

What is a customer worth and why is this worth knowing? This question is receiving growing attention due to the ongoing shift towards a relationship paradigm in marketing (Gronroos 1997). One important implication of this shift is a fundamental change of focus in marketing management from "engaging in transactions with whoever wants to buy our products" to "serving customer relationships by highlighting products' benefits in terms of meeting individual customer needs" (Shah et al. 2006). Implementing a customer-centric management approach requires the deployment of practices that facilitate the alignment of marketing resource spending with the profits customers generate (Ramani and Kumar 2008). Simultaneously, marketers are increasingly required to verify the financial effects of marketing investments (Rust et al. 2004). Consequently, the Marketing Science Institute (MSI) continuously emphasizes marketing accountability as a key focus area for marketing research [see "MSI Research Priorities" 2008-2010 (MSI 2008); 2010-12 (MSI 2010)]. If a positive link between the deployment of customer profitability measurement practices and firm performance can be demonstrated, marketers are in a better position to justify investment decisions regarding scarce marketing resources.

The measurement and management of customer profitability is an intriguing marketing discipline because it taps into both of the above trends in marketing theory and practice as it represents a financial approach to customer relationship management. Therefore, it is important to establish a more profound understanding of customer profitability measurement models exploring both how these models are used by managers across firms but equally importantly whether the implementation and use of these models actually creates financial value to the firms that adopt these practices. With this kind of empirical validation, managers will be more confident that investing considerable resources in implementing

complex customer profitability measurement models will in fact be worth the effort.

Several case studies have provided indicative evidence of a positive effect on firm financial performance of deploying marketing strategies based on customer profitability measurement (CPM) models. This goes for the future-oriented Customer Lifetime Value (CLV) concept (Kumar et al. 2008; Kumar and Shah 2009; Ryals 2005; Venkatesan and Kumar 2004) as well as for the retrospective Customer Profitability Analysis (CPA) concept (Kaplan and Cooper 1998, pp 183-189; Nenonen and Storbacka 2008). One recent large-sample study in the high-tech sector has backed these findings by demonstrating a positive association between the use of marketing performance metrics and firm performance across hith-tech firms (O'Sullivan and Abela 2007).

Although the longitudinal dimension in the above case studies strengthens the ability to draw causal inferences from the data, the limited number of observations makes the inference of statistical generalizations difficult. Hence, although prior case-based research provides support for a causal relationship between CLV/CPA use and firm performance these findings are only indicative. The large sample of O'Sullivan and Abela's (2007) study to some extent facilitates statistical generalization albeit only to a target population of high-tech companies and only at a more general marketing performance measurement level. A general causal relationship between the deployments of CLV/CPA based customer management strategies and firm financial performance therefore still remains to be demonstrated. Another problem with prior case studies is that they investigate a narrow time window during and immediately after CLV/CPA implementations. Consequently, it is not clear whether the demonstrated improvements of financial performance can be sustained over longer periods of time.

This paper addresses the issue whether using customer profitability measurement models as the basis for resource allocation decisions generally leads

to a sustainable increase in firm financial performance across different marketing contexts. More specifically we investigate three research questions:

1. Does CPM model use cause superior financial performance across industries?
2. Can the positive performance effect (if any) of CPM use on firm performance be sustained over time?
3. How does the marketing context (degree of product focus) influence the relationship between CPM model use and firm financial performance?

Applying a survey instrument we gathered a cross-sectional data sample consisting of responses from 218 Sales / Marketing directors in the largest Danish and Swedish companies. This Scandinavian context was chosen as the Scandinavian economies generally consist of very open and globally oriented firms with a strong tradition of being at the forefront of managerial accounting innovation and a more recent history of rapidly adopting and adapting the latest management accounting innovations from abroad (Näsi and Rohde 2006). Hence, we succeeded in gathering a sample of global, as well as more regional/local firms where the share of CPM adopters was sufficiently high to be able to draw some general conclusions about the performance effects of using CPM.

Based on an analysis of this sample we make three main contributions to theory and practice. First, we find empirical evidence in support of the proposition that firms that use CPM models for resource allocation purposes outperform peers that do not. This finding provides an extension of prior case-based evidence hereby adding to the growing body of literature on marketing accountability in general and financial consequences of customer-based marketing metrics in particular. Furthermore, we contribute to marketing practice by providing

marketing managers with a strong argument in favor of implementing CPM models in their firms.

Second, we find a diminishing performance effect of CPM adoption over time. This suggests that the benefits of using CPM for resource allocation purposes are not sustainable. On a general note this finding is in line with recent research within the market orientation literature demonstrating a diminishing performance effect of a market orientation as competition also becomes more market oriented and learn from early adopters (Kumar et al. 2011). How managers can attain a sustainable competitive advantage from implementing new marketing practices such as CPM models therefore seems to be an imperative research topic. One element herein, is to investigate how firms can institutionalize the learnings that new marketing practices provide across the entire organization during the implementation phase and continuously refine and develop their marketing models in order to sustain the benefits of using these practices.

Third, we find a negative moderating effect of product/brand investment on the link between CPM use and firm performance. CPM is therefore not equally efficient in all marketing contexts. This finding contributes to the ongoing discussion about the feasibility of deploying product-/brand- vs. customer-focused marketing metrics (e.g., Ambler et al. 2002; Leone et al. 2006; Shah et al. 2006). Our findings suggest that it depends on the marketing context in which these metrics are to be deployed. Marketing managers should therefore base decisions regarding the amount of resources to invest in new CPM practices on a thorough consideration of the marketing context in which they operate.

The remainder of the paper is organized as follows: First, we briefly review the part of the CLV and CPA literatures where a performance link has been explored and demonstrated. Next, we present our model and develop our hypotheses. Subsequently, we discuss our method and data whereupon we present

our results. Finally, we provide a discussion and identify the managerial implications and the limitations of our study.

2. Customer profitability measurement literature and link to performance

The customer profitability measurement literature has followed two distinct paths to quantifying customers' financial value: The retrospective Customer Profitability Analysis (CPA) approach with its origin in the accrual conventions of the accounting literature and the prospective Customer Lifetime Value (CLV) approach, based on the net present value principle of the finance literature (Pfeifer, Haskins, and Conroy 2005). Despite their shared purpose of estimating the financial value of customer relationships to improve customer management decision making their conceptual differences in terms of time and cost perspectives justifies the distinction between the two techniques.

2.1 Customer Profitability Analysis

Customer Profitability Analysis (CPA) is the structured analysis of Customer Profitability (CP) for the purpose of differentiating pricing and customer services according to customers' contribution to firm profits. CP can be defined as: The difference between the revenues earned from and the costs associated with the customer relationship during a specified time period (Pfeifer, Haskins, and Conroy 2005). Hence, CPA entails tracing *all* the different costs caused not only by product transactions but also by the activities performed across an organization's customer-facing functions to customers (Ward 1992).

Although the principles of CPA are not new (Sevin (1965) presented the idea of assigning costs and revenues to customers over forty years ago), the idea of measuring and managing customer profitability has had a revival with the advent

of Activity-Based Costing (ABC). Following the ABC technique, resource costs (e.g., sales force salaries, support staff salaries etc.) are consolidated into activity cost pools (e.g., customer calls, order processing etc.) and driven to customers via activity cost drivers (Cooper and Kaplan 1991). This two-step approach reduces customer-cost distortions in the process of driving resource costs that are not directly traceable from resources to customers by driving costs to customers based on cause-and-effect relationships rather than more arbitrary allocation keys (Smith and Dikolli 1995).

The ABC-based CPA approach has been demonstrated through a number of case studies (e.g., Guerreiro et al. 2008; Helgesen 2007; McManus 2007; Niraj, Gupta, and Narasimhan 2001; Noone and Griffin 1999). However, investigations of the performance effects of deploying CPA for resource allocation purposes are scarce. Kaplan and Cooper (1998, pp 183-189) report how a B2B manufacturer managed to grow sales without investing in additional administrative, sales and support resources, thus increasing net profit margin considerably, by implementing specific pricing and order-handling customer differentiation strategies based on CPA. More recently Nenonen and Storbacka (2008) investigate three case studies in different B2B manufacturing operations and find indicative evidence of improved performance immediately after CPA implementations.

2.2 Customer Lifetime Value

Customer Lifetime Value (CLV) can be defined as: The present value of all future cash flows obtained from a customer over his or her life of relationship with a firm (Gupta et al. 2006). Whereas the first generalized CLV models focused on quantifying the lifetime value of an average customer across a broad customer cohort (e.g., Berger and Nasr 1998; Dwyer 1997; Gupta and Lehmann 2003), later contributions have advanced the CLV concept by developing CLV models at

micro-segment level (e.g., Haenlein, Kaplan, and Beeser 2007; Libai, Narayandas, and Humby 2002) and ultimately at individual customer level (e.g., Kumar, Shah, and Venkatesan 2006; Kumar et al. 2008; Ryals 2005; Venkatesan and Kumar 2004; Venkatesan, Kumar, and Bohling 2007).

The CLV approach is conceptually aligned with the theoretical definition of intrinsic firm value stated as: The present value of all future cash flows generated by the firm's operations over the firm's lifetime (e.g., Copeland, Koller, and Murrin 2000; Rappaport 1998). Conceptually, the sum of CLV across all extant and future customers (named Customer Equity) thus equals the value of the firm and support for this relationship has been presented in case-based studies (Gupta, Lehmann, and Stuart 2004; Rust, Lemon, and Zeithaml 2004).

Given this conceptual alignment between CLV and firm value it can be argued that firms that pursue customer management strategies that maximize CLV at individual customer level will consequently enhance firm value (Venkatesan and Kumar 2004). Ryals (2005) provides qualitative evidence of a link between CLV-based Customer Relationship Management strategies and the financial performance of the business unit in which these strategies are implemented in two financial services case studies. Kumar et al. (2008) demonstrate how a high tech firm managed to increase firm revenues by $20 million via the reallocation of marketing resources on the basis of CLV-based recommendations. Moreover, a recent study demonstrates how a retailer and a high tech firm experienced abnormally positive stock returns that outperformed peers as well as the general stock market following an implementation of CLV-based resource allocation strategies (Kumar and Shah 2009).

TABLE 1

Overview of Related Research vis-à-vis Current Study

Reference (Year)	*Major Findings*	*Industries*	*Data*		*Focal Variable*		*Performance Link*
					CPA	*CLV*	
Kaplan and Cooper (1998)	Implementation of customer strategies based on Activity-Based Costing (ABC) facilitated top line growth without additional resource investments	Heat Wire Manufacturing (B2B)	1 case	10,000+ customers	Yes	No	Revenue growth
Nenonen and Storbacka (2008)	Differentiated customer strategies based on sophisticated profitability analysis lead to enhanced economic profit in two of three cases	Forestry Products; Metal Products; Beverages (B2B/B2B2C)	3 cases	78/256/ 4,000 customers respectively	Yes	No	Economic Profit
Venkatesan and Kumar (2004)	Managers can improve company profits by designing marketing communications that maximize CLV	High-Tech Manufacturing (B2B)	1 case	2 customer cohorts; 1,316 / 873 customers	No	Yes	Qualitative
Ryals (2005)	Implementation of CLV-based CRM-strategies leads to better customer prioritization decisions	Financial services (B2B & B2C)	2 cases	10 Key Accounts / 61,338 consumers	No	Yes	Qualitative
Kumar et al. (2008)	CLV-based reallocation of direct marketing resources yielded $20 million revenue increase without additional resource investment	High-Tech Manufacturing (B2B)	1 case	35,131 establish-ments	No	Yes	Revenue growth
Kumar and Shah (2009)	Implementation of CLV-based CRM strategies lead to abnormal stock price performance vis-à-vis peers as well as the general stock market	High-Tech Manufacturing (B2B); Retailing (B2C)	2 cases	Entire customer base	No	Yes	Stock price increase
This study	The implementation and use of CPM models (CLV or CPA) generally leads to improved financial performance across industries	Cross-sectional	218 responses	Survey of 218 marketing executives	Yes	Yes	ROA

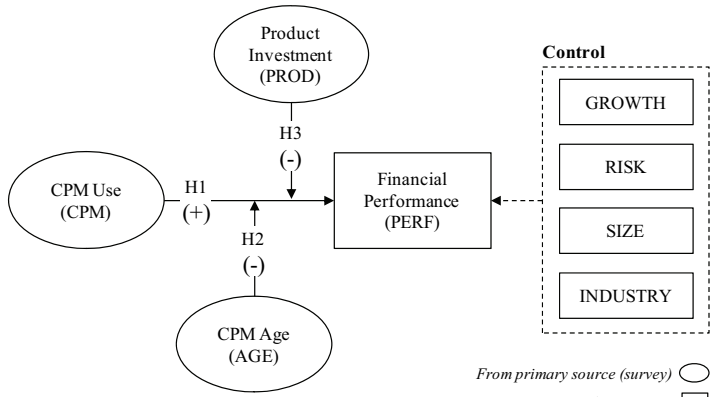
Table 1 summarizes the case-based findings on the link between the use of CPM models for resource allocation purposes and firm performance. All these studies indicate a positive association. By performing a cross-sectional study we

seek to test the cross-sectional viability of these findings by adding large-sample empirical evidence. This also allows us to compare different marketing contexts in terms of the degree of product-focus. Finally, we add to prior studies by integrating CPA and CLV in one study design hereby investigating CPM models' performance effects from a more holistic perspective.

3. The performance outcomes of customer profitability measurement model adoption

Managerial innovations (like CPM models) are generally adopted to obtain benefits that directly or indirectly impact financial performance measures (Cagwin and Bouwman 2002). In this study we test whether a general performance effect of CPM adoption can be empirically demonstrated, whether such an effect is sustainable over time and whether it is equally strong regardless of the product/brand focus in adopting firms. Figure 1 depicts our hypothesized model.

