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# Managing contract manufacturing relationships - An explorative research framework

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# Managing contract manufacturing relationships - An explorative research framework

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***Purpose:*** *Contract manufacturing has established itself as a cornerstone of manufacturing practices across industries. The high degree of external value creation, operational interfaces, relational dynamics, and knowledge exchange coordination require demand-oriented management of contract manufacturing service providers from an outsourcing company's perspective.*

***Methodology:*** *An explorative research framework for managing contract manufacturing organizations (CMOs) is developed through a literature review on inter-organizational relationships (IOR) and empirical validation. The framework draws on contingency theory and complex adaptive systems theory as structural theories to support the research process.*

***Findings:*** *The need for a dedicated management approach of CMOs in distinction to other IORs is derived. The developed framework indicates the role of situational variables of contract manufacturing and their inherent dynamics for relationship management of CMOs.*

***Originality:*** *Despite the strong practical relevance, the literature on the management of IORs does not adequately address the phenomenon against the background of the distinctive management challenges of contract manufacturing. In relationship management, the developed framework systematically addresses these challenges because of the dynamic growth of the contract manufacturing market.*

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# 1 Introduction

Contract manufacturing organizations (CMOs) are taking over ever-larger shares of the value creation in the supply chains of brand-leading companies (Tsay et al., 2018, p. 1177; Kaiser and Obermaier, 2020, p. 28). Despite a high level of maturity of scientific and practical literature on the management of supplier relationships, a large share of outsourcing initiatives miss targeted performance goals or even fail (Wiengarten, Pagell, and Fyness, 2013, p. 630; Foerstl, Kirchoff and Bals, 2016, p. 493). It has been remarked that the ever more dynamic growth of outsourcing practices in contract manufacturing relationships (CMRs) has left research lagging behind practice (Busi and McIvor, 2008, p. 186). To better understand how CMRs can be successfully managed, this paper aims to derive the relevant specifics in the management of CMOs and consider them in an exploratory research framework. Accordingly, the following research questions are addressed:

RQ1: What are the distinctive features of the management of CMRs?

RQ2: How could a dedicated relationship management approach for CMRs be developed?

The paper is organized as follows: Chapter two provides an overview of the state of research and highlights the relevance of managing CMRs and particular challenges. Chapter three presents the research design. In chapter four, the research questions are answered, and the results are presented. Finally, chapter five critically reflects on the results and provides an outlook on further research opportunities.

# 2 State of research

Outsourcing can be defined as "the process by which a company subcontracts activities traditionally performed internally to external parties," with contract manufacturing being a specific form of outsourcing (Meira et al., 2010, pp. 153–154). The subcontracted activities can encompass the entire manufacturing process and involve "manufacturing-related processes" such as product design (Sousa and Voss, 2007, p. 975). In the organizational literature, contract manufacturing and outsourcing are considered

organizational choices to achieve an organization's objective according to its capabilities (Nassimbeni, 1998, p. 548; Cropper et al., 2009, p. 3). However, research on the coordination of strategic alliances and networks is generally scarce and short of operational aspects and contingencies (Park, 1996, p. 820; Nassimbeni, 1998, p. 548). While IORs are a growing research interest in management accounting, Meira et al. note that these studies have "concentrated on the general issues that cut across the various types of inter-firm relationships" (Meira et al., 2010, p. 154). It has been remarked that the heterogeneity of IORs creates unique conditions which need to be investigated separately (Dekker, 2004, p. 29). However, common features of contract manufacturing, such as "parallel production" (Nordigården et al., 2014, p. 974), have been largely neglected in research on the control of CMRs so far.

In outsourcing, the literature on production and operations management focuses on the antecedents and performance implications of outsourcing, while relationship management is mainly viewed as a mediator of performance (Tsay et al., 2018, p. 1186). Consequently, supplier relationship management follows this direction focusing solely on specific aspects or performance dimensions (Park et al., 2010, p. 496).

Hence, there are no conclusive results on the management of CMRs, as methodological approaches do not consider the specific aspects of CMRs, and dedicated research on contract manufacturing focuses on decisions before contracting (Busi and McIvor, 2008, p. 193). Especially the connection between strategic and operational activities in managing CMRs requires further research (Busi and McIvor, 2008, p. 191).

