A measure for companies' customer portfolio management

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Introduction

Research Gap

Relationship marketing has been one of the central themes in marketing especially in B-to-B contexts already over two decades. The main idea of relationship marketing has been that the relationship building and management are central key issues for success in current business (Grönroos, 1994; Morgan and Hunt, 1994). However, in recent years there has been published increasing amount of research that the stronger relationships are not always better. Myopic development of closer relationships or strict customer retention focus can be questioned. Many authors have suggested that a firm should instead adjust its relationship management activities to the value of a customer, and concentrate managing the whole variety of its customer relationships – from transactions to strategic partnerships (Johnson and Selnes, 2005).

Also, the IMP-research focusing to interaction and networks has stressed the importance of customer relationships over the last 20 years (Håkannson 1982). A very strong theme in IMP research has been the customer portfolio analysis for the strategic management of a company's all customer relationships (e.g. Cunningham and Homse 1982; Fiocca, 1982; Freytag and Mols 2001; Turnbull and Zolkiewski 1997; Yourke and Droussuitis 1994). The *customer portfolio analysis* takes the management of the whole portfolio of customers as its starting point. As firms have only limited amount of resources for their customers it is not rational to treat and develop all relationships in a same way but rather to differentiate the resource allocation in relative to the value of customer relationship to the focal firm. Also, instead of managing just individual relationships a firm should consider its whole portfolio of relationships - does the firm have the right kind of portfolio of customers for long-term performance? (Turnbull, 1990) The focus moves *from* strict relationship building and customer retention view *to more balanced view of building right kind of relationships for a company's long term effectiveness goals*.

Currently, by the CRM boom the customer portfolio analysis has become a central hot topic in marketing. However, contradictory views about portfolio analysis exist. The tests of theoretical models support the proposition that customer portfolio analysis is of great value for companies (e.g. Zolkiewski and Turnbull 2002), whereas other researchers argue that formal, simplifying portfolio analysis can be even counterproductive (Armstong and Broadie, 1994; Dubois and Pedersen, 2002).

The current research on customer portfolios has concentrated almost fully to proposing and testing theoretical portfolio models (i.e. portfolio analysis). Even though there is much theoretical knowledge about portfolio analysis, almost no empirical research about the *implementation* (i.e. actual portfolio management) of this concept in business or its effect on *performance* exists (see Räsänen, 1999; Leek, Turnbull and Naudé, 2002 for exceptions). Further, the related empirical research about the strategic customer relationship management is very limited and misses some central aspect of portfolio analysis. This CRM research has ignored to a large extent the special characteristics of B-to-B context, is often heavily rooted in IT-technology, and most importantly concentrates much to the treatment of (individual) relationships instead of future-oriented development of company's whole portfolio of customers (c.f. Reinartz et. al. 2004; Payne and Frow 2005). Arguably a relevant research gap exists.

The purpose of the research

In short, based on conceptual research and case-studies there is currently good theoretical knowledge about customer portfolio analysis but lack of knowledge to what degree companies actually apply portfolio management in practice. Further an interesting unanswered question is whether portfolio management efforts are connected to company performance. Clearly, a quantitative approach is needed to provide new knowledge about customer portfolio analysis and its performance in business. The *purpose* of this research is to form a new measure for studying firms' customer portfolio management (CPM) practices. This purpose is divided to three *research questions*: 1) to conceptualize customer portfolio management 2) to develop a measure for studying customer

portfolio management in business, and 3) to validate this new measure by using empirical data. Finally, a number of research avenues are proposed for future studies.

The customer portfolio models are an interesting topic theoretically. This is because of companies' actual portfolio management practices are company internal activities' focusing to the focal company's whole portfolio of customer relationships. Therefore the theoretical positioning of this research is twofold. First of all, portfolio management as a company internal practice can be understood better by approaching it from the viewpoint of organizational *information processing* and learning theories. Secondly, one cannot understand customer portfolio management only by concentrating to company internal issues. Rather customer relationships and value in business markets form the basis of portfolio analysis. Clearly CPM cannot be understood without thorough knowledge on these issues. Therefore *IMP-research* related interaction and network approach theories are used researching companies' customer portfolio management practices.

Customer portfolio management defined

Theory based definition
The proposed theoretical customer portfolio models are highly diverse[1]. The customer portfolio analysis can be defined based on the central aspects in the customer portfolio <u>theories</u> as an: "*a practice by which a company analyses the current and future value of its customers for developing a balanced customer structure through effective resource allocation to different customers or customer groups*" (Terho and Halinen 2007).

However, the above definition is based on fully theoretical models and it reflects the *philosophy* of customer portfolio analysis staying on rather abstract level representing a limited practical value for studying the companies' customer portfolio management in business. For being able to studying this phenomenon empirically an <u>operational definition is needed</u> (see Jaworkski and Kohli, 1990, 3). An operational definition moves the attention from philosophy to practice and explicates the activities that manifest the general level definition of customer portfolio management. Before moving closer to these activities manifesting customer portfolio management the focus to customer portfolio management is discussed based on a qualitative study and related literature.

Qualitative study for operative definition
A qualitative study has been conducted in seven very different companies. The aim of this study has been twofold. First of all, it has provided a greater understanding about the phenomenon for detailed results see (Terho and Halinen 2007). Secondly, the study has been used to contrast different companies' actual portfolio management practices against the theory-based view of CPM for developing the operative definition for customer portfolio management.

The case-companies comprised as wide variety as possible in their products and customer relationships. The selected companies ranged from relatively "market based" conditions with a large customer base and large amount of weak customer relationship (energy, insurance), to highly "networked conditions" with fewer and stronger customer relationships in the customer base (paper, and ICT companies). See Möller and Halinen (2000, 42–43) for the market based vs. networked based context. All selected companies were large and they were known to apply systematic portfolio management. The qualitative research was based on interviews with the senior managers responsible for customer management in each company. The interviews were semi-structured and lasted about 1,5 hours. The themes included companies' portfolio management aims, contents of analysis, managerial implications, responsibilities, problems, and other experiences of relating to the customer portfolio management.

The results of the study revealed great heterogeneity in companies' customer portfolio management practices. Still, all the key aspects in the theory-based definition of portfolio management

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[1] A table of 21 most central customer portfolio models including their phases, analysis dimensions and their operationalisations, in addition to managerial implications can be received from author via e-mail.

were present in all companies. However, when the theory-based definition is contrasted with the results of the qualitative study three differing main themes can be found. These differences are discussed below.

First of all, the theoretical customer portfolio models concentrate just to the mechanical design of the portfolio analysis at one point in time i.e. on designing and carrying out the analysis, and developing strategies for managing different kinds of customers. In practice this is however a very limited view to portfolio management. Based on results of the qualitative study the companies' customer portfolio management is likely to be an ongoing, *continuous process* centrally involving information processing. This information processing based view of portfolio management is consistent with organisational learning (Huber 1991), information processing (Sinkula 1994), and market orientation (Jaworksi and Kohli 1990) theories. *Consequently, customer portfolio management in business can be regarded as an ongoing process that involves two main activities namely 1) analysis and 2) responsiveness to the new customer knowledge gained in this process.*

Secondly, based on the interviews the customer portfolio management process arguably develops in time as the companies *adapt* their portfolio analysis practices based explicit planning, learning from feedback, new knowledge gained, insights achieved, trial and error in management, and also from external sources such as consultants (for adaptation see Fiol and Lyles 1985). In many firms the customer portfolio management practices had gone, or were under notable changes as the companies adjusted their practices based on their experiences. The portfolio management in business is arguably not a one fixed procedure but a continuous long-term process *involving adaptation of activities as companies learn about their customers and their own portfolio management practices. The design of CPM activities is an essential aspect of customer portfolio management.*

Thirdly, the theoretical models treat customer portfolio management as a fully managerial level practice. Based on the interviews it is arguable though that strategic managerial level CPM cannot be simply separated from other levels of an organisation – this is the case especially in the implementation of CPM into practice. Much of the central customer information is produced in lower levels of organisation (customer boundary personnel), and in various functional areas (sales, KAM teams, accounting, R&D, etc.). Consequently, managers receive a great deal of their information about customers from these various sources. Similarly, the importance and difficulty of the implementation of portfolio management into practice was emphasised to a great deal in interviews. The role of sales department and other customer boundary personnel was often mentioned to be critical in the implementation of strategies. Arguably the lower levels of the organisation cannot be excluded from the research if one wants to examine companies' customer portfolio management practices in business (Campbell 2003; Zablah et al. 2004). *This research will focus in managerial level of CPM. Still, other organisational levels are central in information acquisition and responsiveness activities and cannot be totally excluded from the operational definition of customer portfolio management.*