FIGURE 1
A Model of the Performance Outcomes of CPM Adoption



3.1 Hypothesis development

Main effect of CPM use on firm financial performance

Prioritization of customer relationships according to customers' value to the firm is at the core of Customer Relationship Management (CRM) (Payne and Frow 2005; Slater, Mohr, and Sengupta 2009) and has been shown to be a performance enhancing practice to pursue (Gwinner, Gremler, and Bitner 1998; Homburg, Droll, and Totzek 2008; Lacey, Suh, and Morgan 2007; Reinartz, Krafft, and Hoyer 2004).

Effectively implementing a customer prioritization strategy requires the capability of identifying the most attractive customers. CPM models are proposed to serve this purpose well for three reasons: First, measuring and managing customer profitability reduces uncertainty concerning the operational execution of the strategic ambition of a customer-oriented firm with a customer prioritization strategy by providing managers profitability-based guidelines for resource allocation decisions on a daily basis (Shah et al. 2006).

Second, CPM-based guidelines not only make it easier for firms to adjust their value propositions according to customers' financial contribution (Yim, Anderson, and Swaminathan 2004). They also enable frontline employees to continuously evaluate the impact that different marketing activities have on firm profitability which in turn facilitates better prioritization of their daily customer management decisions (Venkatesan and Kumar 2004).

Third, CPM models facilitate a direct bridging of the effects of micro level resource allocation decisions on firm financial performance measures at the macro level given CPA models' relationship with the annual financial statements of the firm (Gleaves et al. 2008) and CLV models' relationship with firm value (Gupta, Lehmann, and Stuart 2004). The guidelines provided by CPM models consequently link directly into firm financial outcomes hereby ascertaining

alignment between customer prioritization strategies and the overall financial ambitions of firms.

Hence, we expect the positive association demonstrated in case-studies in specific industries (see Table 1) to constitute a proposition that is valid cross-sectionally. This leads to the first hypothesis:

H1: There is a positive association between CPM model use and firm financial performance.

Sustainability of performance effects over time

Intuitively, the knowledge advantages generated via the adoption of new technologies in organizations would be expected to be sustainable given the classical learning curve arguments stating that learning is cumulative and persistent over time (e.g., Yelle 1979). However, this proposition has been challenged by demand-side as well as supply-side arguments in the organizational learning literature.

From a managerial innovation *demand-side* perspective a growing body of research suggests that knowledge is likely to depreciate over time as the challenges of preserving new ways of doing business can be substantial (Argote 1999; Rogers 1983, p. 365; Szulanski 2000) – especially when it comes to "learning by doing" (Argote 1990). Three main reasons for knowledge depreciation are highlighted in the literature: personnel turnover, periods of inactivity and failure to institutionalize tacit knowledge (Besanko et al. 2010; Darr, Argote, and Epple 1995). Research has shown that high employee turnover can cause achieved performance improvements to deteriorate in an unpredictable manner over time despite the fact that tasks and routines do not revert to pre-implementation standards (de Holan and Phillips 2004). Other studies have shown

that when tasks are resumed after interruption, performance is typically inferior to when it was interrupted but superior to when it began initially (e.g., Kolers 1976). And Day (1994, p. 44) suggests that "Organizations without practical mechanisms to remember what has worked and why will have to repeat their failures and rediscover their success formulas over and over again". So even if knowledge is available and utilized by organizational members, knowledge created by new innovations may still deteriorate leading to a declining performance effect over time.

From a managerial innovation *supply-side* perspective the imitation and learning from other organizations often plays an important part in the knowledge acquisition process of firms (Ingram and Baum 1997). However, the transfer of technological know-how across organizations often entails adaptation (or reinvention (see Rogers 1995)) of these innovations either because it is required as a consequence of a general immobility of technological knowledge (Attewell 1992) or because it is beneficial to supply-side actors' (e.g., software vendors, consultants etc.) special agendas (Ax and Bjørnenak 2005). Attewell (1992) goes on to argue that the emergence of mediating institutions (e.g., software vendors, consultants etc.) can reduce the learning burden on firms associated with the implementation and reinvention of new technologies. Consequently, mediating institutions acquire economies of scale in learning through the iterative process of implementing and adapting new technologies across multiple firms – an effect that is particularly important for rare events such as the implementation of new management systems. Firms implementing managerial innovations will therefore only benefit from these economies of scale in learning through the interaction with mediating institutions (Attewell 1992).

When it comes to managerial innovations such as CPM models for resource allocation decision purposes we argue that the above effects are likely to influence the sustainability of performance effects of implementing CPM for early vs. late

adopters. Especially because the primary motive for adoption in the early stages of managerial innovations' lifecycles is *efficient choice* whereas imitation motives (fashion and fad) dominate in later phases (Malmi 1999). This has two main implications: First, early adopters will mainly be performing "learning by doing" implementations driven by an overall ambition of improving customer management decision making but merely guided by preliminary normative academic research and/or heuristic know-how. Knowledge depreciation is therefore likely to occur over time if key employees leave the firm without CPM models having been institutionalized across these organizations and/or if CPM use for some reason is temporarily suspended. Second, later adopters can benefit from learning economies of scale achieved by the group of consultants, software vendors and other CPM experts that emerge as the technology diffuses. This way later adopters can avoid the errors encountered by peers who adopted earlier versions of CPM and benefit from the progress made in CPM model developments.

Based on this, our second hypothesis can be stated as follows:

H2: The positive association between CPM model use and firm financial performance decreases over time.

Moderating effect of marketing context

According to the marketing concept firms can achieve a sustainable competitive advantage by identifying and satisfying customer needs better than competitors (Day 1994). Consequently, market orientation is about identifying and serving expressed customer needs (reactive market orientation) as well as latent customer needs (proactive market orientation) (Narver, Slater, and MacLachlan 2004).

Focusing on customers' expressed needs corresponds well with the logic of CPM models because these models' recommendations take their point of departure in estimates based on past customer behavior. Customers that fit firms' current value proposition well will buy more of current offerings from different categories at attractive prices and thus be more profitable. Hence, customers' expressed needs are translated into buying behavior that is observed and converted to customer profitability measures whereupon resources are allocated accordingly. This may also be an explanation why CPM models have mainly been demonstrated to work well in service industries and other direct marketing contexts (Gupta and Lehmann 2006).

When firms predominantly face a continuous inclination to discover and serve latent customer needs, investments in brands and product development (R&D) are required (product investment) for firms to remain competitive. CPM models have limitations when it comes to incorporating product innovation and brand building activities in estimates of customer profitability because these activities per definition concern aspects of customers that are not reflected in their buying behavior and will therefore not be revealed by their transaction histories. Hence, CPM approaches will ignore brands' potential to impact profits beyond the current marketing environment in several ways. First, strong brands' ability to achieve support from channel and supply chain partners is ignored and this whole interface with channel partners and the management of marketing activities vis-à-vis these potential partners is generally not in scope in CPM models (Leone et al. 2006). Second, the value brands can create outside the current competitive arena through extensions is also absent in CPM-based marketing management approaches (Ambler et al. 2002).

In addition to these general shortcomings vis-à-vis brand investments CPA models in particular face an additional limitation regarding the marketing context. Brand advertising and R&D expenses are incurred to achieve future economic

benefits. Therefore, their incorporation in a single-periodic performance measure like CPA will bias estimates of customer profitability and are therefore recommended to be left out of CPA estimates (Cooper and Kaplan 1991). Firms investing heavily in product development and/or brand advertising will therefore not capture all the expenses incurred as a result of activities performed to influence customer behavior across periods in their CPA models.

So in marketing contexts where identifying and serving latent customer needs are important parts of the value creation process the required investments in products/brands will largely be ignored by CPM models hereby making this marketing management approach less efficient. Based on this we state our third hypothesis as follows:

> *H3: The greater the investments firms make in products/brands the less positive is the association between CPM model use and firm financial performance.*

3.2 Control variables

In order to mitigate omitted variable bias and to isolate the effects of CPM model use and the moderators on firm financial performance it is necessary to control for any factors that may correlate with both the dependent and the independent focal variables. Growth, risk (variability in returns) and size have all been empirically demonstrated as important firm-level determinants of financial performance (Capon, Farley, and Hoenig 1990) and all three variables are therefore included as control variables.

In addition to the three firm-level factors we also control for industry in line with prior research studying the relationship between customer management capabilities and firm financial performance (e.g., Reinartz, Krafft, and Hoyer 2004).

4. Research method and data collection

Given the explanatory nature of this study, testing general causal relationships, a survey instrument has been developed for data collection purposes. This survey instrument was deployed and cross-sectional data was collected in Denmark and Sweden over the Fall and Winter 2010 and the Spring 2011[2]. Development of the survey instrument and the data collection process were guided by frameworks based on the judicial standards for survey research (Morgan 1990; Van der Stede, Young, and Chen 2005) as well as instructions by Dillman (1999).

The level of analysis is the organization (business unit) with target informants being Sales / Marketing decision makers (directors or managers) in charge of marketing prioritization efforts. Even though individual informants may not possess a comprehensive, unbiased view of the entire organization and its environment (Reinartz, Krafft, and Hoyer 2004) we accept this risk mainly because the information we are seeking in this survey is predominately of an objective rather than a subjective nature. Furthermore, securing a satisfactory response rate in this kind of study is difficult. Hence, collecting data from multiple informants within each participating business unit would severely reduce the size of the sample and the kind of broad cross-sectional study that we intended to perform would not be feasible.

The target population of the study is firms' commercial function, i.e. the part of the organization where strategic and operational customer management decisions are performed regularly. This is the reason why the survey population constitutes the overall responsible commercial directors from the largest firms in Denmark and Sweden. Large firms are expected to be more inclined to adopt sophisticated decision tools (e.g., Bjørnenak 1997; Malmi 1999). We therefore decided to manually collect contact information for commercial directors from the

[2] No significant difference between Denmark and Sweden was expected and the inclusion of a country dummy in or regression model confirmed this expectation as the results were not affected by the incorporation of this dummy.

1,000 largest firms in Denmark and the 1,000 largest firms in Sweden respectively (based on revenues). 455 firms were excluded from the population mainly because contact information was not attainable or due to firm policy of non disclosure of employee e-mail addresses. This left us with 1,545 informants evenly distributed between Danish and Swedish firms to whom we sent a cover letter and a hyperlink to the online questionnaire per e-mail.

To minimize the risk of non-sampling error in terms of *response error* (i.e., to ensure face validity and construct validity) we tested the questionnaire prior to launch across three test-groups (Dillman 1999): Six academic colleagues from marketing and accounting departments, nine business managers mainly from marketing/sales, and five management consultants who with insights on a broad range of industries helped uncover context-specific misunderstandings. To minimize the risk of non-sampling error in terms of *non-response error* we executed three rounds of follow-up e-mailings to all informants during the month following the distribution of the questionnaire. Subsequently, we selected a random subsample of approximately 350 non-responders who were re-contacted personally by phone before we re-sent them the questionnaire. A follow-up process was also carried out by phone. All in all this yielded a gross sample of 255 observations and an effective sample of 218 applicable responses (with no missing observations) corresponding to an effective response rate of 14%. This is an acceptable response rate for cross-sectional samples (Churchill 1991) and is within the range that recent similar survey studies in marketing have achieved (e.g., Homburg, Droll, and Totzek 2008; Palmatier, Gopalakrishna, and Houston 2006; Reinartz, Krafft, and Hoyer 2004).

A sample of this size is sufficiently large to draw statistical inferences and to capture a broad cross-section of firms across industries. Sample sizes of 2-300 observations are also usually sufficient to achieve satisfactory face validity in court (Morgan 1990).

However, it is still important to analyze the sample for non-response bias. In order to assess any non-response error in the sample we therefore performed two analyses. First, we compared the sample characteristics in terms of industry and size (see Table 2). Although t-tests revealed that two industries (industrial products and transportation) are overrepresented in the sample the sample still consists of a broad cross-section of industries. Furthermore, the sample's size distribution matched well with that of the total survey population constituting all top 2,000 firms with no significant differences between firms represented in the sample and the rest of the total survey population. Second, we used Armstrong and Overton's (1977) extrapolation method comparing the mean values across focal variables of early and late respondents. The results are summarized in Table 3. Our t-tests revealed a significant difference between mean values for early and late informants' responses regarding the number of years CPM has been used as late informants had used CPM in a shorter period of time. This indicates that firms that have used CPM for longer periods of time may be overrepresented in our sample. However, as we did not detect any systematic differences between early and late responses across the other variables, and since the sample composition all in all seems to correspond well with that of the total survey population we conclude that non-response bias is unlikely to be a major issue in our analyses.

Objective firm performance data for our dependent variable was collected from secondary sources partly to avoid measurement error derived from subjective biases hereby also mitigating common method variance (Birnberg, Shields, and Young 1990); and partly to establish a fit with our business unit level of analysis (Van der Stede, Young, and Chen 2005). Data was obtained from company financial reports via the Greens (Denmark), NNE (Denmark) and Retriever (Sweden) accounting databases.