## 2.1 Relevance of management of CMRs

Contract manufacturing has experienced remarkable growth across industries over the past decades and is expected to continue (Busi and McIvor, 2008, p. 186; Handley and Gray, 2013, p. 1540). Recently Kaiser and Obermaier (2020) observed that outsourcing in German manufacturing companies continues despite mixed performance results. The commitment can be attributed to the development of contract manufacturing as a dynamic business model that offers manufacturing companies specialized services that exceed the traditional motivation of cost reduction (Tsay, et al., 2018, p. 1177). In addition, high complexity in technologies, processes, and capital are recognized as

drivers for outsourcing manufacturing, supporting the ongoing growth of contract manufacturing (544; Wüthrich and Philipp, 2001, p. 421).

The emergence of "strategic contract manufacturing relationships" (Tsay et al., 2018, p. 1178) indicates that CMRs exceed the management requirements of classic buyer-supplier relationships (BSRs) due to their strategic implications. CMRs are entered into upon various objectives that require long-term collaboration and dependency (Nassimbeni, 1998, p. 545). These objectives include cost savings, reduced capital lockup, flexibility, speed to market, access to technical expertise, and the ability for brand-leading companies to focus on their core competencies (Handley and Gray, 2013, p. 1540). Meanwhile, CMOs are integrating forward to offer clients an entire portfolio of services as a strategic partner, increasing the dependency between them (Tsay et al., 2018, pp. 1177–1178). As a result, contract manufacturing is already regarded as a competitive factor in specific industries, such as the pharmaceutical industry (Zhang et al., 2013, p. 1094). The management of CMRs can therefore be directly linked to corporate success: While on the one hand, appropriate management for CMRs leads to competitive advantages, studies show that inadequate management negatively affects company performance (Dekker, 2004, p. 28; Pernot and Roodhooft, 2014, p. 158).

## 2.2 Challenges in the management of CMRs

High failure rates of contract manufacturing arrangements indicate that their management is challenging (Kinkel, 2014, p. 64). Five types of challenges in managing CMRs are presented below to accentuate the topic's relevance to practitioners.

***Inter-organizational Interfaces***

Medium- to long-term improvement of operational metrics through management practices, such as business improvement, knowledge management, performance management, and change management, is not easily achieved in an inter-organizational context (Busi and McIvor, 2008, p. 193). Therefore, Handley and Gray (2013) have already advocated an "inter-organizational quality management" approach to outsourced manufacturing. However, entering into CMRs means that operational interfaces are overshadowed by intangible complexity drivers that must be reconciled to ensure a

stable relationship (Lamminmaki, 2008, p. 163). These interdependencies are rooted in social dynamics, organizational culture, and work ethics and interact with operations management in often opaque ways (Nassimbeni, 1998, p. 545; Zhang et al., 2013, p. 1082). Consequently, it has been described that the traditional "structure follows strategy" sequence is reversed in CMRs (van den Bogaard and Speklé, 2003, p. 92).

***Knowledge Interconnection***

Knowledge interconnection is seen as a decisive factor in long-term business relationships' success (Mandjak et al., 2021, p. 13). In CMRs, knowledge management extends to different types of knowledge, such as market, process, and material expertise, encompassing various layers of management, which operate according to different guiding patterns and objectives (Mandjak et al., 2021, p. 13). Revilla and Villena (2012) show that poor alignment of knowledge management across management layers results in unwanted performance results. However, practical knowledge management in CMRs must enable knowledge interconnection and counter appropriation concerns (Dekker, 2004, p. 28). Against the background of sharing sensitive product and manufacturing data, appropriation due to "coopetition" by CMOs, plays a crucial role in managing CMRs (Tsay et al., 2018, p. 1178). Coopetition describes a phenomenon in which there is simultaneously cooperation and competition between companies and is particularly prevalent in high-tech industries where contract manufacturing is also common practice (Chen, Wang, and Xia, 2019, p. 1447).

***Trust***

Another example of the complex intertwining between operational and strategic management layers is found in trust. In order to act flexibly in dynamic markets, it is necessary to strike a balance between formal control and trusting cooperation (Malmi and Brown, 2008, p. 296). However, studies have shown that inter-organizational trust is closely linked to interpersonal trust and cannot be easily standardized (Varoutsa and Scapens, 2018, p. 135). Pernot and Roodhooft (2014) show that staffing key positions in CMRs based on interpersonal trust has a critical impact on relationship performance. Consequently, communication about all issues is essential in managing CMRs (Wiengarten, Pagell, and Fyness, 2013, p. 640).