Hence, based on the results of the qualitative study and the literature customer portfolio management can be considered as a *continuous process involving four central phases relating to the analysis of customers, and responsiveness to the analysis conducted.* 1) The interviews indicate that *design of the analysis* to company needs is a central aspect of CPM. The importance of the understanding the customer related contingencies and the tailoring of the analysis to company needs have been also stressed in the earlier research (e.g. Salle, Cova and Pardo, 2000, 434). 2) A crucial aspect is naturally the actual *analysis efforts* the company carries out. To what degree the company analyses its portfolio of customers from value point of view. 3) A company should also respond to the knowledge gained in the analysis process. This can be approached by response efforts. 4) Finally, the *design of resource allocation strategies* can vary notably. To what degree has the company paid attention to the response efforts? All these issues are likely to be a continuous process where the company learns about its portfolio of customers, its own managerial practices, and adapts its actions to the gained new knowledge in this process (see figure 1 CPA process below).
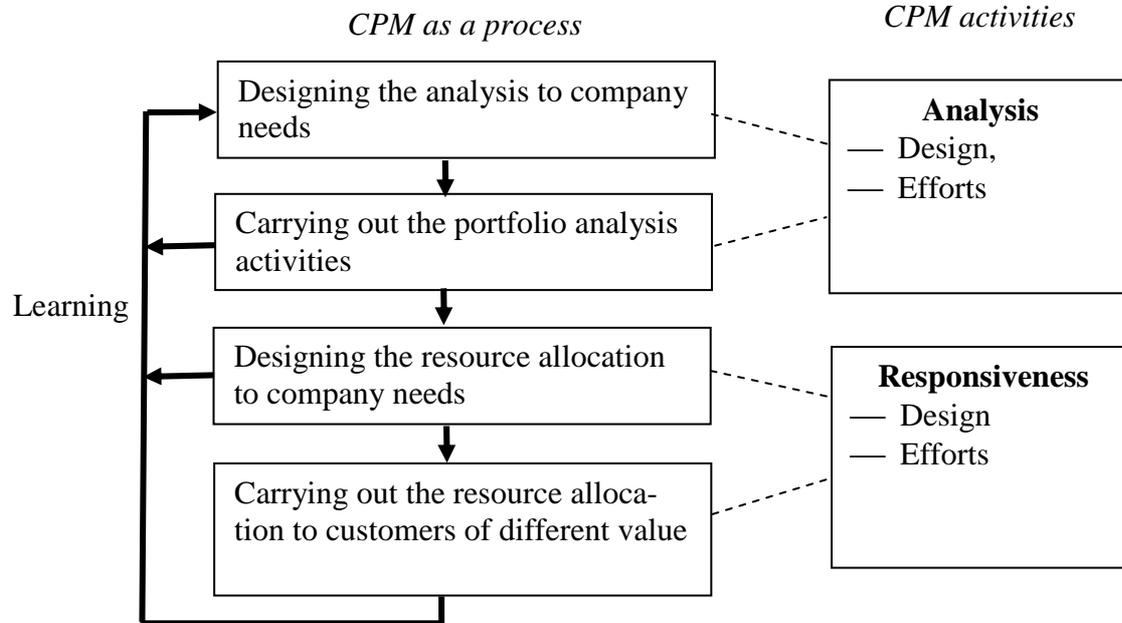
CPM as a process   *CPM activities*

Figure 1 CPA process based on literature and the qualitative study

This process view of customer portfolio management comprises of two main elements. Consequently the operational definition of CPM will be based on these activities – the *analysis* and *responsiveness* (see Figure 1 CPA activities). Both of the activities include two aspects namely the *design* (continuous planning, evaluation, and adaptation of the activity to company needs), and the *efforts* (degree the activity is done in practice). This conceptualisation is close to the measure of *network competence* which is comprised of network management *task execution* indicating the degree and *qualifications* indicating the quality (Ritter, 1999). Next, the two activities of customer portfolio management will be discussed in detail based on theory and the qualitative study. Finally, a formal operational definition of portfolio management is given.

1) Analysis activities
The analysis activities form the core of customer portfolio management. Analysis activities include two central aspects, namely the *design (quality)* and *efforts (existence)* of analysis activities in place.

The customer portfolio analysis activities aim at getting a thorough understanding about different customers' role in providing current and future value for the focal firm in the customer base (for being better able to allocate limited resources among all the customers in the portfolio in the long-term). For doing this a firm should be able to identify correctly what are the central aspects for analysing its customers and the structure of its customer base. When the company has a sufficient understanding about its customer portfolio structure and different customers' roles in the customer base it can arguably better develop strategies for allocating its resources among the customers for achieving its long-term and effectiveness goals (cf. Turnbull, 1990, 21; Johnson and Selnes 2005). If the analysis activities miss some central aspects of the focal firm's business, are of poor quality, or concentrate to wrong issues they will produce inevitably unsatisfactory, misleading outcomes (cf. Zolkiewski and Turnbull 2002, 578–582).

Consequently, the design of analysis activities for company needs (analysing things right) is a highly central issue in portfolio analysis (Salle, Cova, and Pardo 2000, 434). The quality of the analysis design is nonetheless a highly difficult issue to study in practice. This is because of the appropriateness of the design depends on the contingencies a firm is facing. Firms have notably different characteristics; they are acting in different kinds of contexts and have different positions and strategies in the relational networks they are embedded in (c.f. Anderson and Narus 2001; Easton and Araujo 2003). Also companies have great differences in their portfolio of customer relationships, (e.g. how willing their customers are to develop relationships) – all posing different challenges for analysing and managing the customers and tailoring the CPM analysis activities to company needs (Johnson and Selnes 2004; Möller and Halinen 2000). This assumption is also

highly supported in the qualitative study where the companies' portfolio analysis practices varied strongly among companies based on the companies' perceived contingencies of customer portfolio management. The tailoring of analysis activities to fit the strategy of the company, its customer base characteristics, and the broader industry characteristics (mediated by the customer relationships) is expected to be essential aspect in the CPM. Hence the concept of *analysis design* is used to examine the degree a company has put efforts into tailoring its analysis to fit its needs *i.e. the focal company's continuous efforts to plan, evaluate, and adapt its customer portfolio analysis activities to company needs.*

Secondly, the existence of the analysis activities is a key aspect of portfolio management – different degrees of analysis activities take place between companies. Rather than studying the pure presence or absence of analysis activities it is better to study the degree of analysis efforts. The *analysis efforts refer here to the focal company's efforts to analyse its whole portfolio of customers pertaining to different customers' role in providing current and future value for the focal company.* Based on the literature and the qualitative study the customer value must be seen broadly in portfolio analysis. *The portfolio analysis activities are by no means restricted to customers' direct, economic value but rather concentrate to different customers' role in providing current and future value for the focal company* (c.f. Johnson and Selnes 2005). The different customer relationships serve different functions for a company (Möller and Törrönen 2003; Walter, Ritter, Gemünden, 2001; Wilson and Jantrania 1996). Similarly the value of relationship may not be realised directly but though a customer's broader role in the customer *structure* e.g. via economics of scale (Johnson and Selnes 2004, 3). In addition, customer relationship characteristics influence the long-term development and success of relationships therefore having a role in the future value of a customer being also linked to value and portfolio analysis. As the portfolio management is a heavily future oriented practice customers' future value potential (e.g. growth, customer shares) represents a central aspect in CPM.