TABLE 2
Sample vs. Population Composition (percentage-split)

	In Sample	*Not in Sample*	*Survey Population*
A: Industry	*(n = 218)*	*(n = 1,782)*	*(n = 2,000)*
1. Industrial Products*	29*	17	19
2. Transportation*	12*	7	7
3. Construction & Building Materials	12	10	10
4. Consumer Products	8	11	11
5. Services	9	12	11
6. IT & Telecom	8	10	10
7. Chemicals (incl. Pharma/Medical)	5	7	7
8. Retailers	5	7	7
9. Financial Institutions	5	7	6
10. Energy	3	5	5
11. Others	4	7	7
* $p < 0.05$			
B: Annual Revenues (in DKK mio.)			
< 1,000	54	56	56
1,000 - 2,499	21	23	23
2,500 - 4,999	10	10	10
5,000 - 9,999	6	5	5
10,000 - 20,000	4	3	3
> 20,000	5	3	3
Mean (DKK mio.)	4,025	3,117	3,218
Median (DKK mio.)	897	828	839
* $p < 0.05$			
C: Position of Informants			
Managing Director / CEO	20		-
Marketing/Sales Director or VP	39		-
Marketing/Sales Manager	18		-
Business Development Director	6		-
Finance Director or Manager	4		-
Business Development Manager	3		-
Others	4		-
Missing	6		-

TABLE 3

Comparison of early and late responses

Variable	*Response*	*N*	*Mean*	*S.D.*
ROA (PERF)	Early	109	3.02	12.78
	Late	109	4.64	16.58
CPM Model Use (CPM)	Early	109	0.36	0.48
	Late	109	0.26	0.44
CPM Model Age (AGE)*	Early	109	3.49*	6.85
	Late	109	1.63	4.09
Product Focus (PROD)	Early	109	2.27	1.17
	Late	109	2.23	1.25
Sales Growth (GROW)	Early	109	1.79	12.23
	Late	109	1.61	12.88
Variability in return (RISK)	Early	109	6.42	5.79
	Late	109	6.18	5.63
Ln(Sales) (SIZE)	Early	109	20.97	1.32
	Late	109	20.93	1.21

*$p < 0.05$

4.1 Variable measurement

The dependent variable (performance) is measured as the firm's return on assets (ROA) in 2009 defined as operating profits in 2009 relative to average total assets (2008-09). This measure is consistent with previous customer-related performance studies in marketing (Han, Kim, and Srivastava 1998; Reinartz, Krafft, and Hoyer 2004).

The independent focal variables are self-reported measures (see Appendix A for a reprint of the complete online questionnaire and consult the Synopsis section, Table 1, p. 27 for identification of the questions that apply to this article). CPM-use (CPM) is a dummy variable indicating whether the firm had adopted any kind

of CPM model by 2009. Informants were asked whether some kind of single-period historical profits per customer (CPA) and/or whether some kind of forecasted future profits per customer (CLV) was being measured and used for resource allocation purposes. In both cases CPA and CLV were carefully defined (in a way similar to Ax, Greve, and Nilsson 2008) in order to minimize the risk of non-sampling error in terms of response error. All responses where the informant indicated that the firm was currently using or had decided to start using CPA, CLV or both in the near future were labeled as "adopters" while all other responses were labeled as "non-adopters" (see questions Q3 and Q8 respectively in Appendix A)[3].

The number of years that the firm has used CPM (AGE) was computed based on a self-reported estimate of the year that CPM was implemented at the firm. Product/brand investment (PROD) is a composite average of the respective, self-reported approximate advertising intensity (annual advertising spending relative to annual sales) and R&D intensity (annual R&D spending relative to annual sales) of the firm. Both advertising intensity and R&D intensity were measured on a 7-point scale from '1' = "1% or less" to '7' = "More than 10%". Any missing values were substituted by the industry average reported by peers in the same industry (31 observations (14%) for advertising intensity and 51 observations (23%) for R&D intensity).

The control variables are all objective measures obtained from secondary sources (annual reports). SIZE is the natural logarithm to annual sales in 2009[4], GROW is the three-year compound annual growth rate during the period 2006-09, RISK is measured as the standard deviation in ROA during the period 2006-09,

[3] Due to the fact that the year of analysis is 2009 we only included firms that indicated that they had adopted CPA and/or CLV by that year. Therefore, there is no issue with regards to the 'intention to adopt' element embedded in the question. Hence, only firms adopting in the year when the data was collected (2010) will potentially be 'intentional adopters' rather than actual adopters.

[4] Applying Ln (Assets), another widely used proxy for size, yielded similar results in the regression analysis

and finally, INDUSTRY categorizes the firm in one of 11 industry codes by matching SIC 3-digit codes, and Swedish and Danish industry classifications.

4.2 Model specification and estimation

The specification of our model is presented in equation (1). β_1 represents the direct effect on performance of adopting CPM models for resource allocation decision purposes (*H1*), β_2 represents the moderating effect of the number of years the CPM model has been in use at the firm (*H2*), β_3 represents the main effect of product/brand investment[5] and β_4 represents the moderating effect of product/brand investment on the CPM-performance link (*H3*). γ represents control variable effects (other than industry effects) and δ_i represents the effect for industry *i*:

$$(1)\ PERF = \alpha + \underset{(+)}{\beta_1\ CPM} + \underset{(-)}{\beta_2\ AGE} + \beta_3\ PROD + \underset{(-)}{\beta_4\ CPMxPROD} +$$

$$+ \underset{(+)}{\gamma_1\ GROW} + \underset{(+/-)}{\gamma_2\ RISK} + \underset{(+)}{\gamma_3\ SIZE} + \delta_i\ INDUSTRY_i + \varepsilon_1$$

, where

- PERF = Return on Assets (ROA) = Operating Profit (2009) / Assets Total (avg. 08-09)
- CPM = Self-reported indication of CPM use (dummy)
- PROD = Index of self-reported Advertising and R&D intensities
- AGE = Self-reported indication of the years of CPM use (0 = not implemented by 2009)
- GROW = Compound Annual Growth Rate (2006-09)
- RISK = Standard deviation in ROA (2006-09)
- SIZE = Natural Logarithm to annual sales (2009)
- $INDUSTRY_i$ = Industry dummies, Industry *i*

[5] The direct effect of of PROD is included in the model although no theoretical relationship with performance is hypothesized. This is done to ensure that we do in fact capture an interaction effect between CPM and PROD and not just a direct effect of PROD (Hartmann & Moers 1999)

All self-reported measures are specified in the reprint of the questionnaire in Appendix A (see the Synopsis section, Table 1, p. 27 for identification of the particular questions that apply to this article).

5. Results

Table 4 provides summary statistics and a correlation matrix for the variables in model (1). Table 4 reveals that mean ROA is substantially lower for non-adopters (3.0%) than for adopters of CPM (5.7%) and that CPM adopters experienced lower annual growth rates than non-adopters. No essential differences are noticed on any of the other variables in the sample across adopters and non-adopters.

In order to be able to interpret the main effect of CPM use on firm performance we centered the PROD variable around its mean (Hartmann and Moers 1999).

Our model (1) was estimated using moderated regression analysis. Due to our cross-sectional data set we used White standard errors (White 1980) to adjust for any potential heteroscedasticity issues.

TABLE4
Summary Statistics and Correlation Matrix

A: Summary Statistics

	CPM Adopters n = 67					*CPM Non-Adopters n = 151*					*Total Net Sample n = 218*				
Variable	*Freq.*	*Mean*	*Standard Deviation*	*Min.*	*Max.*	*Freq.*	*Mean*	*Standard Deviation*	*Min.*	*Max.*	*Freq.*	*Mean*	*Standard Deviation*	*Min.*	*Max.*
Performance (PERF)	-	5.7	19.8	-34.6	135.9	-	3.0	11.9	-50.8	75.0	-	3.8	14.8	-50.8	135.9
CPM Model Use (CPM)	-	1	0	1	1	-	0	0	0	0	-	0.31	0.46	0	1
CPM Model Age (AGE)	-	8.3	7.6	1	30	-	0	0	0	0	-	2.6	5.7	0	30
Product Focus (PROD)	-	2.3	1.3	1.0	6.5	-	2.2	1.2	1.0	6.5	-	2.2	1.2	1.0	6.5
Sales Growth (GROW)	-	-0.8	13.0	-43.7	43.4	-	2.8	12.2	-31.5	41.4	-	1.7	12.5	-43.7	43.4
Variability in return (RISK)	-	6.2	5.4	0.3	27.5	-	6.3	5.8	0.3	37.7	-	6.3	5.7	0.3	37.7
Ln(Sales) (SIZE)	-	21.1	1.3	19.0	24.6	-	20.9	1.2	19.2	25.3	-	21.0	1.3	19.0	25.3

B: Correlation Matrix

Variable	**PERF**	**CPM**	**AGE**	**PROD**	**CPMxPROD**	**GROW**	**RISK**	**SIZE**
PERF	*1.00*							
CPM	0.08	*1.00*						
AGE	-0.08	0.67**	*1.00*					
PROD	0.02	0.05	0.05	*1.00*				
CPMxPROD	0.05	0.84**	0.58**	0.35**	*1.00*			
GROW	0.23**	-0.13*	-0.14**	0.09	-0.1	1.00		
RISK	-0.26**	-0.01	0.06	-0.04	-0.03	-0.25**	*1.00*	
SIZE	0.1	0.05	0.04	0	0.05	0.15**	-0.25**	*1.00*

Note: Pearson correlation coefficients

** $p < 0.05$

* $p < 0.10$

Table 5 provides the results of model (1). The adjusted R^2 of 0.20 is satisfactory compared to other cross-sectional studies of relationship marketing's effects on performance (e.g., Palmatier, Gopalakrishna, and Houston 2006; Reinartz, Krafft, and Hoyer 2004).

TABLE 5
Regression Results - Base Model

A: Model Statistics

	N	218
	Adjusted R^2	0.20
	F Statstic	4.11
	d.f.	17
	p value	<.0001

B: Parameter Estimates

Variable		*Coefficient*	*Estimate*	*Standard Error*	*t-value*	*VIF*
	Intercept	α	-11.67	16.06	-0.73	
Main Effects	CPM Model Use (CPM)	β_1	7.53	3.95	1.91**	2.04
	Product Focus (PROD)	β_3	-0.32	0.87	-0.37	1.98
Moderator	CPM Model Age (AGE)	β_2	-0.47	0.21	-2.23**	1.94
	CPM x PROD	β_4	-1.79	1.23	-1.46*	1.57
Control Variables	Sales Growth (GROW)	γ_2	0.18	0.07	2.68***	1.22
	Variability in return (RISK)	γ_3	-0.57	0.20	-2.8***	1.17
	Ln(Sales) (SIZE)	γ_4	0.48	0.74	0.64	1.18
	Industry 1 - Industrial Products	δ_1	6.62	1.89	3.5***	6.25
	Industry 2 - Transportation	δ_3	7.85	2.35	3.35***	3.90
	Industry 3 - Construction	δ_2	6.77	2.46	2.75***	3.92
	Industry 4 - Consumer Products	δ_4	7.42	1.95	3.8***	3.23
	Industry 5 - Services	δ_5	5.28	2.36	2.24**	3.20
	Industry 6 - IT & Telecom	δ_6	9.05	2.74	3.3***	3.39
	Industry 7 - Chemicals	δ_7	13.25	2.88	4.59***	2.54
	Industry 8 - Financial Institutions	δ_8	-1.86	2.18	-0.86	2.18
	Industry 9 - Energy	δ_{10}	3.48	2.64	1.32	2.03
	Industry 10 - Retailers	δ_9	26.56	11.29	2.35**	2.45

*p < 0.10; **p < 0.05; ***p < 0.01

Note: One-tailed significance levels are reported for all variables except "AGE" and industry dummies (two-tailed);
Standard Errors and t-values are heteroscedasticity consistent estimates (White 1980);
"Others" is the reference industry and is the least profitable industry group

We performed one-tailed tests for hypotheses *H1* and *H3* as these are unidirectional hypotheses. However, hypothesis *H2* was tested via a two-tailed test as this hypothesis (decreasing performance effect over time) is challenging the conventional learning curve based arguments that knowledge is cumulative and that the positive performance effect will therefore increase over time as firms progress along the learning curve. Our first hypothesis (*H1*) stated that CPM model use for resource allocation decision purposes would have a direct, positive effect on firm financial performance. We find a statistically significant positive relationship between CPM use and firm ROA in 2009 ($\beta_1 = 7.53$, $p < 0.05$). This means that we cannot reject the hypothesis that CPM adopters generally perform better than non-adopters of CPM models on the basis of this data set.

Our second hypothesis (*H2*) addressed the sustainability of the CPM-performance association over time expecting a declining effect. This hypothesis (*H2*) was also supported as we found a significant negative association between the number of years firms had used CPM and firm ROA ($\beta_2 = -0.47$, $p < 0.05$)

Finally, we hypothesized that firms investing more heavily in products/brands would experience a less positive performance effect of using CPM models for resource allocation purposes. We also found support for this hypothesis (*H3*) through a statistically significant negative interaction effect (CPMxPROD) ($\beta_3 = -1.79$, $p < 0.10$).

All control variables (except size) and all industries (except financial institutions and energy) showed statistically significant relationships with firm performance.

Given Scandinavian countries' heavy reliance on and involvement in the global economy a significant share of the firms operating in the Scandinavian countries are subsidiaries of global corporations. In fact 40% of our sample constitutes subsidiaries of a foreign corporate owner.

Although these business units are a natural part of the Scandinavian economies they pose potential issues to the dependent variable (PERF) in our analysis in two important ways. First, local subsidiaries of global corporations may operate under transfer pricing practices that arbitrarily skew reported earnings in ways so that the underlying operational performance of the business unit is not reflected properly. Second, the asset base of local subsidiaries may be influenced by decisions regarding the global manufacturing setup hereby distorting the comparability with the consolidated accounts of Danish or Swedish companies.

In order to test the robustness of our results we therefore isolated the 131 firms (60%) that were not part of an international group with an ultimate foreign owner and repeated the moderated regression analysis on this sub-sample of independent firms.