***Heterogeneity***

Contract manufacturing is not a concept with fixed parameters but moves on a scale between in-house and third-party manufacturing and encompasses various administrative forms (Nordigården et al., 2014, p. 994). Consequently, due to the high heterogeneity of CMRs, literature and practice focus on single aspects of relationship management, such as control (Kang et al., 2014, p. 179), knowledge management (Mandjak et al., 2021, p. 13), or quality management (Handley and Gray, 2013, pp. 1540–1541). However, Handley and Gray (2015) demonstrated that high heterogeneity of CMRs leads to little routine and more unsatisfactory quality compliance due to increased complexity across products.

***Dynamics***

Furthermore, the challenges cannot be viewed in a static light. As relationship characteristics change over time, the management of CMRs must also adapt its communication, coordination, and control measures (Mandjak et al., 2021, p. 5). Pernot and Roodhoft (2014) illustrated the effects of dynamic relationship development and the inadequate response of relationship management. Their study shows the impact of dynamics on managing CMRs and how a thorough understanding of the relationship variables is necessary for problem-solving. Therefore, a key challenge in managing CMRs is to align the management approach to the dynamics of the relationship variables and their interdependencies.

# 3 Methodology

The research design and data collection and analysis of the study are described below.

## 3.1 Research design

The research motivation is grounded in the assumption that the management of CMRs comprises dedicated challenges, which require a different approach to relationship management than in the case of BSRs and product-unrelated service outsourcing

relationships (SORs). Therefore, the unit of analysis is the management of CMRs within a dyad from the perspective of the outsourcing company.

Based on the premise that new forms are constantly evolving in practice, primary and secondary sources are used to answer the research questions (Busi and McIvor, 2008, p. 186;). A design science research approach was adopted to structure the research process and ensure the rigor and relevance of the exploratory research framework (Hevner, 2007, p. 3). The first distinctive features of CMRs were derived through literature research on IORs following the approach by Arksey and O'Malley (2005). Their scoping method aims to rapidly map an unexplored research area for fundamental concepts and relevant studies. It can be accompanied by parallel empirical validation. In line with their approach, these findings served as a knowledge base for empirical proof, which was conducted through a multiple case study design according to Yin (2018). Because CMRs are built on multilayered and complex relationships, only a small sample can be thoroughly analyzed. Therefore, an inductive qualitative case study approach is chosen (Eisenhardt, 1989, p. 533). The high dynamics and contingency, which require a deep understanding of CMRs, support a case study approach (Ketokivi and Choi, 2014, p. 236). The study can be characterized as a "theory generation" study based on Corbin and Strauss' (1990) grounded theory.

## 3.2 Data collection and analysis

For the empirical data collection, cases from different industries were collected in line with the objectives for case selection by Seawright and Gerring (2008) (see table 1). The pharmaceutical sector was chosen due to the high relevance of contract manufacturing and its industry-specific aspects, which indicate the occurrence of CMRs (Wüthrich and Philipp, 2001, p. 421; Zhang et al., 2013, p. 1081). In line with the study's exploratory nature, the pharmaceutical industry was considered the "polar case" for, particularly complex CMRs. Thus, a particular industry bias was tolerated in the sample selection to detect distinctive features of management of CMRs empirically. Two additional industries were included in the sample to reduce overweight. Consumer electronics and the food industry were selected due to their respective high and low maturity on contract manufacturing (Handley and Gray, 2015, p. 1024; Tsay et al., 2018, p. 1177).

Table 1: Case Overview

| ID | Industry | No. of Interviews | Interview Partners | Relationship Level |
|---|---|---|---|---|
| 1 | Pharmaceutical industry | 3 | Director Strategic Partnerships<br>Head Supply Chain Planning & Execution<br>Head Product Supply<br>Product Supply Team | Management<br>Management<br>Operations<br>Operations |
| 2 | Food Industry | 1 | Head Contract Manufacturing | Management |
| 3 | Consumer Electronics | 1 | Logistics Management Specialist | Operations |

The interviews were conducted with outsourcing companies for which external manufacturing by CMOs accounts for a significant share of value creation. In addition, to consider both operational and strategic perspectives, interviewees from the corresponding management levels were consulted.