2) Responsiveness

The second main element of customer portfolio management is the responsiveness to the analysis. Very little is accomplished by a thorough analysis of customers unless a firm is able to *respond to the knowledge it gains through the analysis activities it carries out.* The customer portfolio analysis is a future oriented practice as it basically helps in understanding company's *current* portfolio of customers for better *future* resource allocation among customers of different value. The development of systematic analysis activities for understanding the value of different customers in the relationship portfolio can help firms to minimise the errors in understanding the value of different kinds of customers. This is essential as errors in understanding of customers are likely to lead to under- or overspending of resources among customers (cf. Reinartz et. al. 2004, 296). Based on a thorough literature on CPM it can be seen that the responsiveness activities are all centrally related to *resource allocation* (cf. Turnbull 1990). Again two aspects are separated in response activities: *response efforts* and *response design.*
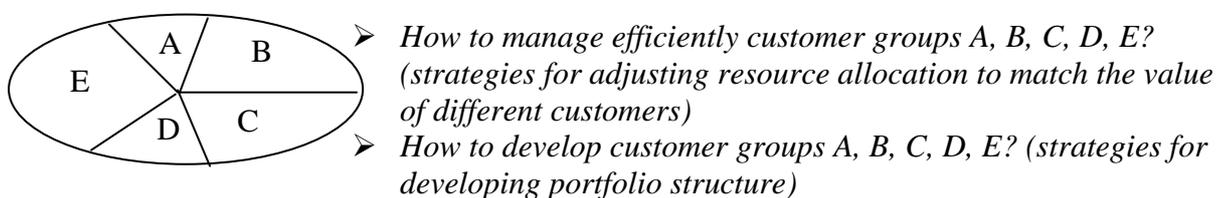

> ➤ *How to manage efficiently customer groups A, B, C, D, E? (strategies for adjusting resource allocation to match the value of different customers)*
> ➤ *How to develop customer groups A, B, C, D, E? (strategies for developing portfolio structure)*

Figure 2 Response efforts for customer portfolio – hypothetical customer portfolio ABCDE

Räsänen (1999, 99) has drawn a rather ambiguous division between operative and strategic portfolio models. Operative customer portfolio analysis aims at increasing the efficiency of marketing efforts such as sales programs (e.g. La Forge and Cravens, 1982). Strategic level implications focus on managing customer relationships in a way that safeguards the future of business as a whole, the focus being on long-term effectiveness (e.g. Fiocca, 1982). Based on this division and the literature analysis two main aspects of resource allocation can be distinguished: 1) the *match-*

ing of resource allocation *to different customers' value* for focal company and 2) the future oriented *development of customer relationship* (see figure 2 above). Zolkiewski and Turnbull (2002, 578) have summarized four possible relationship development strategies in the form of questions: Do new relationships need to be created? Which relationships should be developed? Which relationships should be maintained? Are there any relationships that should be broken or discarded?

Rather than studying carefully the specific individual resource allocation strategies the focus lies in the general degree a company differentiates its resource allocation among customers of differing value. *Hence, by response efforts is referred to the focal company's efforts to adjust its resource allocation to different customers' value in its current and future customer portfolio.* The timeframe refers to the above discussed twofold role of resource allocation in portfolio analysis: on the other hand the company should adjust its resource allocation to the value of different customers (efficient ways to manage customers of different value in customer portfolio), and on the other hand it should aim at developing its future customer portfolio structure to meet its long-term goals (development of customer relationships for better portfolio structure in future). Naturally, both these aspects of resource allocation are vastly overlapping. This is because of the customer treatment strategies (e.g. sales efforts, service level, or offerings) are without doubt always including a relationship development aspect, and the other way around, plans to develop different value relationships in the company's portfolio include always customer treatment aspect in practice. Interestingly, the current CRM literature is concentrating to first group of strategies and misses the latter aspect (c.f. Reinartz Hoyer and Kraft 2005)

Another side of the responsiveness is the *response design i.e. the focal company's continuous efforts to plan, evaluate, and adapt its response activities to company needs for implementing them into practice.* In other words, how much the company has planned these activities, does it evaluate its current practices, and how much it has put efforts into implementing these activities into practice. This is not a self-evident issue as in the interviews of the qualitative study it became clear that many companies had much difficulties in implementing the differentiated resource allocation into practice because e.g. product or sales volume oriented culture. To be able successfully implement differentiated resource allocation a firm must be able to bring the strategies into the actions of customer boundary personnel in various functions (c.f. Campbell 2003, 380–381).

Definition of customer portfolio management
To conclude customer portfolio management is defined operationally as the company activities to 1) analyze its portfolio of customers pertaining to customers' role in providing current and future value for the focal company, and 2) company's responsiveness to the analysis conducted.
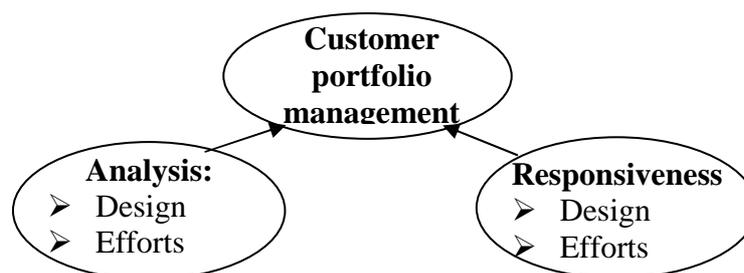

Figure 3 Central activities of customer portfolio analysis

In summary, the analysis consists of the 1.1), *analysis design* (i.e. the focal company's continuous efforts to plan, evaluate, and adapt its customer portfolio analysis activities to company needs) and 1.2) *analysis efforts* (i.e. the focal company's efforts to analyse its whole portfolio of customers pertaining to different customers' role in providing current and future value for the focal company). The responsiveness consists of 2.1) *response design* (i.e. the focal company's continuous efforts to plan, evaluate, and adapt its response activities to company needs for implementing them into practice), and 2.2) *response efforts* (the focal company's efforts to adjust its resource allocation to different customers' value in its current and future customer portfolio). Naturally, these activities do not necessary hang together, that is, a company can analyze its customers but it does not have to

respond to the knowledge. Alternatively, a company can analyze its customers to a great degree but without a proper design. Hence, the level of CPM is *formed* by the analysis and responsiveness activites. This is illustrated by the arrows in the figure 3.

Clearly this definition of CPM does not help to distinguishing directly the presence or absence of customer portfolio management in a company. However, the reality is likely to be complex – rather than being black or white (pure presence or absence) companies' customer portfolio management in business is likely to lie in a continuum representing different shades of grey. Hence the aim of this conceptualization is to examine the *degree* companies apply CPM activities. Several measures in marketing can be criticized for concentrating to only the degree of some phenomenon is present missing the *quality or style* of those activities (see e.g. market orientation - Jaworski and Kohli 1990, 16; CRM activities Reinartz Hoyer and Kraft 2005.) This conceptualization of customer portfolio management will approximate also the style of the CPM activities similar to Ritter (1999).

Forming the CPM measure

Formative measurement

Ever since Churchill (1979) presented his article about measure development quantitative researchers in marketing have devoted a considerable attention to the development of multiple item measures with sound psychometric properties. In other words measurement in marketing has been based on the ideas of the classical test-theory and the assumptions it makes about the relationship between a construct and its indicators. The basic assumption here is that the *latent variable causes the indicators* (Bollen and Lennox 1991). As the direction of the causality is from the construct to the indicators and change in the construct causes changes in the indicators the classical measures are called as <u>reflective</u>. More formally said the classical test theory assumes that the variation in the true scores on measures of a construct is a function of the true score and the error (Jarvis, Mackezie and Podsakoff, 2003, 199). The reflective indicators (questions) should be therefore internally consistent as they all reflect the same underlying construct (Bollen and Lennox, 1991, 378). For the same reason the indicators in reflective measurement should be interchangeable and construct validity should be unchanged when a single indicator is removed (Bollen and Lennox, 1991, 308).

However, if the suggested conceptualization of customer portfolio management is examined it can be concluded that it does not easily fit to this traditional (reflective) measurement perspective. The CPM is suggested to be a second order construct. First of all, the all four first-order dimensions of CPM are (internally) very broad and include a wide variety of indicators that need not to be necessarily intercorrelated (see figure 3). For example a company can analyze historical customer (or positive customer value) value but it does not have to analyze customer future value potential (or costs of a relationship). Similarly, a company can manage customers of different value very efficiently but it does not have to try to develop its customer structure by managing customer relationships to certain direction (cf. figure 2). Secondly, the same applies to the second-order constructs which are neither necessarily intercorrelated. This is obvious as the existence of analysis activities does not imply that a company will respond to this knowledge. Neither, the wide analysis or response efforts need not to be designed thoroughly. Still, based on theory all these CPM components form a meaningful and relevant entity.