The results of the moderated regression analysis on this reduced sample are outlined in Table 6. As is evident from this table the reduced sample explains slightly more of the variation in PERF (Adjusted R^2 increases from 0.20 to 0.24) despite the lower sample size. Additionally, we observe that the relationships between our three focus variables (CPM, AGE and CPMxPROD) and the dependent variable (PERF) are still significant and the signs are identical with our previous results. Hence, our three hypotheses can still not be rejected on the basis of this reduced data sample and the corporate affiliation therefore does not seem to be an issue.

TABLE 6
Regression Results - Reduced Sample (Excluding International Subsidiaries)

A: Model Statistics

N	131
Adjusted R^2	0.24
F Statstic	3.47
d.f.	17
p value	<.0001

B: Parameter Estimates

Variable		*Coefficient*	*Estimate*	*Standard Error*	*t-value*	*VIF*
	Intercept	α	-8.91	17.98	-0.5	
Main Effects	CPM Model Use (CPM)	β_1	13.42	6.15	2.18**	2.21
	Product Focus (PROD)	β_3	-0.73	0.91	-0.8	1.78
Moderator	CPM Model Age (AGE)	β_2	-0.71	0.28	-2.54**	1.94
	CPM x PROD	β_4	-2.42	1.68	-1.44*	1.57
Control Variables	Sales Growth (GROW)	γ_2	0.17	0.08	2.17**	1.27
	Variability in return (RISK)	γ_3	-0.42	0.30	-1.41*	1.22
	Ln(Sales) (SIZE)	γ_4	0.39	0.86	0.45	1.16
	Industry 1 - Industrial Products	δ_1	2.88	2.80	1.03	7.31
	Industry 2 - Transportation	δ_3	4.11	2.79	1.47	4.49
	Industry 3 - Construction	δ_2	6.26	2.10	2.98***	4.67
	Industry 4 - Consumer Products	δ_4	0.41	4.52	0.09	3.41
	Industry 5 - Services	δ_5	0.97	2.56	0.38	4.28
	Industry 6 - IT & Telecom	δ_6	6.71	3.17	2.12**	3.21
	Industry 7 - Chemicals	δ_7	9.16	4.26	2.15**	2.74
	Industry 8 - Financial Institutions	δ_8	-4.51	3.66	-1.23	2.84
	Industry 9 - Energy	δ_{10}	-0.18	4.13	-0.04	3.07
	Industry 10 - Retailers	δ_9	32.79	14.51	2.26**	2.89

*p < 0.10; **p < 0.05; ***p < 0.01

Note: One-tailed significance levels are reported for all variables except "AGE" and industry dummies (two-tailed);
Standard Errors and t-values are heteroscedasticity consistent estimates (White 1980);
"Others" is the reference industry and is the least profitable industry group

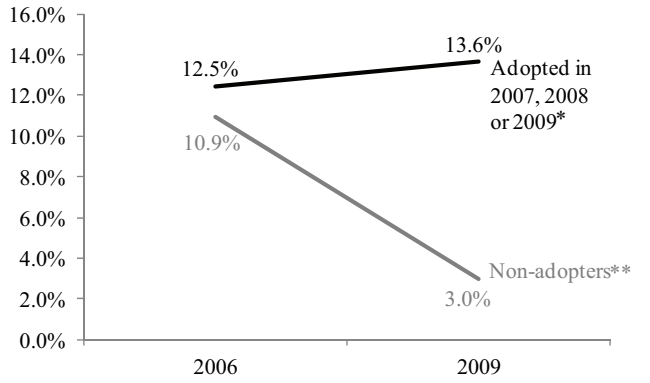
6. Discussion and research implications

This study was performed to test the relationship between CPM model use and firm financial performance over time as well as in different marketing contexts. The cross-sectional data provide empirical support in favor of a general positive association between CPM model implementation and firm performance. This supports prior case-based findings suggesting that the structured use of CPM models for resource allocation purposes causes superior financial performance.

However, as in any cross-sectional study the ability to draw causal inferences is limited as the specific point in time of the analysis makes temporal priority difficult to establish based on the empirical data per se (Pinsonneault and Kraemer 1993). Hence, although the data supports our theory-based hypotheses we cannot, based on our model, completely rule out the notion that causality may be reversed, i.e., that high-performing firms are more inclined to adopt managerial innovations such as CPM models.

In order to strengthen our argumentation for the direction of causality we therefore perform a post hoc analysis comparing the development in financial performance during the years 2006-2009 for the cohort of firms that had not adopted CPM by 2006. We split this cohort into two sub-samples: One sub-sample containing firms that eventually adopted CPM either in 2007, 2008 or 2009 (24 eligible observations) and one sub-sample containing firms that did not adopt CPM throughout this period (151 eligible observations). The results reveal a remarkable decline in ROA from 10.9% in 2006 to 3.0% in 2009 among non-adopters of CPM models for resource allocation purposes whereas the firms that started implementing CPM models during the years 2007-09 experienced a slight increase in ROA from 12.5% in 2006 to 13.6% in 2009 (see Figure 2). A t-test confirms that the difference between these two developments in ROA is significantly different from zero ($p < 0.01$).

FIGURE 2
Development in ROA for Non-adopters vs. Adopters in 2007-09



* N = 24
** N = 151

The adoption of CPM models thus appears to have facilitated the maintenance of a certain financial return as the financial recession set in towards the end of the last decade whereas non-adopters' returns were declining rapidly. This supports our thesis that it is in fact the implementation of CPM models that leads to strong financial performance and not the other way around. Furthermore, this finding suggests that CPM models are not only performance enhancing per se but may also increase financial robustness in times of macroeconomic crises Future field-study research could look into how the structured measurement and management of customer profitability reduces the downside risks associated with declining demand caused by macro-economic downturns.

Another implication of our study is that the positive performance effect caused by CPM adoption can be difficult to sustain over time. Hence, we find that later adopters achieve larger performance effects of using CPM models than

earlier adopters. This finding simultaneously supports the deterioration of knowledge arguments as well as arguments based on scale economies of learning for mediating institutions regarding the transfer of technology across organizations presented in our hypothesis development paragraph (*H2*). Future studies could look into how these two factors influence the use of CPM models over time. The way CPM models are implemented by firms in terms of the way customer management routine changes are institutionalized is particularly interesting. Longitudinal research designs are therefore required. Case studies comparing the implementation of CPM models with and without the assistance of external change agents (e.g., consultants) over longer periods of time could even incorporate both effects in the same research design. An important derived issue relates to how the CPM implementation approach selected subsequently affects the sustainability of the positive performance effects achieved by using CPM models.

Somewhat related to this is the effect of the evolutionary change of CPM models. CPA has changed quite radically with the advent of Activity-Based Costing (ABC) and CLV models have gone from basic deterministic frameworks (e.g., Berger and Nasr 1998; Dwyer 1997) to more advanced stochastic simulation models (e.g., Donkers, Verhoef, and de Jong 2007; Venkatesan, Kumar, and Bohling 2007). If early adopters do not update marketing practices like CPM models on a regular basis and if the data and insights provided by CPM models are not continuously utilized via deployment of profitability-based customer management strategies there appears to be a latent risk, that the competitive advantage that these models originally provided, will eventually disappear. Future research in the marketing discipline could look into what kind of precautions marketing managers take in order to continuously refine and update their marketing tools in order to stay aligned with the development of new, efficient

marketing management techniques in academia as well as in the business environment.

In addition to the deteriorating performance effect of CPM use over time we also find the marketing context to moderate the relationship between CPM use and firm performance. The greater the investments in brand building and product development activities the less positive is the financial performance effect of using CPM models for resource allocation purposes. This finding is important in the sense that it modifies the general perception that using CPM models is a universal solution to marketing management. In direct marketing contexts with a non-anonymous relationship between buyers and sellers and where brands and/or R&D play a more marginal part in firms' value creation process CPM may indeed be extremely value creating. However, when firms' brands must reach millions of anonymous consumers through various distribution channels or when a few key accounts must be retained and expanded through continuous product innovation the implementation of CPM models will add less value. Linking customer value to brand value has been suggested as a path that could potentially alleviate CPM use in product/brand intensive business contexts (Kumar 2008; Leone et al. 2006). It would be interesting to find out what the impact of establishing such a link would have on the performance effect of using CPM in more product/brand focused firms.

Despite this moderating effect of marketing context it is still puzzling from an efficient choice perspective that CPM models are not more commonly used given these models' superior performance effects. In fact in our gross sample (including all completed questionnaires with or without missing values (n=255)) only 38% of managers reported that they used some kind of CPM model (CPA, CLV or both) for resource allocation purposes. This way, our findings correspond well with research on the diffusion of managerial innovations across organizations challenging the traditional rational choice perspective by proposing more social or

emotional explanations for adoption patterns for new management practices (Abrahamson 1991; Ansari, Fiss, and Zajac 2010; Ax and Bjørnenak 2005; Malmi 1999; Malmi 2001; Sturdy 2004).

Ansari, Fiss and Zajac (2010) identify three forms of fit that may all influence managerial innovation adoption: Technical fit, cultural fit and political fit. They argue that a lack of fit on these three dimensions makes outright adoption of a managerial innovation too costly and that managers will therefore either adapt the managerial innovation to achieve better fit (see also Ax and Bjørnenak 2005) or eventually abandon the idea. Future research on the diffusion of CPM models could look into what role technical, cultural and political barriers play when deciding whether to implement CPM models across firms as well as whether contextual factors influence their relative importance.

7. Managerial implications

The ability to measure and manage the profitability of customer relationships is a financially rewarding practice to implement for managers across industries. Managers with the goal of increasing shareholder value will therefore generally benefit from pursuing CPM model implementations. Furthermore, by communicating around the initiation of customer profitability measurement model implementations managers can signal to the stock market that future improvements in financial performance are likely, which in turn should have a positive impact on stock price.

That being said CPM models are not equally efficient across marketing contexts. In some industries the ability to create a competitive edge via continuous product innovation and brand building is more value creating than the differentiation of customer service levels and direct marketing contacts. Consequently, managers should give CPM models the kind of attention they

deserve depending on the relative importance of satisfying latent vs. expressed customer needs in their industry.

Finally, our study shows that the financial benefits of managing customers for profits can be difficult to preserve over time. Therefore, a crucial part of the implementation and integration of CPM practices is to institutionalize tasks and procedures as quickly as possible hereby embedding the learnings in the organizational DNA rather than in key employees where important knowledge is at the risk of being lost if the employee leaves the company. Simultaneously, managers must make the necessary arrangements in an attempt to keep CPM models technologically and conceptually up to date by monitoring the ongoing development within this field. Further, innovations in methods and strategies have to be monitored so that the firm can always be on the cutting-edge of implementing the best practices available. Failing to do so may jeopardize the competitive edge that CPM users achieve.

8. Limitations

Although our study yields some interesting findings there are a few limitations that need to be considered. First, our analysis focused primarily on the general performance effects of CPM use. However, despite the decent fit achieved by our model we cannot rule out the possibility that other factors may be correlated with both CPM use and performance. Mediating constructs (e.g., marketing performance) and moderating constructs (e.g., customer performance management capabilities or the quality of top management) may play some part in this relationship. Future studies could look into expanding our model by bringing in mediating and/or additional moderating constructs hereby gaining further insights on the ways CPM adoption influences firm performance.

Second, we focused on large Scandinavian firms. Future research could replicate our study on samples from larger economies (e.g., USA, UK, Germany and Japan) as well as in a true small cap setting to test whether the results hold there as well.

Third, successful CPM is a cross-functional exercise. However, our study focused on the customer-facing function in charge of commercial prioritization strategies. Future studies could look into the performance effects of inter-functional collaboration across finance, marketing and service departments. This would provide valuable insights on the importance of including different functions in the implementation and use of CPM models across firms.

Finally, it could be interesting for future field-study research to explore which barriers are most significant among firms implementing CPM and how firms deal with overcoming these barriers. Additionally, longitudinal field studies are well suited for investigating how tasks and processes underlying managerial innovations such as CPM evolve over time. An important element herein is to explore the activities firms perform to monitor the development of marketing practices and how this information can be used to upgrade existing marketing metrics and models. This could in turn add much more knowledge on why the competitive edge provided by CPM models is inclined to deteriorate in order to understand how this effect is better preserved over time.

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Article #3

A contingency-based survey of service complexity's and competition's influence on Customer Profitability Analysis sophistication

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Abstract

Despite a rising focus on measuring and managing customer profitability among management accounting practitioners, management accounting research is remarkably silent on the topic. This paper seeks to shed more light on the use of customer profitability measurement models in practice by investigating the environmental factors influencing the degree of Customer Profitability Analysis (CPA) model sophistication deployed for decision making purposes. Based on cross-sectional survey data from CPA-adopters in Sweden and Denmark the author finds that increasing customer service complexity leads to the application of more sophisticated CPA models. However, competitive intensity is found to moderate this relationship negatively. Hence, increasing customer service complexity has a larger effect on CPA model sophistication in markets characterized by weak/moderate competition. Additionally, the paper contributes to the customer performance management literature by conceptualizing the CPA sophistication construct and to general contingency-based research by validating the service complexity construct empirically.

Key Words: Customer Accounting, Customer Profitability Analysis (CPA), Contingency Theory, Customer Service Complexity, Competition, Cost System Sophistication

1. Introduction

Accounting for customer relationship profitability has been a key priority for management accounting practitioners for some time. A recent survey on customer value management performed by the Chartered Institute of Management Accountants (CIMA) among their members concluded that customer profitability measurement techniques are "becoming a must have within many organizations" and that they provide "an interesting opportunity for management accountants to add considerable value and work alongside their colleagues in marketing, sales and strategy" (CIMA 2008, p. 5). This point was already raised more than a decade ago when customer profitability and satisfaction were identified as the single most important current management priority in a survey of American and Australian managers (Foster and Young 1997).