In fact, the CPM is better operationalised by using an alternative measurement perspective which is based on <u>formative</u> (cause) indicators. The formative measurement perspective has though been rare in marketing studies. This is largely because of the historical reasons (strong emphasis on internally consistency in measurement) and the lack of validation methods for the formative measures. Still much of the issues studied in marketing are in fact not reflective. Jarvis, Mackezie and Podsakoff (2003) have found that in current research a models misspecification problem is very pervasive – for example 34% of measures published in Journal of marketing were incorrectly modelled. Especially, conceptualizations of managerial constructs in marketing are often formative in nature, defined as combinations of relatively independent factors that determine the level of the latent construct. The formative measurement is discussed more in detail below.

The formative measurement is based on the idea that the indicators cause the concept measured. This has several effects for the properties of formative measures. First of all, the internal consistency criterion is not valid for the cause-indicators (Bollen, 1984, 381). Still, the constructs can be meaningful entities for research such as the concept of socio-economical status. Secondly, as the formative constructs are caused by its indicators dropping an indicator may alter the meaning of the construct. Thirdly, in formative models the measurement error cannot be measured in item level but must be estimated rather in the construct level. (Bollen and Lenox, 1991, Jarvis, Mackezie and Podsakoff, 2003, 201). A natural consequence from these characteristics is that the formation and validation of formative measures (or indexes) differ notably from traditional reflective measurement. This validation procedure is discussed next.

The development of formative measures

Diamantopoulos and Winklehofer and (2001) have presented guidelines for developing formative measures. This process is based on the special characteristics of the formative constructs discussed above. First of all*, content specification* is the starting point of the index construction. This is particularly important as an index is more abstract and ambiguous than a latent variable measured with reflective measures. Further, as the latent construct is caused by its indicators rather than vice versa *a failure to consider all facets of the* construct will lead to an exclusion of relevant indicators and thus exclude part of the construct itself. (Diamantopoulos and Winklhofer, 2001, 271.)

Secondly, in reflective measurement a set of items are randomly chosen from the universe of items tapping the construct of interest (DeVellis 1991, 55). This is natural because of the interchangeable nature of reflective indicators. In contrast, for formative measures a census of indicators, not a sample, is required for *indicator specification* (c.f. Bollen and Lennox 1991, 308). That is, the items used as indicators must cover the entire scope of the latent variable as described under the content specification. It should be noted that this does not imply that index purification (dropping bad items) is not possible but rather that one should one sufficiently inclusive in order to capture fully the constructs domain of content. (Diamantopoulos and Winklhofer, 2001, 272.)

Thirdly, *indicator collinearity* is an important issue in creating indexes. This is because of excessive collinearity among indicators makes it difficult to separate the distinct influence of the individual indicators on the latent variable (Diamantopoulos and Winklehofer, 2001, 272). If a particular item turns to be almost perfect linear score of the other items, it is likely to contain redundant information and can therefore become a candidate for exclusion from index (Bollen and Lennox 1991, 307). In other words index construction procedures tend to *eliminate* highly intercorrelated items (for minimizing multicolleniarity), whereas traditional scale development procedures tend to retain highly intercorrelated items (for maximizing internal consistency) (Diamantopoulos and Siguaw, 2006, 271). Multicollinearity can be examined by the maximum inflation factor (VIF) – the suggested cut-of threshold value is 10 (Diamantopoulos and Winklehofer, 2001, 272).

Fourthly, the *validity* of formative measures has been a problematic issue because of the current means for examining the goodness of measures is based on the idea of internal consistency. Bollen and Lenox (1991, 312) conclude that as causal indicators are not invalidated by low internal consistency, to assess validity, one needs to examine other variables that are the effects of the latent construct. Therefore the error of an index can be approached in construct level. Diamantopoulos and Winklehofer (2001, 272) propose that the external validity of an index should be examined by using a multiple indicators and multiple causes (MIMIC) model. In this model the index (cause) indicators act as direct causes of the latent variable which is in turn indicated by one or more reflective indicators. If the overall model fit proves acceptable, this can be taken as supporting evidence of for the set of indicators forming the index. In addition the contribution and significance of the individual indicators can be examined with this procedure. It should be noted that the guidelines by Diamantopoulos and Winklehofer (2001) focus to first-order constructs. The few researches with second-order constructs have tested construct validity of in aggregate level (see Reinartz, Kraft and Hoyer 2004; Ulaga and Eggert 2006). Also, a measure should be additionally tested in relation to other measures to check its nomological validity. In other words, the formative

construct should be linked to other constructs which it would be expected to be linked based on theory. For identification reasons this other construct should be reflective (see Jarvis, Mackezie and Podsakoff 2003, 213). To indicate nomological validity a theoretical relationship should be postulated to exist between the constructs. Next the empirical measure development process of this research will be in focus.

CPM measure development

This far the CPM concept has been conceptualized and analyzed based on a thorough literature analysis. Further, the formative measure development process has been discussed in general level. Next the focus moves into the empirical part of the measure formation. Clearly, the *content specification* is firmly rooted on theory and qualitative study both resulting to the extensive definitions of CPM and its components. Moreover, by using Jarvis, Mackezie and Podsakoff's (2003, 205) typology of second-order factor models, CPM is a Formative First-Order, Formative Second-Order model (see figure 3).

The *indicator specification* is based on the definitions of the CPM components. For ensuring that the indicators will cover the entire scope of the latent variable (CPM) conceptual matrixes based on definitions are used as help. This provides a structured way of ensuring that questions cover evenly all central aspects of the construct. In addition to literature review and qualitative study, the indicator specification is based on a number of interviews with experts. This qualitative process aims at insuring that questions are understandable, relevant, and do not overlap too much with each others. This additional qualitative phase consists of 7 personal interviews with senior managers responsible for customer management (emphasis in clarity and scope of the questions), 10 personal interviews with academic experts (emphasis on theoretical rigidity and scope of the questions), and additionally a critical review with 9 academics examining how the indicators fit the definitions. During this process several questions were modified and some questions were dropped/ added until the indicators were found suitable. This process produced a list of 10+6+9+6 indicators that cover all central aspects of CPM. The final indicators are presented in appendix 3. Below are the theory based matrixes which were used to ensure that central aspects of the CPM activities are present in the measures. The numbers in the matrixes refer to the item numbers of the questions in the appendix 3. Original questions are in Finnish language.

The *analysis efforts (i.e. the focal company's efforts to analyze its whole portfolio of customers pertaining to different customers' role in providing current and future value for the focal company* is measured by 10 questions. The two main aspects of the analysis are the temporal aspect of customer value (current vs. future) and to what degree individual and larger portfolio of customers are analyzed. (see figure 4; appendix 3.).

	Relationship level	Portfolio level
Current (backward-looking) value	1-2	5-7
Future value	3-4	8-10

Figure 4 Key aspects of CPM analysis efforts for indicator development

The *analysis design (i.e. the focal company's continuous efforts to plan, evaluate, and adapt its customer portfolio analysis activities to company needs)* is measured with six questions.

	Planning / eval. of practices	Adaptation of practices
Current focus	1-2	4-5
Future focus	3	6

Figure 5 Key aspects of CPM analysis design for indicator development

Based on the definition two main aspects are distinguished namely time (what has been done/ future oriented development orientation) and the type of design (evaluation, planning/ adaptation of practices). (see figure 5; appendix 3.)

The *response efforts (i.e. focal company's efforts to adjust its <u>resource allocation</u> to different customers' value in its <u>current</u> and <u>future</u> customer portfolio)* are measured with 9 questions. Main aspects in response efforts are again the temporal aspect (current/ future moment) and focus of resource allocation (matching customer value/ developing customer portfolio structure based on customer value). (c.f. figure 2 and 6; appendix 3.)

	Matching focus	Development focus
Current focus	1-3	5-7
Future focus	4	8-9

Figure 6 Key aspects of CPM response efforts for indicator development

The *response design (i.e. the focal company's <u>continuous</u> efforts to <u>plan, evaluate, and adapt</u> its response activities to company needs for implementing them into practice.)* is measured with six questions. Again the definition is based on two main aspects namely time (what has been done/ future oriented development), and the type of design (evaluation, planning/ adaptation of practices). (see figure 7; appendix 3.)