In the management accounting literature research on the use of customer accounting (CA) is scarce (McManus and Guilding 2008) despite its importance to practice and despite the fact that its potential has been repeatedly demonstrated (e.g., Cardinaels, Roodhooft, and Warlop 2004; Kaplan and Narayanan 2001; Niraj, Gupta, and Narasimhan 2001). In fact only one empirical management accounting study has, to the best of the author's knowledge, explored determinants of CA use from a cross-sectional perspective. Guilding and McManus (2002) did a cross-sectional survey among marketing managers and management accountants in Top 300 listed Australian companies and found that CA practices (retrospective Customer Profitability Analysis in particular) were actually more widely used than first anticipated.

Little is thus known about CA practices in general and the factors that influence their design and use in particular. This study therefore seeks to expand the CA contingency-framework thereby contributing to contingency-based

research in management accounting as well as the growing research stream on customer performance measurement in the marketing discipline in two ways.

First, the paper adds knowledge on the degree of sophistication regarding a specific CA technique: Customer Profitabiliyt Analysis (CPA). Recent contributions in the marketing literature have suggested a dichotomous distinction between the *retrospective* CPA practice and the *prospective* Customer Lifetime Value (CLV) practice (Gleaves et al. 2008; Pfeifer, Haskins, and Conroy 2005). Focusing on one of these is necessary as the design of CPA and CLV models are expected to be influenced differently by different contingency factors (Holm, Kumar, and Rohde Forthcoming). Even though CLV is an interesting CA practice that has received considerable attention in the marketing literature (see Gupta et al. 2006; Villanueva and Hanssens 2006 for recent reviews) it is considerably less prevalent in practice (CIMA 2008; Guilding and McManus 2002). Focusing on CPA is therefore expected to improve the prospects of gathering a reasonable sample size as well as generating more generally relevant findings.

The paper contributes to the body of knowledge on customer performance management techniques by offering a novel conceptualization of CPA sophistication. Rather than merely studying the extent of use of CPA this study investigates the degree of sophistication deployed. Recent research contributions on the adoption of sophisticated product costing systems argue in favor of a continuum rather than the dichotomous "adopted/not adopted" approach applied in earlier surveys of e.g. ABC (Al-Omiri and Drury 2007; Drury and Tayles 2005) and Malmi (2004) also suggests that CPA practices can be more or less sophisticated. Therefore, this paper conceptualizes CPA sophistication along three dimensions: The level of aggregation (individual accounts vs. segments), range of costs, and number of cost pools and cost drivers. Future studies can use and expand on this conceptualization in order to establish a more profound

understanding on the way customer profitability is measured and managed across organizations.

The second contribution of the study concerns the investigation of two important environmental constructs' direct *and* interaction effects on the degree of CPA model sophistication. The study hereby refines the environmental dimension of the contingency perspective on the use of CA practices across companies. Hence, the impact of the environmental constructs *customer service complexity* and *competition* on CPA sophistication are demonstrated empirically. A direct, positive association is found between customer service complexity and CPA sophistication whereas no significant direct effect of competition is found. Instead competition negatively moderates the positive association between customer service complexity and CPA sophistication. This indicates that competition plays a more subtle role when it comes to its impact on *customer* cost system rather than *product* cost system sophistication. Moreover, this finding demonstrates the potential of exploring interaction effects among contextual variables in contingency-based research.

Management accounting researchers can build on these findings in the pursuit of a more comprehensive contingency theory explaining the sophistication of management accounting systems in general and customer performance measurement models in particular. Moreover, practitioners considering implementing CPA models can use the findings as guidance on the level of sophistication that fits their organizational context.

In addition the empirical validation of the customer service complexity construct also contributes to contingency-based research. This finding is useful for future contingency-based studies regarding customer-related constructs where the customer service complexity measure deployed in this study can be adopted.

The rest of the paper is organized as follows: Initially, CPA model sophistication is conceptualized based on a review of the CPA literature. Next,

hypotheses on the relationship between CPA model sophistication and contingency factors are developed. Subsequently, research design, variable measurement and model specification is discussed followed by a presentation of the results. The paper is concluded by a discussion of the study's implications and limitations.

2. Customer Profitability Analysis model sophistication

The development of a conceptual framework for CPA model sophistication is based on a review of the progression of CPA research in the marketing and the management accounting literatures. It should be noted that, *sophistication* is here defined merely as an expression of how advanced techniques firms apply to estimate customer profitability rather than a normative guideline stating that more is always better.

In the late 1980s discussions about the merits of measuring and managing individual customer profitability reemerged (Bellis-Jones 1989; Howell and Soucy 1990; Shapiro et al. 1987; Ward 1992). One general message embedded herein was that one dollar of sales did not necessarily contribute equally to net profits as customer needs were getting increasingly heterogeneous leading to increasingly different cost-to-serve across customers. Consequently, the applicability of customer turnover as an unbiased estimator of customers' net financial worth to the firm was challenged.

Creating transparency on all revenues, costs, assets and liabilities caused by activities required for servicing customers across customer-facing functions became the focus of attention. Simultaneously, new innovations within managerial accounting techniques, most notably Activity-Based Costing (ABC) (Cooper 1988; Cooper and Kaplan 1991), were put forward as a viable solution to the

challenge of assigning cost-to-serve to the customers that cause it (Goebel, Marshall, and Locander 1998; Smith and Dikolli 1995).

However, a full-scale ABC-model is not always necessary to support insightful customer management strategies. Storbacka (1997) and Mulhern (1999) demonstrate how focusing on direct costs reveals valuable insights on customer profitability diversity in a financial services and a pharmaceuticals context respectively. Consequently, direct costing and full costing techniques may provide sufficient information to guide resource allocation decision making across customers.

The initial ABC-based CPA case demonstrations emerged concurrently in the management accounting (Noone and Griffin 1999) and the marketing (Niraj, Gupta, and Narasimhan 2001) literatures. Both cases demonstrate how resource expenses are assigned to customers via a two-stage approach. First, resource expenses are split into a number of activity cost pools and subsequently costs are assigned to customers via a set of activity cost drivers. Noone and Griffin (1999) demonstrate the model in a service context whereas Niraj et al. (2001) demonstrate their model for a supply chain distributor. Subsequently, a growing body of contributions has replicated ABC-based case demonstrations in different business contexts in management accounting (e.g., Andon, Baxter, and Bradley 2003; McManus 2007) as well as in marketing (e.g., Guerreiro et al. 2008; Helgesen 2007).

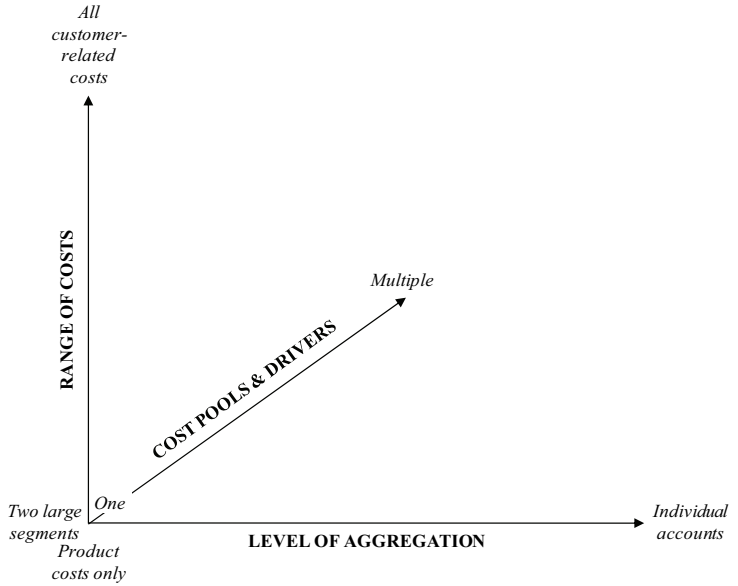
This progression in CPA model research reflects the spectrum of design opportunities with various degrees of sophistication available to managers implementing CPA. Based on this spectrum a conceptualization of the different degrees of CPA model sophistication can be developed.

Three dimensions determine CPA sophistication: First, the costs accounted for (what to assign) range from merely accounting for cost of goods sold at the least sophisticated end to assigning all Sales, General & Administrative (SG&A)

costs that are directly or indirectly caused by the marketing to and servicing of customers across the value chain. Second, the method applied to assign overhead costs that cannot be traced directly to customer on a one-to-one basis (how to assign) depends on the number of cost pools and cost drivers deployed in line with Al-Omiri and Drury (2007) and their conceptualization of product costing sophistication. The more cost pools and cost drivers deployed to assign overhead costs that are not directly traceable to individual customers – the more sophisticated the CPA-model. Third, the level of aggregation that such overhead costs are assigned at can be anything from large segments to individual accounts. The larger the number of units for any given cost objects (e.g., customers or segments) that cost-to-serve components must be assigned to the more sophisticated CPA models will be required to provide unbiased approximations of customer/segment profitability. The individual customer therefore constitutes the ultimate endpoint in the sophisticated end of this spectrum whereas the most aggregated customer segmentation (two segments) constitutes the other.

All this yields a three-dimensional spectrum of CPA model sophistication (see Figure 1). The least sophisticated CPA model (bottom left hand corner of Figure 1) is a model where customer profitability is approximated by sales or gross profits for two segments. Expanding the range of costs by including customer-related services in addition to product costs adds sophistication along one dimension; increasing the number of cost pools and cost drivers when assigning the overhead portion of these costs to customers/segments adds sophistication along a second dimension; and increasing the number of cost objects by assigning costs to a larger amount of customer segments adds sophistication along a third dimension.

FIGURE 1
Three-dimensional conceptualization of CPA sophistication



3. Hypotheses on contingency factors influencing CPA model sophistication

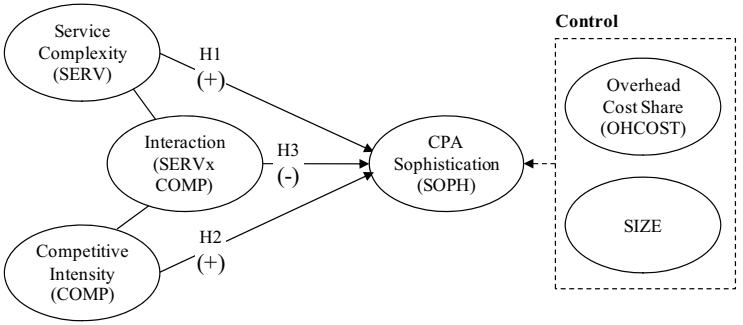
According to the contingency approach in management accounting research there is no panacea for the design of management accounting systems (Otley 1980). Instead firms adapt their decision support systems and control mechanisms to the context in which they operate. Building on this notion the decisions concerning the degree of sophistication selected for CPA model implementation and use will rely on careful consideration of the contextual factors the firm operates under. In organizations where a decision has been made to implement and use CPA it is therefore expected that the degree of CPA model sophistication is

adapted to fit these contextual factors, as rational managers are unlikely to invest resources in sophisticated management accounting systems that do not increase firm performance (Chenhall 2003). This suggests that a selection fit approach (Drazin and Van de Ven 1985; Hartmann 2005) is appropriate and this approach to fit is also the dominant approach deployed by management accounting researchers when studying cost management system sophistication (Al-Omiri and Drury 2007).

Two contextual factors have been identified as particularly influential environmental determinants of cost system sophistication: (1) The degree of task diversity/heterogeneity, and (2) The degree and nature of competition faced by firms (Cagwin and Bouwman 2002; Cooper 1988; Cooper and Kaplan 1991; Karmarkar, Lederer, and Zimmerman 1990).

Figure 2 sets out the hypothesized model. In the following section the hypotheses regarding the contextual variables' influence on CPA sophistication are formulated.

FIGURE 2
A model of environmental factors influencing CPA sophistication



3.1 Customer service complexity

In the marketing literature environmental *diversity, heterogeneity* and *complexity* are used interchangeably and refer to the degree of dissimilarity of the entities dealt with in an organization's task environment (Achrol and Stern 1988; Sheth, Sisodia, and Sharma 2000; Sohi 1996). From a customer perspective this environmental complexity factor can be further divided into a *customer service complexity* and a *customer behavioral complexity* construct in line with Holm et al. (Forthcoming). They argue that customer service complexity and customer behavioral complexity will impact the degree of customer profitability measurement model sophistication differently. Customer service complexity, defined as the degree of diversity in service needs and requirements that invoke differential activities on an organization across customer-facing functions in terms of the number of activities performed as well as the time spent on each activity, is expected to mainly influence the degree of CPA model sophistication. Customer behavioral complexity, defined as the degree of variation in retention durations (relationship length), transaction frequency and value of transactions (relationship depth), and cross-buying behavior (relationship breadth) across the total number of customer relationships a firm serves, will mainly influence the degree of Customer Lifetime Value (CLV) model sophistication deployed (Holm et al. Forthcoming). Therefore, the customer service complexity construct is in focus for the complexity dimension of this contingency study of CPA model sophistication.

High levels of customer service complexity compel large diversity in service needs that must be coped with by firms. Consequently, the resources consumed during the process of servicing customers will vary considerably in environments characterized by high service complexity effectively yielding differences in cost-to-serve – differences that can be substantial (see Helgesen 2007; Kaplan and Cooper 1998; Niraj, Gupta, and Narasimhan 2001).

If firms do not possess sophisticated capabilities in terms of estimating the cost-effects of different service requirements across customers they are unlikely to be able to separate profitable from unprofitable customers in highly complex customer service environments.