	Planning/ eval. of practices	Adaptation of practices
Current focus	1-2	4-5
Future focus	3	6

Figure 7 Key aspects of CPM response design for indicator development

Sample
Large companies are more likely to apply systematically portfolio management because of their bigger resources. Therefore a purposive sample was drawn from a Finnish "Fonecta ProFinder B2B" database for the largest B-to-B companies acting in all industries in Finland. There were no statistical considerations in selecting the companies. In practice selecting all companies with a turnover over 55 Million Euros led to a list of 630 companies. The upper management of all these companies was personally contacted by phone for finding correct respondents. Companies who stated that they acted mainly in B-to-C business, non-profit companies, or companies mainly supplying to their owners were dropped from this research. Further, customer portfolio management is practiced often in independent business areas in large companies instead of being a centralized practice. Therefore, companies were asked for respondents in all independent business areas in the company responsible for CPM. *The sample consisted of 493 independent units responsible for customer base management.* Because of limited research resources and difficult respondent group (senior management) single respondent approach was adopted. Of the contacted independent units 446 managers promised to participate to this research. All these managers were sent an electronic questionnaire and two reminders for getting as good response rate as possible. The questionnaires were sent in six phases (N= 116+112+88+102+16+12). This was done for ensuring the effectiveness of time consuming personal contacting. As the customer portfolio management is an ongoing strategic level phenomenon it is highly unlikely that the time would have any effect on responses (c.f. Huber and Power 1985, 177). In the end of three months data collection 225 answers were returned. 197 companies returned answers from one, 13 companies returned answers from two, one from three, and one from four independent business areas.

After removing responses with low respondent competency (a separate question) and question-naires with substantive amount of missing values lead to a number of *212 usable responses which means a high response rate of 43%*. Armstrong and Overton's (1977, 396) guidelines for estimating nonresponse bias were used. First of all, the personnel class, turnover, and industry of responding and non-responding companies were compared with ANOVA and Chi-Square test. Results indicate that there are no statistically significant differences in companies' turnover or industry. However, companies' with slightly higher personnel classes responded slightly more often than smaller companies. No significant differences were found between when early and late respondents. In summary, a slight bias towards larger companies may be possible. However, the responses can be considered to represent well large Finnish B-to-B companies.

Estimation and results

The next step in the CPM measure formation process is the *examination of the collinearity.* Excessive collinearity is a problem for formative measurement as it affects the stability of indicator coefficients. Further multicollinear indicators would include redundant information making the index problematic (Diamantopoulos and Winklehofer, 2001, 272). Multicollinearity can be examined by several methods. Winklehofer and Diamantopoulos' (2001, 272) guidelines include the use of *variance inflation factor (VIF)* where they suggest a cut-of threshold value of 10. Based on the VIF values none of the indicators were found problematic. Diamantopoulos and Siguaw (2006, 271) suggest studying multicollinearity by *tolerance value* with a more conservative *a cut-off value of 0.30.* Based on this procedure two items are problematic and therefore they are deleted (questions AD1 and AD6). Further, multicollinearity can be studied by examining *pair-wise correlations* where correlations over 0.8 indicate about multicollinearity (Gujarati 2003, 359). Here most of the correlations stay under 0.6 and all correlations under 0.7 (5 variables over 0.6). Finally, Hair Anderson Tatham's (1995, 153) *two part process for assessing multicolinearity* did not indicate problems in multicollinearity.

The final phase in formative measurement development is ensuring the *external validity* of the measure. As discussed above the formative measurement differs notably from reflective measurement and therefore differs notably from traditional perspectives. This is because of the formative indicators can have positive, negative, or no correlation between one another (Bollen and Lennox, 1991, 307). This implies that the traditional assessment of individual item reliability and convergent validity are not meaningful for formative constructs (Hulland, 1999, 201). Diamantopoulos and Winklehofer (2001) suggested testing a MIMIC model for ensuring external validity. Here the measurement error can be examined in the construct level.

Indicator elimination – by whatever means – should not be divorced from conceptual considerations when formative measurement model is involved (Diamantopoulos and Winklehofer, 2001, 273). Therefore the external validity of the second-order CPM construct is estimated in *aggregate level* similar to earlier researches using second-order constructs (c.f. Reinartz, Hoyer and Kraft, 2004; Ulaga and Eggert, 2006). Here, external validity is examined in a higher structural level rather than emphasis being in the single indicator level. The MIMIC-model for studying the external validity is based on four items reflecting the overall level of CPM activities. These reflective indicators are: *"We analyze the current and future value of our customer relationships extensively", "We seek to develop our customer base analysis practices", "Customer value is a central factor in our customer base management practices", and "We seek to develop our customer base management practices"*

The model is tested by using Partial Least Squares (PLS) which is a component based structural equation modeling technique. Several reasons exist for choosing this approach instead of maximum likelihood based methods such as LISREL. First of all, PLS is chosen because of its ability to model latent constructs under conditions of non-normality which is the case in this research (e.g. Chin, Marcoulin and Newstead, 2003, 197). Secondly, The PLS also avoids two serious problems of maximum likelihood based methods namely the improper solutions and factor indeterminacy

(Fornell and Bookstein 1982, 440). Attempts to explicitly model formative indicators in the traditional structural equation modeling have been shown to lead identification problems – one way around this problem is to apply components-based PLS which can better model formative indicators (Chin 1998, 9–10). PLS estimates the latent variables as exact linear combination of the observed measures, thereby avoiding the indeterminacy problem and providing an exact definition of component scores. Finally, PLS is appropriate when theory is untested in an application domain (Gobal, Bostrom and Chin, 1992, 57). In sum, as the data is not normal and CPM is a formative second-order construct PLS becomes a natural analysis method.

The model is tested by using PLS-graph 3.0. Second-order factor measurement models can be estimated by using different methods. In this research the second-order model will be tested by hierarchical component analysis as recommended Wold (cf. Lohmöller, 1989, pp. 130-133). Here, a second order factor is directly measured by observed variables for all the first order factors. While this approach repeats the number of manifest variables used, the model can be estimated by the standard PLS algorithm (Chin, Marcoulin and Newstead, 2003, 123, appendix A). In other words the second-order constructs repeat the indicators of the lower order constructs (i.e. in analysis 6+10 indicators and responsiveness 6+9 indicators).

The four item reflective CPM measure has a Cronbach's alpha of 0.66 (0.65 acceptable), composite reliability of 0.798 (over 0.7) and AVE 0.495 (should be larger than 0.5) with item loadings of 0.69, 0.74, 0.71, and .0.68. Even though these figures are not ideal they can be seen acceptable as this research is 1) explorative in its nature and 2) the CPM measure is a very complex second-order construct including wide variety making it difficult to capture the whole construct with reflective measure (c.f. Churchill 1979, 68; DeVellis 1991, 85). In formative measurement item weights can be seen as validity coefficients (Diamantopoulos and Winklhofer 2001, 273). When testing the model several items had low weights. Item weights under 0.100 are clearly not relevant and they were removed from the CPM measure - removed items are marked with (*) see appendix 3. The suggested original list of items was very fine-grained based on theory. The removed items do not alter the overall measure as there was slight overlap in the items and the final items cover still very well the central aspects of CPM phenomenon theoretically. More specifically, items AE3 and AE4 can be seen to be covered by AE1 and AE2; AE6 by AE5 and AE7; AE8 by AE10; ME3 and ME7 by ME1, ME2, ME3; and MD4 by MD5 and MD6. Questions AE9 and ME1 were retained in the in the CMP construct because of conceptual reasons.
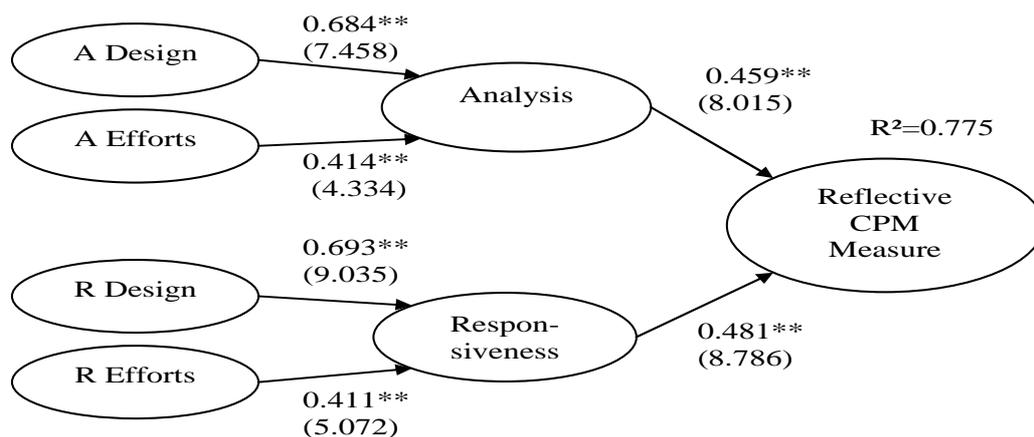

Figure 8 CPM construct validation with reflective measures

The path loadings, R² values and t-values of the structural model are presented in the figure 8 above. The interpretation of R² values is identical to that of traditional regression (Chin 1998, 316). The corresponding path estimates can also be interpreted in a same manner. Using a bootstrap procedure included in the PLS-graph 3.0 (500 resamples as recommended by Chin 1998, 323) all path coefficients of the model were found significant at the 1% level (indicated by**, t-values below). The Further the R² of the CPM construct is substantial (0.77) indicating that the reflective and formative measurement approaches share 77% of their variance supporting predictive validity of the formative CPM dimensions. Overall goodness-of-fit for the model can be estimated by GoF

figure (geometric mean of the average communality and the average R^2) which is 0.642 indicating good fit (c.f. Tenenhaus, Vinzi, Chatelin and Lauro 2005, 173). An alternative way of conceptualizing CPM could be a first-order model where design activities would be antecedents for the effort activities. Interestingly this model has a slightly lower R^2 (.746) indicating that the chosen conceptualization of CPM is correct. Purified outer model statistics can be found in appendix 1.

Secondly, nomological validity is further tested. This involves linking the index to other constructs with which it should be expected to be linked i.e. antecedents or consequences (Winklehofer and Diamantopoulos, 2001, 273). This is tested by examining how the two CPM sub-activities of analysis and responsiveness are related to managers' perceptions whether managing customers based on their value represents a strength/ weakness to the company. The perceived strength of value based management is measured by four reflective questions: *"Understanding the value of different customer relationships", "Reacting to value of different customers", "Efficient resource allocation between customers with different value", and "Tailored management of customer relationships from weak relationships to stronger partnerships".* The scale used is a seven point scale: 1- considerable weakness, 4- neither a weakness nor a strength, 7- considerable strength.

The four item reflective measure approximating the perceived strength of value based customer management has a good Cronbach's alpha 0.80, composite reliability of 0.87 (over 0.7) and AVE 0.63 (over 0.5) with item loadings of 0.78, 0.84, 0.77, and 0.78. Again all paths were found significant at 1% level except second-order analysis-measure which is significant at 5% level. Hence, all CPM components behave as expected supporting further the nomological validity of the CPM analysis and responsiveness activities. CPM activities explain 36% of the outcome construct's variance. The lower R^2 compared to above situation is natural as the dependent variable is an outcome of CPM activities (nomological validity) rather than in a measure reflecting the CPM (construct validity). The goodness-of-fit value GoF is 0.43 which is supports nomological validity. Outer model statistics can be found in see appendix 2.
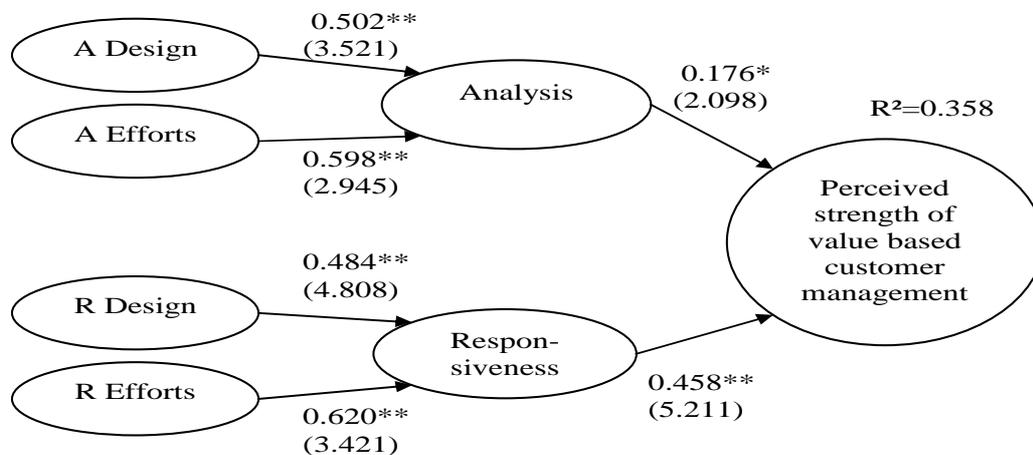

Figure 9 Test of nomological validity

In summary, it can be concluded that the measurement formation procedures support external and nomological validity for the customer portfolio management measure. Next the future research implications are discussed.

Research summary and future research implications

This paper has first of all conceptualized customer portfolio management based on theory and a qualitative study (7 cases). The conceptualization is based on IMP research related interaction theories, customer value related theories in B-to-B relationships, and additionally on information processing and learning related theories. Hence both company internal and customer relationships related "external" perspectives are present in this study. Based on theory customer portfolio management is a second order formative construct. It consists of two activities of analysis and responsiveness. Both these activities consist of efforts (degree done) and the design (quality aspect).

Secondly, based on literature and a qualitative measure development process with managers (7 interviews) and academic experts (10 interviews, 9 pilot questionnaires) indicators for CPM has been suggested. Thirdly the customer portfolio management measure has been validated based on quantitative data (N= 212). The results support the validity of the suggested CPM construct.

Naturally the focus of this paper is largely theoretical and the outcomes of this paper relate mainly for researching CPM. However, some managerial issues can be underlined as well. The operationalisation of CPM based on the literature and qualitative study emphasise certain main issues in designing customer portfolio management for companies. In analysing the customer base the focus of customer value can vary from narrow monetary view to very broad view including the non-monetary value of customers. Different relationships have different roles and functions in the focal company customer base. Further the state and characteristics of customer relationship can affect the future outcomes of customer relationships. These issues should be considered carefully when analysing customer base. Importantly two essential aspects were distinguished in the customer portfolio management implications. Optimally, the portfolio management should *match* (current focus) company resource allocation to customer value for cost-efficient customer treatment. Further, a company should also be able to *develop* (future focus) its customer portfolio structure long-term effectiveness goals.

The suggested conceptualisation and measure clearly supports the current conceptual customer portfolio research and will open up new avenues for creating knowledge about companies' actual customer portfolio management practices. There is currently a great amount of researches that describe and also provide understanding about conducting portfolio analysis. However, there is no knowledge to what degree companies apply CPM in business, or to a what degree the companies' portfolio management activities are connected to performance. Next, three possible research areas for future research for CPM measure are presented.

First of all the performance outcomes of CPM are of great interest. A natural question is whether CPM activities are related to company performance (c.f. Turnbull and Zolkiewski 1997), or can they be even counterproductive (c.f. Dubois and Pedersen, 2002)? As CPM is conceptualized as a process where a company learns about its customers and their value and responds to this knowledge it has the possibility to affect performance. Are the activities connected to overall customer performance or financial customer performance such as customer profitability? Are all aspects of portfolio management are equally important from performance point of view? What is the relative importance of analysis and responsiveness activities for performance?

Secondly, there is much conceptual research suggesting that customer relationship management is contingent on the relational context a company is acting in. For example a highly relevant proposition by Möller and Halinen (1999, 2000) is that market and network –like exchange contexts favour different kinds of relationship management. Therefore it would be highly interesting to investigate whether analysis or responsiveness actives are emphasised in certain relational contexts. Alternatively, the importance of CPM efforts and design for performance in different contexts is a highly interesting issue from management point of view. Answering these questions will have notable managerial relevance.