This reasoning is in line with former studies of general cost management system sophistication. Bjørnenak (1997) argues that product diversity is the major contributor to product cost distortions in less sophisticated product costing systems (also referred to as "conventional costing systems"). Subsequent research contributions have found significant positive associations between product diversity and product costing system sophistication (Al-Omiri and Drury 2007; Drury and Tayles 2005; Drury and Tayles 2005) as well as between product diversity and the adoption of ABC in general (Krumwiede 1998; Malmi 1999).

By adapting these arguments and findings to a customer context it can be hypothesized that firms adopting CPA models are expected to take customer service complexity into consideration during the design phase and implement CPA models that fit the level of service complexity encountered in their customer environments. A positive direct relationship between customer service complexity and CPA model sophistication is expected and the first hypothesis can thus be stated as follows:

> *Hypothesis H1: There is a positive association between customer service complexity and CPA models sophistication.*

3.2 Competitive intensity

Competitive intensity can be defined as the level of competition for available resources in the environment (Sharfman and Dean 1991). Within this rather broad framing, Khandwalla (1972) previously has provided a conceptualization defining competition as a composite, three-dimensional construct determined by the level

of: (a) price competition; (b) promotion and distribution (marketing) competition; and (c) competition in product quality and variety.

From a customer perspective the competitive intensity construct has been researched as an integrated part of the vast body of research in the marketing literature where the link between market orientation and firm performance has been studied. In this context competition has been defined with respect to the number of options available to customers. Weak competition means that customers will have a limited set of options to choose from (Kohli and Jaworski 1990; Kumar et al. 2011). Consequently, there will be limited pressure on prices, as well as on marketing activities and product quality following Khandwalla's (1972) different dimensions of competition. As competition increases the number of alternative options to satisfy customers' needs and wants increase as well (Kohli and Jaworski 1990; Kumar et al. 2011).

Competition's effect on management accounting system usage and sophistication has been studied rather intensively since the entry of contingency-based studies into management accounting research. There seems to be general agreement that increasing competition warrants more extensive use of more sophisticated management accounting systems for two reasons. First, costing errors are more frequently punished by competitors in environments characterized by fierce competition. Second, margins are generally lower in highly competitive environments where customers have many alternative options which in turn makes costing errors more damaging to firm profits.

Empirical evidence both supports the proposition that increasing competition leads to more extensive use of cost management systems and that it calls for the implementation of more sophisticated cost management systems.

Regarding the *extent of use* of cost management systems Khandwalla (1972, p. 275) shows that "the greater the competition, the greater the need to control costs, and to evaluate whether production, marketing, finance, etc. are operating

according to expectations." Other studies have investigated competition's influence on the extent of management accounting system use as well and have found that "Managers faced with high levels of competition may ask for more and different types of information from their systems before making crucial decisions" (Libby and Waterhouse 1996, p. 147) and that "[I]ncreasing intensity of market competition is associated with increasing managerial use of the Management Accounting System information" (Mia and Clarke 1999, p. 153).

When it comes to cost management system *sophistication* (e.g., the adoption of novel cost management systems like Activity-Based Costing) the evidence is a little less convincing. Although Malmi (1999) finds a significant positive relationship between competition and the use of Activity-Based Costing, Bjørnenak (1997) and Cagwin and Bouwman (2002) find non-significant relationships. Moreover, Drury and Tayles (2005) also fail to find backing in their data for a positive association between competition and cost system sophistication.

One possible explanation for these weak results may be the fact that all of the above studies apply only one or two items to measure competition. This can be problematic as the use of single-item measures for ambiguous latent constructs may lead to reliability issues (Wanous, Reichers, and Hudy 1997). Furthermore, two recent studies where competition was measured using multiple (4) items both found significant positive relationships between competitive intensity and (a) cost system sophistication (Al-Omiri and Drury 2007); and (b) the adoption of target costing (Ax, Greve, and Nilsson 2008) respectively.

More sophisticated means of monitoring costs thus appear to be required as competition intensifies and a greater range of different management accounting systems are being used for decision support in order to establish as accurate cost estimates as possible. One purpose of CPA is to monitor costs at individual customer level. Consequently, it is hypothesized that increasing competition is associated with the implementation of increasingly sophisticated CPA models:

Hypothesis H2: There is a positive association between competitive intensity and CPA model sophistication.

In addition to this direct effect of competition on CPA model sophistication competition is also hypothesized to have a more indirect effect as a moderator of the relationship between customer service complexity and CPA model sophistication.

In non-competitive environments the range of options available to customers is limited. Therefore, supplying firms are able to take advantage of heterogeneous needs and desires by tailoring their offerings and services according to the profit potential different customers constitute. For this purpose sophisticated means of measuring customer profitability will be beneficial to identify highly profitable customers from unprofitable ones. The more diverse the customer needs (i.e., the higher the customer service complexity) the more sophisticated CPA models will be required for these purposes.

As competition intensifies and approaches perfect competition two things happen (Guilding and McManus 2002): First, the range of options available to customers expands which makes competing firms' offerings increasingly similar. Second, firms to a greater extent become price takers making it very difficult to build long-term relationships with customers. Both effects negate the need for a sophisticated CPA model.

For resource allocation decision purposes the level of customer service complexity thus becomes less relevant when designing CPA model sophistication in highly competitive markets as firms will not be in a position to take advantage of the insights generated by these highly sophisticated models by deploying profitability-based customer differentiation strategies and initiatives – regardless of the service complexity encountered due to diversity in customer needs. All this leads to the third hypothesis:

Hypothesis H3: The positive association between customer service complexity and CPA model sophistication is larger in environments characterized by weak competition than in environments characterized by strong competition.

3.3 Control variables

Two additional variables are considered important to include when investigating cost system sophistication because they have been found to explain some of the variation in cost system sophistication: The proportion of overhead costs in a firm's cost structure and the size of the business.

Proportion of overhead costs is a key determinant of cost management sophistication as a larger share of the total cost base hereby cannot be traced directly to cost objects (Cooper and Kaplan 1991; Kaplan and Cooper 1998). Conversely, if overhead costs make up a relatively small proportion of total costs it may not be worthwhile investing in sophisticated accounting methods to allocate overhead costs (Brierley 2008).

The proportion of overhead costs has been included in many empirical studies of cost system sophistication (e.g., Al-Omiri and Drury 2007; Bjørnenak 1997; Booth and Giacobbe 1998; Clarke, Hill, and Stevens 1999; Drury and Tayles 2005; Malmi 1999) albeit with somewhat mixed results. Due to this strong focus on overhead cost proportion in prior research and due to its expected relationship with cost system sophistication this variable is included as a control variable in the model.

The influence of a business' *size* on the sophistication of cost management systems has been studied at different levels in the management accounting literature. The general agreement across these studies is that larger firms adopt more sophisticated management control systems and cost management systems than smaller firms (e.g., Al-Omiri and Drury 2007; Bruns and Waterhouse 1975; Chenhall 2003; Clarke, Hill, and Stevens 1999; Drury and Tayles 2005; Innes and

Mitchell 1995; Khandwalla 1977; Krumwiede 1998; Malmi 1999; Merchant 1981). Firm size is therefore also included as a control variable in the hypothesized model.

4. Research design

A survey instrument was developed and cross-sectional data was collected from large Danish and Swedish companies over the Fall, Winter and Spring 2010/2011. The survey development and data collection were performed with guidance from van der Stede et al.'s (2005) survey development framework for management accounting survey studies as well as Dillman's (1999) general recommendations on survey research.

The study was designed to explain how the sophistication of CPA practices is adapted to fit the environments in which organizations operate. The level of analysis is firm/business unit level. For feasibility reasons a single informant was contacted from each firm. To mitigate validity issues executives from the target population of firms' commercial departments were targeted. With their tenure and expected broad knowledge of the customer management practices deployed these executives were believed to provide the most qualified responses.

To best reflect a target population of commercial departments in large firms the survey population of the study was the Top 1,000 firms (based on revenues) in Denmark and in Sweden respectively. Large firms were targeted in an attempt to maximize the number of CPA adopters in the sample as firm size is expected to be positively correlated with the adoption of sophisticated managerial innovations (e.g., Bjørnenak 1997; Malmi 1999).

Prior to launch the questionnaire was pre-tested among six academic colleagues and fourteen practitioners. This testing served the dual purpose of validating the item scales of the constructs in the study and to avoid any

misunderstandings that could lead to non-sampling error in terms of response error.

Contact information was retrieved for sales & marketing managers/directors from 1,545 firms. For the remaining 455 firms in the survey population it was either (a) impossible to retrieve contact information on relevant contact persons; (b) considered too time consuming to participate in by potential contact persons; or (c) in conflict with corporate policy to participate. So the 1,545 available contacts were e-mailed a link to the online questionnaire.

After having distributed the questionnaire to the potential informants in the population three rounds of follow-up e-mailings were performed to mitigate non-sampling error in terms of non-response bias. However, as these three rounds of follow-up e-mailings only resulted in a total gross sample of 150 completed questionnaires corresponding to a response rate of less than 10% personal phone calls were subsequently initiated to randomly selected firms from the survey population in order to increase the sample. This added an additional 105 completed responses that brought the gross sample up to 255 informants yielding a gross response rate of 17%. Out of the gross sample 11 responses had missing observations leaving 244 relevant responses corresponding to a net response rate of 16%. Of this sample 93 (38%) were using CPA. However, 8 observations were excluded through listwise deletion due to one or more missing scale items (SERV/COMP) yielding a net applicable sample of 85 CPA adopters to be used for this study. Despite the fact that this net sample is well below the 2-300 observations usually recommended (Van der Stede, Young, and Chen 2005) it was derived from a gross sample that falls within this recommended range so the small size of the sample is not critical from a generalization perspective.

Although a response rate of 16% is within the range that is deemed satisfactory for general management surveys (Churchill 1991) and within the 15-20% range that management surveys usually achieve (Menon, Bharadwaj, and

Howell 1996) it is still very low compared to van der Stede et al.'s (2005) recommendations for management accounting research. Therefore, the sample was thoroughly analyzed for non-response bias in two ways.

First, the composition of the part of the gross sample with no missing observations (n = 244) in terms of industry and size (revenues) was compared with that of the total survey population (n = 2,000).

The results of this analysis are outlined in Table 1. Generally, the sample provides a fairly good match with the survey population as a whole in terms of the range of industries represented in the gross sample (panel A in Table 1). Only one industry (industrial products) had an average representation in the sample that was significantly different from its representation in the total survey population ($p < 0.01$; t = 3.73). Although this means that the number of industrial product firms appears to be overrepresented in the data the sample still consists of firms from a broad cross-section of industries as no significant differences were identified for any of the other industries.

A test of the size distribution (annual revenues) across the sample (panel B in Table 1) revealed no significant differences between the gross sample and the total survey population as a whole so the gross sample appears to be representative of the total survey population in terms of firm size distribution.

TABLE 1

Sample vs. Population Composition (percentage-split)

A: Industry	CPA Users (n = 85)	Gross Sample (n = 244)	Not in Sample (n = 1,756)	Survey Population (n = 2,000)
1. Industrial Products*	34	29*	17	19
2. Consumer Products	16	9	11	11
3. IT & Telecom	9	8	10	10
4. Services	8	9	12	11
5. Chemicals (incl. Pharmaceuticals)	7	5	7	7
6. Transportation	8	11	7	7
7. Financial Institutions	6	6	7	6
8. Energy	4	3	5	5
9. Retailers	3	5	7	6
10. Construction & Building Materials	1	10	10	10
11. Others	4	5	7	7

* $p < 0.05$

B: Annual Revenues, DKK mio.				
< 1,000	60	56	57	57
1,000 - 2,499	19	21	23	23
2,500 - 4,999	7	10	9	9
5,000 - 9,999	4	5	5	5
10,000 - 20,000	5	4	3	3
> 20,000	6	4	3	3
Mean (DKK mio.)	3,977	3,750	3,142	3,218
Median (DKK mio.)	844	886	827	839

* $p < 0.05$

C: Position of Informants			
Managing Director, CEO	21	21	-
Marketing/Sales Director or VP	41	40	-
Marketing/Sales Manager	20	17	-
Business Development Director	6	6	-
Finance Director or Manager	5	4	-
Business Development Manager	1	3	-
Others	0	3	-
Missing	6	6	-

TABLE 2
Comparison of early and late responses

Variable	*Response*	*N*	*Mean*	*S.D.*
CPA Sophistication (SOPH)	Early	43	3.53	1.37
	Late	42	3.52	1.42
Service Complexity (SERV)	Early	43	3.79	0.44
	Late	42	3.57	0.71
Overhead Cost Proportion (OHCOST)	Early	43	41.8	24.2
	Late	42	35.3	27.7
Competitive Intensity (COMP)	Early	43	3.50	0.55
	Late	42	3.44	0.72
SIZE	Early	43	20.9	1.3
	Late	42	20.9	1.3

* $p < 0.05$

In the second analysis the extrapolation method for detecting non-response bias in the sample by comparing the means of early and late respondents (CPA users only; n = 85) was applied (Armstrong and Overton 1977). As is evident in Table 2 this analysis did not result in any statistically significant differences between mean values for early and late responses so no systematic differences between early and late informants was found.

It is therefore concluded that no critical sign of non-response bias was detected via the conventional detection methods available.