Thirdly, also the company internal arrangements represent an interesting domain for future research. How do interdepartmental relationships, organizational alignment, top-management support, accounting function, customer information acquisition, or information quality affect CPM outcomes? The suggested measure can help providing answers to these central questions relating to relationship management.

Anderson, J. C. and Narus, J. A. (1991) "Partnering as a focused marketing strategy", **California Management Review**, Vol. 33, No. 3, pp.95–113.

Argyris, C.(1977) "Double-loop learning in organizations", **Harvard Business Review**, vol. 55, No. 5, pp.115-125.

Armstong, J. S. and Brodie, R. J (1994) "Effects of portfolio planning methods on decision making: Experimental results", **International Journal of Research in Marketing**, Vol. 11, No. 1, pp.73–84.

Armstrong, S. J. and Overton, T. S. (1977). "Estimating nonresponse bias in mail surveys" **Journal of Marketing Research**, 16 (August), pp.396-402

Bollen, K. "Multiple Indicators: Internal Consistency or No Necessary Relationship?", **Quality & Quantity**, (18), 1984, pp. 377-385.

Bollen, K. and Lennox, R. (1991) "Conventional Wisdom on Measurement: A Structural Equation Perspective", **Psychological Bulletin**, Vol. 110, No. 2, pp.305-314.

Campbell, A. (2003) "Creating customer knowledge: managing customer relationship management programs strategically", **Industrial Marketing Management**, Vol. 32, No. 5, pp.375-83.

Chin, W., Marcolin L. and Newsted R. (2003) "A Partial Least Squares Latent Variable Modeling Approach for Measuring Interaction Effects: Results from a Monte Carlo Simulation Study and an Electronic-Mail Emotion/Adoption Study", **Information Systems Research**, Vol. 14, No. 2, pp.189-217.

Chin, W. (1998) "Issues and Opinion on Structural Equation Modeling", **MIS Quarterly**, Vol. 22, No. 1, pp.7-16.

Churchill, G. (1979) "A paradigm for developing better measures of marketing constructs", **Journal of Marketing Research**, vol. 16, No. 1, pp.64-73.

Cunningham, M. and Homse, E. (1982) "An interaction approach to marketing strategy. In: Håkansson Håkan, editor. **International Marketing and Purchasing of Industrial Goods**, Chichester, John Wiley & Sons, 1982. pp. 328–345.

DeVellis, R. F. (1991) **Scale Development : Theory and Applications**. Sage Publications, Inc., Thousand Oaks, California.

Diamantopoulos and Siguaw (2006) "Formative Versus Reflective Indicators in Organizational Measure Development: A Comparison and Empirical Illustration", **British Journal of Management**, Vol. 17, no. 4, pp.263-282.

Diamantopoulos, A. and Winklhofer H. (2001) "Index Construction with Formative Indicators: An Alternative to Scale Development", **Journal of Marketing Research,** Vol. 38, no. 2, pp. 269-277.

Dubois, A. and Pedersen A-C. (2002), "Why Relationships do Not Fit into Purchasing Portfolio Models – a Comparison between the Portfolio and Industrial Network Approaches", **European Journal of Purchasing & Supply Management**, vol. 8 No. 1, pp.35-42.

Easton, G. and Araujo L. (2003) "Evaluating the Impact of B2B e-Commerce: A Contingent Approach", **Industrial Marketing Management**, Vol. 32, No. 5, pp.431-439.

Fiocca, R. (1982) "Account portfolio analysis for strategy development". **Industrial Marketing Management,** Vol. 11, No. 1, pp.53–62.

Fornell, C. and Bookstein, F. L. (1982) "Two Structural Equation Models: LISREL and PLS Applied to Consumer Exit-Voice Theory", **Journal of Marketing Research**, Vol. 19, No. 4, pp.440-452.

Freytag, PV. and Mols NP. "Customer portfolios and segmentation". In: Freytag, P. (ed.) **Portfolio Planning in a Relationship Perspective.** Köbenhavn: Forlaget Thomson, 2001. pp. 93–129.

Gopal, A., Bostrom, R. and Chin, W (1992). "Applying Adaptive Structuration Theory to Investigate the Process of Group Support Systems Use", **Journal of Management Information Systems**, Vol. 9, No. 3, pp.45-69.

Grönroos, C. (2002) "Quo Vadis Marketing?" **Marketing Review**, 2002. vol. 3, No. 2, pp.129-146

Gujarati, D. (2003) **Basic econometrics.** 4th Edition, McGraw Hill, Boston.

Hair, J., Anderson, R. and Tatham, R. (1995) **Multivariate Data Analysis**. Macmillan: New York.

Håkansson, H. (ed.) (1982) **International Marketing and Purchasing of Industrial Goods**, New York, John Wiley & Sons.

Huber, G., (1991) "Organizational Learning: The Contributing Process and the Literature", **Organisational Science**, vol. 2, pp.88–115

Hulland (1999) "Use of Partial Least Squares (PLS) in Strategic Management Research: A Review of Four Recent Studies", **Strategic Management Journal**, Vol. 20, No. 2, pp.195-204.

Jarvis, C. Mackenzie S. and Podsakoff P. (2003), "A Critical Review of Construct Indicators and Measurement Model Misspecification in Marketing and Consumer Research," **Journal of Consumer Research**, Vol. 30, No. September, pp.199-218.

Jaworski, B. J. - Kohli, A. K. (1993) "Market orientation: Antecedents and consequences", **Journal of Marketing**, vol. 57, No. 3, pp.53–70.

Johnson, M. D. – Selnes, F. (2004) "Customer portfolio management: Toward a dynamic theory of exchange relationships", **Journal of Marketing**, vol. 68, No. 2, pp.1-17.

Kahane, Y. (1977) Determination of the product mix and the business policy of an insurance company – a portfolio approach. **Management Science**, Vol. 23, No. 10, pp. 1060–1069.

La Forge, R., and Cravens D. (1982) "Steps in Selling Effort Deployment", **Industrial Marketing. Management**, Vol. 11, No. 3, pp.183-194.

Leek, S., Turnbull P., and Naudé P. (2002) "Managing business to business relationships: an emerging model" **Journal of Customer Behaviour**; Vol. 1, No. 3, pp.357–375.

Lohmöller, J.-B. (1989) **Latent Variable Path Modeling with Partial Least Squares**, Springer-Verlag, New York.

Möller K., and Halinen A. (2000) "Relationship marketing theory: Its roots and directions", **Journal of Marketing Management,** Vol. 16, No. 1, pp. 29–54.

Möller, K., and Törrönen, P. (2003) "Business Supplier's Value Creation Potential A Capability-based analysis", **Industrial Marketing Management**, Vol. 32, No. 2, pp.109–119.

Möller, K., and Halinen A. (1999) "Business Relationships and Networks: Managerial Challenge of Network Era", **Industrial Marketing Management,** vol. 28, No. 5, pp.413-427.

Morgan, R. M. – Hunt, S. D. (1994). "The Commitment-Trust Theory of Relationship Marketing", **Journal of Marketing**, Vol. 58, No. 3, pp.20-38

Payne, A.F.T. and Frow, P. (2005) "A strategic framework for customer relationship management", **Journal of Marketing**, Vol. 69, No. 4 pp. 527-538.

Räsänen H. (1999) **Developing intimate relationships: the effect of knowledge-intensity on management of customer relationship portfolios in profitable high-technology firms**. Ph.D thesis. Tampere: TTKK Monistamo, Tampereen teknillinen korkeakoulu: julkaisuja 245.

Reinartz, W., Krafft, M., and Hoyer, W. D. (2004) "The customer relationship management process: Its measurement and impact on performance", **Journal of Marketing Research**, vol. 41, No. 3, pp. 293-305.

Salle, R., Cova, B. and Pardo, C. (2000) "Porfolio of Supplier–Customer relationships". In: **Getting better at sensemaking**, ed. by Arch Woodside, 419-442. Jai Press inc.: Stamford, Connecticut.

Sinkula, J. (1994), "Market Information Processing and Organizational Learning", **Journal of Marketing**, Vol. 58, No. 1, pp. 35-45.

Tenenhaus V., Chatelin and Lauro (2005) "PLS path Modelling", **Computational Statistics & Data Analysis**, Vol. 48, No. 1, pp. 159-205.