5. Variable measurement

Based on the conceptualization of CPA sophistication (SOPH) (see Figure 1) an ordinal 5-point scale capturing the sophistication of the CPA practices adopted by different firms was developed. '1' represents the least sophisticated CPA model and '5' represents the most sophisticated one. The scale was converted from a general question on how the firm measured customer profitability (see Q5 in

Appendix A) and captures the range of costs included, the level of detail in assigning overhead costs (number of cost pools and cost drivers) and the level of aggregation. The scale can be outlined as follows:

Customer Profitability Analysis sophistication scale:

1. Sales and/or gross profit per individual customer and/or segment
2. Gross profit and direct SG&A costs per individual customer and/or segment
3. Gross profit, direct SG&A costs and overhead SG&A costs. Overhead SG&A are allocated to individual customers and/or segments via a single cost driver
4. Gross profit, direct SG&A costs and overhead SG&A costs. Overhead SG&A are assigned to *segments* via multiple cost pools and cost drivers
5. Gross profit, direct SG&A costs and overhead SG&A costs. Overhead SG&A are assigned to *individual customers* via multiple cost pools and cost drivers

The latent environmental factors (SERV and COMP) were measured as reflective multi-item constructs. The customer service complexity (SERV) measure was adapted from Holm et al. (Forthcoming). The measure constitutes the average score across seven items that reflect the diversity in customer needs across different customer-facing functions measured on five-point Likert scales ranging from '1' (strongly disagree) to '5' (strongly agree). Two general items were added

to the original construct in an attempt to strengthen construct reliability (see items 'a' and 'g' in Q12 in Appendix A).

The competitive intensity (COMP) measure was adapted from Jaworski and Kohli (1990) in order to match the market-orientation perspective on competition that mainly focuses on the range of alternative options available to customers. All six original items were used (albeit with minor semantic changes) and rated on five point likert scales ranging from '1' (strongly disagree) to '5' (strongly agree). Again, the average across the items was used as the COMP measure in the analysis.

TABLE 3

Summary Statistics for the Confirmatory Factor Analysis (n = 85)

Item	*Factor 1 SERV*	*Factor 2 COMP*
Serv1	0.42	-0.01
Serv2	0.40	-0.02
Serv3	0.51	-0.10
Serv4	0.56	0.32
Serv5	0.82	-0.01
Serv6	0.66	-0.07
Serv7	0.37	-0.30
Comp1	0.28	0.71
Comp2	-0.01	0.58
Comp3	-0.25	0.52
Comp4	-0.09	0.66
Comp5	0.32	0.48
Comp6	-0.18	0.30
Cronbach's Alpha	0.74	0.71
Average Variance Extracted	30.8%	31.1%

In order to assess construct reliability confirmatory factor analysis with varimax rotation was performed. The results are presented in Table 3. Generally, construct reliability is acceptable for both constructs when comparing Cronbach's Alpha (SERV = 0.74; COMP = 0.71) with the traditional hurdle rate of 0.70 (Nunnally 1978).

The first of the two control variables, proportion of overhead costs (OHCOST), has traditionally been measured based on primary data sources (self-reported) in studies of cost management sophistication (e.g., Al-Omiri and Drury 2007; Drury and Tayles 2005) since overhead cost proportion of total costs is rarely identifiable via secondary data sources. Response bias introduced when asking informants about this kind of information may explain why prior empirical investigations have not always found a significant relationship between overhead cost proportion and cost management system sophistication. Alternatively, this study approximates overhead cost proportion by fixed assets relative to total assets (in 2009) attained from secondary sources (annual reports). The rationale for applying this proxy is based on the assumption that firms with heavy investments in fixed assets (e.g., buildings, machinery, delivery trucks, equipment etc.) will also have a high proportion of overhead costs associated with these fixed capacities. This proxy is by no means perfect but since only few companies report fixed and variable costs in their annual reports this is the best proxy for fixed cost share available from secondary sources. This is probably also the reason why it has been widely used in the finance literature as a proxy for the fixed cost proportion when approximating operating leverage (e.g., Garcia-Feijóo and Jorgensen 2010; Nguyen and Swanson 2009; Saunders, Strock, and Travlos 1990).

Finally, the control variable SIZE is the natural logarithm to annual sales in 2009 obtained from secondary sources (annual reports).

6. Model specification and estimation

The model specification is presented in Equation (1)[6]:

$$(2)\ SOPH = \alpha + \beta_1\ SERV + \beta_2\ COMP + \beta_3\ SERVxCOMP + \gamma_1\ OHCOST + \gamma_2\ SIZE + \varepsilon$$

(+) (+) (-) (+) (+)

, where

- SOPH = CPA sophistication scale (self-reported)
- SERV = Reflective, multi-item measure of service complexity (self-reported)
- COMP = Reflective, multi-item measure of competitive intensity (self-reported)
- SERVxCOMP = Interaction between SERV and COMP
- OHCOST = Fixed Assets / Total Assets (2009)
- SIZE = Natural logarithm to annual sales (2009)

β_1 and β_2 represent the main effects of SERV and COMP on SOPH and β_3 represents the interaction effect (SERVxCOMP) whereas γ_i represent control variable effects.

[6] Previous studies of cost system sophistication have included industry sector as an independent variable in their models (e.g., Drury and Tayles 2005; Al-Omiri and Drury 2007). However, controlling for the industry sectors suggested in the above mentioned studies did not add additional explanation power and did not change any of the results regarding the focal variables. Therefore, it was decided to keep the model as simple as possible also in order to preserve more degrees of freedom given the small sample size.

TABLE 4

Summary Statistics and Correlation Matrix (n = 85)

	Descriptive Statistics					Correlations				
Variable	*Items*	*Mean*	*S.D.*	*Min.*	*Max.*	*SOPH*	*SERV*	*COMP*	*OHCOST*	*SIZE*
CPA Sophistication (SOPH)	1	3.5	1.4	1.0	5.0	*1.00*				
Service Complexity (SERV)	7	3.7	0.6	1.1	4.9	0.23**	*1.00*			
Competitive Intensity (COMP)	6	3.5	0.6	1.7	4.7	0.04	0.00	*1.00*		
Overhead Cost Proportion (OHCOST)	1	38.6	26.1	0.2	99.9	0.20*	0.12	-0.06	*1.00*	
Ln Sales (SIZE)	1	20.9	1.3	18.7	24.6	-0.12	0.08	-0.03	0.24**	*1.00*

Note: Pearson correlation coefficients disclosed
** $p < 0.05$
* $p < 0.10$

7. Results

Descriptive statistics and a correlation matrix are presented in Table 4. The mean CPA sophistication score is above 3 (3.5). This indicates that some sort of overhead allocation across customers or segments seems common among CPA adopters.

The analysis was performed using hierarchical moderated regression analysis. The independent variables were mean-centered in order to mitigate any potential multicollinearity issues (Cohen et al. 2003) but also to allow interpretation of the main effects of SERV and COMP on CPA sophistication (Hartmann and Moers 1999). So in line with the recommendations on simultaneous testing of main effects and interaction effects, each main effect (SERV => SOPH) and (COMP => SOPH) were examined as the effect of the predictor on the dependent variable when the predictor it interacts with equals its mean (Aiken and West 1991). Hence, the direct effect of SERV (COMP) on SOPH is the effect that is experienced when COMP (SERV) is average.

TABLE 5
Hierarchical Moderated Regression Model

A: Tests of models (blocks)

	Adj. R^2	*F*	*df*	*p*
Block 1: Control variables	0.05	2.99	2	0.06
Block 2: Main effects	0.07	2.70	4	0.04
Block 3: Interaction	0.12	3.24	5	0.01

B: Tests of variables

Variable	*Coefficient*	*Estimate*	*Standard Error*	*t-value*	*VIF*
Block 1: Control variables					
Intercept	α	6.92	2.44	2.84***	
OHCOST	γ_1	0.01	0.01	2.25**	1.06
SIZE	γ_2	-0.19	0.12	-1.57*	1.06
Block 2: Main effects					
Intercept	α	7.23	2.27	3.19***	
OHCOST	γ_1	0.01	0.01	2.10**	1.08
SIZE	γ_2	-0.20	0.11	-1.81**	1.07
SERV	β_1	0.52	0.27	1.92**	1.02
COMP	β_2	0.10	0.21	0.47	1.00
Block 3: Interaction					
Intercept	α	7.30	2.32	3.14***	
OHCOST	γ_1	0.01	0.01	2.25**	1.08
SIZE	γ_2	-0.20	0.11	-1.79**	1.07
SERV	β_1	0.60	0.22	2.80***	1.05
COMP	β_2	0.07	0.18	0.37	1.01
SERVxCOMP	β_3	-0.81	0.28	-2.92***	1.04

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$
Note: One-tailed significance levels are reported for all variables;
Standard Errors and t-values are heteroscedasticity consistent estimates (White 1980)

The results are outlined in Table 5. The technique of least squares was used with the control variables (OHCOST and SIZE) entered as Block 1, followed by the main effects (SERV and COMP) in Block 2, and the interaction effect

(SERVxCOMP) in Block 3. One-tailed tests were generally performed as directional hypotheses are being tested. In order to detect any potential multiconllinearity issues variance inflation factors (VIF) were analyzed in parallel with the regression results. Since all VIF's are close to 1 in each of the three steps multicollinearity does not seem to be an issue in our regressions.

To assess hypotheses *H1* and *H2* regarding the main effects of customer service complexity (SERV) and competitive intensity (COMP) on CPA model sophistication (SOPH) the results in Block 2 were analyzed. Both *H1* and *H2* suggest positive associations between the independent variable (SERV and COMP) and SOPH. However, the results in Block 2 only provide support for *H1* ($\beta_1 = 0.52$, $p < 0.05$) whereas the positive association found between COMP and SOPH (H2) was not significant. Model fit does not decline from Block 1 to Block 2 and the F-test turns from insignificant in Block 1 to significant in Block 2 ($p < 0.05$). This provides support for including SERV and COMP in the model. Finally, the results from Block 2 turn out to be robust in Block 3 when the interaction term is introduced. In fact the relationship between SERV and SOPH (H1) is even stronger in Block 3 ($\beta_1 = 0.60$, $p < 0.01$). This step also provides support for *H3* as the relationship between the interaction variable (SERVxCOMP) and SOPH is significant ($\beta_3 = -0.81$, $p < 0.01$). Again, the model still fits the data and r^2 (adjusted) jumps from 0.07 to 0.12.

Regarding the control variables both are significant throughout the three steps with the strongest effect in Block 3. In this final step a significant positive relationship between overhead cost proportion (OHCOST) and SOPH is found ($\gamma_1 = 0.01$, $p < 0.05$) as expected. However, a significant negative association is found between SIZE and SOPH ($\gamma_2 = -0.20$, $p < 0.05$) which is contrary to the expected.

Overall hypotheses *H1* and *H3* were supported in the hierarchical regression analysis whereas *H2* was not.

8. Discussion and conclusions

This study was performed to shed more light on how firms adapt their customer-based cost management systems to the task environment in which they operate. The purpose was to validate the customer service complexity construct empirically and to explore its influence on CPA model sophistication in conjunction with competitive intensity. Five main implications for research and practice emerge.

First, a novel conceptualization of the CPA model sophistication construct is developed. Future cross-sectional studies of customer accounting technique sophistication can use this conceptualization when operationalizing their CPA constructs. Furthermore, this conceptualization could provide a useful addition to the CPA curriculum in management accounting textbooks – a curriculum that is currently marginal both in terms of the number of textbooks covering CPA as well as the amount of space allocated to CPA in the textbooks that do incorporate customer profitability topics (Gleaves et al. 2008).

Second, the data provide empirical support in favor of the customer service complexity construct being a valid and reliable construct. Hence, future studies in management accounting as well as in marketing can adopt this customer service complexity measure as part of contingency-based research designs investigating customer-related relationships.

Third, the study adds to previous contingency-based research on customer accounting practices by demonstrating how customer service complexity influences CPA model sophistication. The findings suggest that firms adapt CPA model sophistication to the degree of diversity in customer service requirements they encounter. Therefore, customer service complexity constitutes an important expansion of the original customer accounting contingency-framework proposed by Guilding and McManus (2002), and should be incorporated in future research

designs investigating the determinants of customer accounting techniques. Additionally, this finding adds further empirical support to contingency-based cost system research where complexity/diversity has been shown to influence cost system sophistication (e.g., Cagwin and Bouwman 2002; Drury and Tayles 2005; Malmi 1999).

Fourth, competitive intensity seems to play a more subtle role when it comes to the design of customer-based cost systems compared to previous research on product cost system sophistication. Contrary to what was expected no statistically significant relationship was found between competitive intensity and CPA model sophistication. However, a significant negative moderating effect on the positive association between customer service complexity and CPA model sophistication was found. Consequently, the degree of customer service complexity encountered matters more in non-competitive environments than in environments characterized by intense competition. This not only has implications for future research expanding the customer accounting contingency-framework, but also highlights the potential of exploring interaction effects among contextual variables in selection fit contingency studies.

Fifth, the control variables in the analysis give rise to a couple of interesting observations. The positive association between overhead cost proportion in the cost structure and cost system sophistication is supported. Most previous research has suggested such a relationship but the empirical results have been weak. Future studies could look into whether this relationship is due to higher importance of overhead when it comes to customer-related cost components, whether the fixed assets relative to total assets proxy provides a better proxy for the proportion of overhead costs in firms' cost structures than previous measures or whether other explanations can be identified. Additionally, the negative relationship between size and CPA model sophistication was an interesting and surprising finding considering that prior research suggests that larger firms will adopt more

sophisticated cost management systems. The reasons for this deviation when it comes to customer-based cost management systems like CPA provide an interesting path for future research. Research from the organizational innovation literature suggests a more ambiguous relationship between size and innovative capabilities of organizations (Damanpour and Schneider 2006; Hitt, Hoskisson, and Ireland 1990; Mintzberg 1979; Nord and Tucker 1987). This may provide a productive source of inspiration to investigate the influence of latent constructs that are expected to correlate with firm size (e.g., innovative capabilities, financial slack, know-how of human resources, inertia, managerial conservatism, degree of cross-functional coordination etc.) on the sophistication of customer-based cost systems.