Terho, H. and Halinen, A. (2007) "Customer portfolio analysis practices in different exchange contexts", **Journal of business research.**

Turnbull, P. (1990) " A review of portfolio planning models for industrial marketing and purchasing management", **European Journal of Marketing,** Vol. 24 No. 3, pp. 7-22.

Turnbull, P. and Zolkiewski, J. (1997) "Profitability in customer portfolio planning", In Ford, D (ed.) **Understanding Business Markets: Interaction, Relationships and Networks** 2nd edition, The Dryen Press: London. pp. 305–325.

Ulaga, W. and Eggert, A. (2006)."Value-Based Differentiation in Business Relationships: Gaining and Sustaining Key Supplier Status", In: **Journal of Marketing**, Vol. 70, No. 1, pp. 119-136.

Walter, A, Ritter T, and Gemünden H. (2001) "Value creation in buyer-seller relationships: theoretical considerations and empirical results from a supplier's perspective", **Industrial Marketing Management**, Vol. 30, No. 4, pp. 365–377.

Wilson, D., and Jantraria, S. (1997) "Understanding the Value of a Relationship" in Ford, D (ed.) **Understanding Business Markets: Interaction, Relationships and Networks**, Second Edition, The Dryen Press, London, pp. 288–304.

Yorke, D. and Droussiotis G. (1994) "The use of customer portfolio theory: An empirical survey", **Journal of Business and Industrial Marketing**, Vol. 9, No. 3, pp. 6–18.

Zablah, A. and Bellenger D., and Johnston W. (2004) "An Evaluation of Divergent Perspectives on Customer Relationship Management: Towards a Common Understanding of an Emerging Phenomenon", **Industrial Marketing Management**, Vol. 33, No. 6, pp. 475-89.

Zolkiewski, J. and Turnbull, P. (2002) "Do relationship portfolios and networks provide the key to successful relationship management?", **Journal of Business and Industrial Marketing**, vol. 17, No. 7, pp. 575-.597.

APPENDIX 1. Formative measure formation – Outer Model, construct validity

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Formative measures Item weights:	Original sample estimate	Mean of subsamples	Standard error	T-Statistic
AE :				
Analysis1	0.1912	0.1941	0.0959	**1.9935**
Analysis2	0.1680	0.1526	0.0860	***1.9527+***
Analysis3	0.2879	0.2661	0.0866	**3.3235**
Analysis4	0.4324	0.4624	0.0891	**4.8521**
Analysis5	0.0925	0.0667	0.0929	0.9962
Analysis6	0.2592	0.2697	0.0908	**2.8541**
AD :				
Analysis1	0.2857	0.2872	0.0994	**2.8754**
Analysis2	0.2406	0.2398	0.0803	**2.9952**
Analysis3	0.5041	0.4797	0.0956	**5.2738**
Analysis4	0.1710	0.1915	0.0922	***1.8538+***
RE :				
Manageff1	0.0906	0.0945	0.0987	0.9175
Manageff2	0.4227	0.4371	0.0891	**4.7467**
Manageff3	0.1450	0.1197	0.0946	1.5321
Manageff4	0.3176	0.2996	0.1018	**3.1186**
Manageff5	0.1067	0.1277	0.0952	1.1213
Manageff6	0.1349	0.1245	0.0743	***1.8162+***
Manageff7	0.2261	0.2169	0.0792	**2.8560**
RD :				
Managdes1	0.2461	0.2322	0.0791	**3.1100**
Managdes2	0.2797	0.2830	0.0927	**3.0184**
Managdes3	0.1899	0.1984	0.1037	***1.8316+***
Managdes4	0.1771	0.1695	0.0989	**1.7898**
Managdes5	0.3783	0.3723	0.0900	**4.2027**
Reflective CPM measure - item loadings:				
(Composite Reliability = 0.798 , AVE = 0.497)				
Reflect_1	0.6862	0.6837	0.0634	10.8168
Reflect_2	0.7444	0.7412	0.0468	15.9212
Reflect_3	0.7126	0.7135	0.0645	11.0427
Reflect_4	0.6746	0.6790	0.0703	9.5928

Cronbach's alpha 0.66

APPENDIX 2. Formative measure formation – Outer Model, nomological validity

```
=======================================================================
Formative measures  Original    Mean of     Standard    T-Statistic
Item weights:       sample      subsamples  error
                    estimate
AE        :
    Analysis1       0.3012      0.3074      0.1290      2.3357
    Analysis2       0.2182      0.2050      0.1303      1.6743+
    Analysis3       0.3070      0.2863      0.1146      2.6793
    Analysis4       0.2519      0.2576      0.1141      2.2075
    Analysis5       0.0108      0.0018      0.1105      0.0977
    Analysis6       0.3396      0.3458      0.1025      3.3136
AD        :
    Analysis1       0.5835      0.6032      0.1268      4.6016
    Analysis2      -0.0178     -0.0791      0.1348      0.1320
    Analysis3       0.6029      0.5718      0.1300      4.6366
    Analysis4      -0.0957     -0.0417      0.1334      0.7175
RE        :
    Manageff1       0.1781      0.1980      0.1121      1.5887
    Manageff2       0.2695      0.2673      0.1088      2.4773
    Manageff3       0.3777      0.3475      0.1231      3.0676
    Manageff4       0.1809      0.1822      0.1206      1.5003
    Manageff5       0.0750      0.0777      0.1015      0.7392
    manageff6       0.1781      0.1738      0.0936      1.9026+
    manageff7       0.1988      0.1921      0.1151      1.7268+
RD        :
    Managdes1       0.5402      0.5359      0.1338      4.0381
    Managdes2       0.2464      0.2479      0.1478      1.6672+
    Managdes3      -0.2237     -0.2210      0.1333      1.6782+
    Managdes4       0.1607      0.1527      0.1194      1.3464
    Managdes5       0.4024      0.3915      0.1148      3.5038
CPM_outcome (reflective) – item loadings:
(Composite Reliability =      0.871 , AVE =      0.629 )
    outcome_1       0.7839      0.7782      0.0358      21.9038
    outcome_2       0.8433      0.8414      0.0253      33.3392
    outcome_3       0.7684      0.7668      0.0384      20.0341
    outcome_4       0.7748      0.7723      0.0298      25.9831
```

Cronbach's alpha 0.80

APPENDIX 3. Questionnaire – CPM items

Analysis efforts:
1. We analyze the value of all customer relationships in our customer base
2. We analyze the costs of all customer relationships in our customer base
3. *We evaluate the expected value of our customer relationships(*)*
4. *In our customer base, we look for customers with high future value potential(*)*
5. In our customer base, we look for diverse customer groups that represent different value for our company
6. *We make comparisons of our customers based on their value(*)*
7. We segment our customers based on their value
8. *We analyze the roles different customers have to our company in the long term(*)*
9. We analyze the development of different customer groups in our customer base
10. We analyze the health of our customer base in the long term

Analysis design
1. *We have carefully thought out the essential criteria for analyzing our customer relationships (*)*
2. We evaluate the quality of our customer base analysis practices
3. We tend to discuss how to develop our customer base analysis practices
4. We have tailored the criteria of our customer base analysis to match the special characteristic of our business
5. We have invested in developing our customer base analysis methods
6. *We adapt our customer base analysis practices based on the experiences received from current practices (*)*

Response efforts
1. We tailor different product and service entities for customers based on their value
2. We have created different operation models for treating customers with different value (e.g. service channels, level of service, etc.)
3. *We allocate our sales resources to customers in relation to their value for our company(*)*
4. We systematically direct resources to customers that have high future value potential
5. With our actions, we aim at converting low-value relationships to more valuable ones
6. We systematically develop our most valuable customer relationships
7. *We try to retain customer relationships that do not have development potential, but are careful with overly investing in these relationships(*)*
8. We ignore or aim at terminating certain unprofitable customer relationships
9. We put effort in finding new customers that have potential value to our company

Response design:
1. We have carefully considered the central aspects of our customer base management practices
2. We evaluate the quality of our customer base management practices
3. We try to find means to improve our customer base management practices
4. *We put a lot of effort to apply the principles of our customer base management to our everyday business(*)*
5. We have created concrete instructions of our customer management principles to our personnel working at customer interface
6. We adapt our customer base management practices based on the experiences received from our practices

   (*) = removed items