In addition to the traditional limitations related to survey research the dichotomous identification of CPA adopters chosen in this study may result in selection bias. So, even though careful consideration was given to the identification process (three first questions in questionnaire – see Appendix A) and to providing a broad and unambiguous definition of CPA there may still be CPA users that were not included in the sample. Although this is probably mainly a concern when interpreting the adoption rate a larger sample of CPA users could perhaps have been secured by confronting all informants with a multi-item sophistication measurement scale. Future studies related to CPA model sophistication could apply this approach.

Another limitation of this study is the sole focus on contingency factors in the environment. This focus was selected as a viable starting point within a relatively undeveloped field of research. However, as contingency-based research on customer accounting is scarce a better understanding of the organizational contingency factors that may influence CPA sophistication is required in order to identify relevant organizational constructs and develop theory-based propositions about their interrelations. A deeper understanding of these conditions can be

achieved through case studies as has also been suggested in the product cost sophistication literature (Al-Omiri and Drury 2007). One way could be to compare two firms operating in similar environments regarding competition and customer service complexity that have adopted CPA models that are substantially different in terms of sophistication. A useful frame of reference could be Chenhall's (2003) review study of contingency factors in management control research which identified five contingency dimensions in addition to the environment: Technology, organizational structure, strategy, culture and size (which is controlled for in this study). Case-based research could be beneficial in order to gain more thorough knowledge of the complex intra-organizational relationships that may influence the process of implementing and using customer profitability measurement models in organizations. Such case-based findings could potentially help exploring the relative importance of the above contingency factors with regards to the design of customer profitability measurement model sophistication as well. These insights could, in turn, provide a good starting point for developing measures and propositions that can later be empirically tested as well as general insights on how customer profitability measurement models are used in practice.

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8. Appendix A: Questionnaire

INTRODUCTION

Welcome!

Before you proceed please review two important general definitions that apply throughout the survey:

1. *The term "firm" refers to the particular business unit in which you are employed.*
2. *The term "customer" refers to the buyer entity which your firm has a direct buyer-seller relationship with i.e.:*

   (a) Institutional customers for Business-to-Business (B2B) firms;
   (b) End-consumers for Business-to-Consumer (B2C) firms;
   (c) Intermediary channel members for Business-to-Business-to-Consumer (B2B2C) firms that reach end-consumers through these intermediaries.

You can easily navigate back and forth in the survey via the "Prev" (back) and "Next" (forward) buttons at the bottom of each screen. If you, for some reason, wish to take a break from the survey, clicking the "Exit this survey" link in the top right hand corner will allow you to re-access the survey again at any time and resume from where you left via the link in the e-mail.

Whenever you are ready to start the survey, please proceed to the first question by clicking the "Next" button below.

SECTION 1 – KNOWLEDGE AND USE OF CUSTOMER PROFITABILITY MEASUREMENT MODELS

Section 1a: Past/Current Customer Profitability (CP)

Q1. *Are you aware of past/current customer profitability (CP) measurement as a tool for supporting resource allocation decisions across customers?*

In responding please consider the following:

Past/current customer profitability (CP) measures the revenues earned from and/or the costs realized in a customer relationship during some specific time period (past or current). Hence, any measurement of past/current customer-related revenues or profits is in this survey to be considered as customer profitability (CP) measurement.

[If "yes" in Q1 – informant is redirected to Q2; If "no" in Q1 – informant is redirected to Q6]

Q2. *Is your firm currently using customer profitability (CP) measurement, have you ever tried using it, or have you at some point over the past three years considered to start using it to support resource allocation decisions across customers?*

[If "yes" in Q2 – informant is redirected to Q3; If "no" in Q2 – informant is redirected to Q6]

Q3. *Please specify the current status on customer profitability (CP) usage at your firm:*

a. *We're **currently considering whether to start using CP** at our firm but have not reached a decision yet*

b. *We're **currently running a CP trial** which will help decide whether to implement CP at our firm*

c. *We **currently use CP at our firm or have decided to start using it** in the near future*

d. *We have considered to start using CP but eventually **decided not to implement CP** at our firm*

e. *We **have tried using CP in the past** but decided to abandon it again*

[If 'c' in Q3 – informant is redirected to Q4; In all other cases: informant is redirected to Q6]

Q4. *Please specify what year you started using customer profitability (CP) at your firm.*

Q5. *Please specify how the following P&L-components are accounted for when measuring customer profitability (CP) at your firm (you are encouraged to consult relevant colleagues (e.g., in finance/accounting) if you are not sure how CP is measured at your firm):* [check all that apply]

	Segment-level	Individual customer-level	Not at all
a. **Revenues** are accounted for at...	☐	☐	☐
b. **COGS*** are accounted for at… **COGS: Cost Of Goods Sold i.e., all costs related to producing your firm's core offerings (products/services)*	☐	☐	☐
c. **SG&A* that are DIRECTLY MEASURABLE**** are accounted for at… **SG&A: Sales, General & Administrative costs incurred from activities not related to producing your firm's products/services* ***Directly measurable: Resources are dedicated to a specific customer/segment and costs can therefore be traced directly from the dedicated resource to the customer/segment (e.g., direct mailings, customer promotions, key account managers, segment managers etc.)*	☐	☐	☐

d. Some or all **SG&A* that are NOT MEASURABLE*** are allocated in proportion to a **SINGLE COST DRIVER** (e.g., sales volume) to.. **SG&A: Sales, General & Administrative costs incurred from activities not related to producing your firm's products/services* ***Not measurable: Resources are dedicated to multiple customers/segments and costs must therefore be allocated via cost drivers (e.g., marketing research staff, sales personnel, order-handling departments, logistics setup, hotline support etc.)*	☐	☐	☐
e. Some or all **SG&A* that are NOT MEASURABLE**** are assigned based on **multiple cost pools and cost drivers*** (e.g. via Activity-Based Costing) to... **SG&A: Sales, General & Administrative costs incurred from activities not related to producing your firm's products/services* ***Not measurable: Resources are dedicated to multiple customers/segments and costs must therefore be allocated via cost drivers (e.g., marketing research staff, sales personnel, order-handling departments, logistics setup, hotline support etc.)* ,	☐	☐	☐

Section 1b: Forward-Looking Customer Lifetime Value (CLV)

Q6. *Are you aware of forward-looking customer lifetime value (CLV) estimation as a tool for supporting resource allocation decisions across customers?*

In responding please consider the following:

Forward-looking customer lifetime value (CLV) is the present value of expected future revenues, profits or cash flows generated from a customer relationship (in one or more future periods). Hence, estimating customer lifetime value (CLV) involves predicting future customer behavior and converting these predictions to forecasts of customer revenues, profits or cash flows in future periods.

[If "yes" in Q6 – informant is redirected to Q7; If "no" in Q6 – informant is redirected to Q11]

Q7. *Is your firm currently using customer lifetime value (CLV), have you ever tried using it, or have you at some point over the past three years considered to start using it to support resource allocation decisions?*

[If "yes" in Q7 – informant is redirected to Q8.; If "no" in Q7 – informant is redirected to Q11]

Q8. *Please specify the current status on customer lifetime value (CLV) usage at your firm:*

a. We're currently considering whether to start using CLV at our firm but have not reached a decision yet

b. We're currently running a CLV trial which will help decide whether to implement CLV at our firm

c. We currently use CLV or have decided to start using it in the near future

d. We have considered to start using CLV but eventually decided not to implement CLV at our firm

e. We have tried using CLV in the past but decided to abandon it again

[If 'c' in Q8 – informant is redirected to Q9; In all other cases – informant is redirected to Q11]

Q9. *Please specify what year you started using customer lifetime value (CLV) at your firm.*

Q10. *Please specify which of the following components are forecasted in your customer lifetime value (CLV) estimation model (you are encouraged to consult relevant colleagues (e.g., in finance/accounting) if you are not sure how CLV is measured at your firm):* [Check all that apply]

	Firm- or segment-level (average)	Individual customer level	Not at all
a. Retention rates or probabilities	☐	☐	☐
b. Acquisition rates or probabilities	☐	☐	☐
c. Revenues	☐	☐	☐
d. Gross profits (i.e., revenues less total cost of goods sold)	☐	☐	☐
e. Direct marketing/sales costs (derived from marketing/sales activities targeted at individual customers)	☐	☐	☐
f. Other Sales, General & Administrative Costs (SG&A) (e.g., marketing overhead, order-handling, distribution, after-sale services etc.)	☐	☐	☐
g. Working capital components (e.g., receivables, payables, inventories etc.)	☐	☐	☐
h. Other assets / liabilities (e.g., buildings, machinery etc.)	☐	☐	☐
i. Discount rate / cost of capital	☐	☐	☐

SECTION 2 – CUSTOMER ENVIRONMENT IN WHICH YOUR FIRM OPERATES

Q11. *Please indicate to what extent you agree to each of the following statements concerning your firm's competitive situation:*
(5-point Likert-scale where '1' = "Strongly Disagree"; '5' = "Strongly Agree")

a. Competition in our industry is extreme.

b. There are many "promotion wars" in our industry.

c. Anything that one competitor can offer, others can match straight away.

d. Price competition is a hallmark of our industry.

e. One hears of a new competitive move almost every day.

f. Our competitors are relatively weak.

Q12. *Please indicate to what extent you agree to each of the following statements concerning your customers' resource requirements*:
(5-point Likert-scale where '1' = "Strongly Disagree"; '5' = "Strongly Agree")

a. In our kind of business service levels generally vary from customer to customer.

b. Sales & marketing resource usage is different from customer to customer in our markets.

c. Core offerings (products/services) are customized to match the needs of individual customers in our markets.

d. Different customers are offered different commercial terms (i.e., price, rebates/discounts, credit terms etc.) in our markets.

e. Delivery/distribution resource requirements vary from customer to customer in our markets.

f. After-sale service resource requirements vary from customer to customer in our markets.

g. Resource usage per customer is similar across customers in our markets.

Q13. *Please indicate to what extent you agree to each of the following statements concerning your customers' behavioral differences:*
(5-point Likert-scale where '1' = "Strongly Disagree"; '5' = "Strongly Agree")

a. Buying behavior generally differs across customers in our markets.

b. In our markets customers switch between suppliers all the time.

c. In our markets some customers perform only a couple of transactions per year while others trade all the time.

d. The variation in customer spending/use per transaction is large from transaction to transaction in our markets.

e. In our markets some customers buy from an extensive range of product categories while others buy from only one.

f. In our markets customers have similar purchasing patterns.

SECTION 3 - FIRM INFORMATION

Q14. Please indicate the **primary industries** your firm operates in:

a. *Agricultural Products*
b. Natural Resources
c. Utilities & Energy
d. Construction
e. Industrial Product Manufacturing
f. Consumer Product Manufacturing
g. Transportation, Wholesaling & Warehousing
h. Retail Trade (store/non-store)
i. Pharmaceutical Products
j. Medicare Products
k. Technology Products/Services (hardware/software)
l. Financial Services
m. Information/Media
n. Entertainment
o. Travel & Hospitality
p. Internet-based services
q. Telecommunications
r. Professional Services
s. Real Estate
t. Other

Q15. Please indicate your firm's average **annual advertising spending as a percentage of annual revenues**:

a. 1% or less
b. More than 1% but less than or equal to 2%
c. More than 2% but less than or equal to 4%
d. More than 4% but less than or equal to 6%
e. More than 6% but less than or equal to 8%
f. More than 8% but less than or equal to 10%
g. More than 10%
h. Don't know

Q16. Please indicate your firm's **average annual Research & Development (R&D) spending as a percentage of annual revenues**:

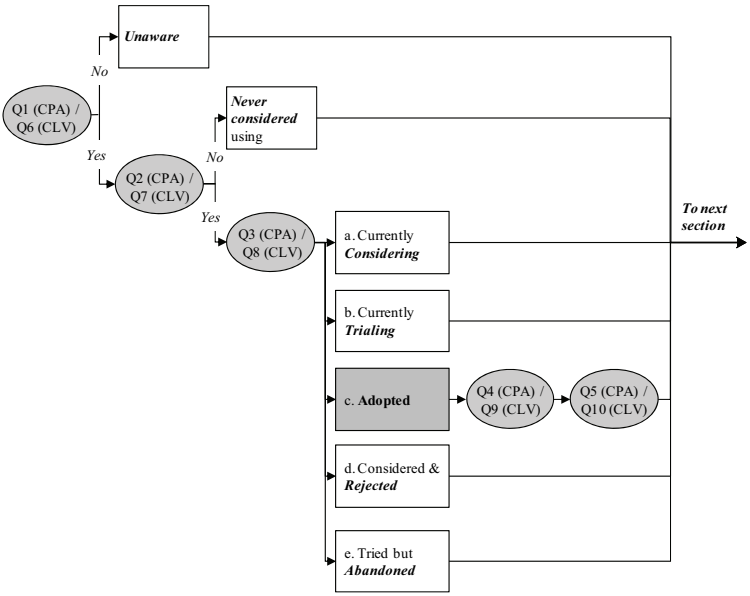
a. 1% or less
b. More than 1% but less than or equal to 2%
c. More than 2% but less than or equal to 4%
d. More than 4% but less than or equal to 6%
e. More than 6% but less than or equal to 8%
f. More than 8% but less than or equal to 10%
g. More than 10%
h. Don't know

SECTION 4 - PERSONAL INFORMATION

Q17. Please indicate your primary job function at the firm where you are employed:

a. Chief Executive Officer (CEO) / Business Unit Director / General Manager
b. Country Manager
c. Marketing Executive / Chief Marketing Officer (CMO)
d. Marketing/Sales Vice President (VP)
e. Marketing/Sales Director
f. Business Development Director
g. Marketing/Sales Manager
h. Business Development Manager
i. Do not wish to answer
j. Other

Appendix A – FIGURE 1
Questionnaire flow – Section 1



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