The interviews followed a semi-structured approach according to the study's explorative design (Yin, 2018). The intention was first to understand the company's case. Then, based on the answers of the interview partners, individual findings from the literature research were raised and discussed. The questionnaire was sent to the interviewees in advance, but the literature search results were not released to not bias the participants. The duration of the interviews varied from 30 to 60 minutes. The interviews were recorded and later transcribed.

Analysis of the data was conducted through data triangulation. The first-order analysis was based on the individual cases, and the second-order analysis included a cross-case

analysis. It was then integrated with the literature review results following the approach by Gioia et al. (2013).

# 4 Results

The following section presents the findings from the literature review, which are then evaluated through case studies. Subsequently, the results are incorporated into an exploratory research framework.

## 4.1 Findings from literature

In the absence of studies that directly addressed the research question, the scoping study took two approaches: Firstly, typologies and taxonomies in IORs were examined to identify potential distinctive features. Secondly, studies related to supplier control in outsourcing were reviewed to determine specific challenges from which distinctive features could be derived. Relevant studies were identified by consulting electronic databases (Google Scholar, Science Direct, Emerald) and reference lists. Seven relevant studies of the first type and 118 of the second type were found. Through analysis of these studies, seven distinctive features of management of CMRs could be identified (see table 2). While four distinguishing characteristics could be derived from the classification of CMRs into existing typologies, three additional features were selected through studies of management challenges. These features impact the management of CMRs and place particular demands on companies when managing their CMOs. Moreover, the comparison with BSRs and SORs shows that these features are critical in managing CMRs.

Table 2: Distinctive features of CMRs in literature

| ID | Feature | CMR | BSR | SOR |
|---|---|---|---|---|
| 1 | Asset specificity | High | Low | Medium |
| 2 | Share of value added | High | Low | Low |

| ID | Feature | CMR | BSR | SOR |
|---|---|---|---|---|
| 3 | Appropriation concerns | High | Low | Low |
| 4 | Disintegration orientation | Vertical / Horizontal | Vertical | None |
| 5 | Service delimitation | Complex | Simple | Simple |
| 6 | Operational interdependency | Coordinated / Collaborative division of labor | Exchange of information and results | Coordinated division of labor |
| 7 | Contract form | Framework agreements / Capital investments | Purchase / Framework agreements | Framework Agreements |

***Asset specificity***

Asset specificity is high by default in CMRs because the CMO produces the goods in question for one client only. Physical assets and the manufacturing process may be new to either partner and require detailed knowledge interconnection and control for the setup and afterward (van den Bogaard and Speklé, 2003, p. 92). In BSRs and SORs, product or service asset specificity is much less distinct, making the assets used in the relationship easier to replace or transfer (Park, 1996, p. 801).

***Share of value-added***

Since quality risk is higher with externally supplied products, the concerned share of value-added relates to the required control intensity of the relationship (Handley and Gray, 2013, pp. 1540; Tsay et al., 2018, p. 1177). In retail BSRs, the value proposition lies in the product availability, and quality problems can be passed onto the brand-leading

manufacturer, giving it a greater interest in optimal product quality (Schuckel and Toporowski, 2007, p. 25).

***Appropriation concerns***

Appropriation concerns are especially relevant in CMRs due to the depth of knowledge interconnection over an extended amount of time (Dekker, 2004, p. 29). In BSRs and SORs, detailed knowledge on products is rarely shared, and incentives for opportunism are low. Prevalent appropriation concerns demand high control intensity and deliberate information sharing practices (Gerybadze, 2003, p. 452). Coopetition in CMRs puts additional matter on protecting intellectual property since incentives for opportunism are high (Tsay et al., 2018, p. 1178).

***Disintegration orientation***

While supply chain disintegration is strictly vertical in BSRs and SORs, horizontal disintegration is common in CMRs (Nordigården et al., 2014, p. 974). The diversity of disintegration forms leads to a high degree of heterogeneity among CMRs, affecting coordination efforts and hindering management standards and routines (Handley and Gray, 2015, p. 1034).

***Delimitation of the service***

As CMRs are turning more strategic, the delimitation of the service a CMO offers becomes more difficult compared to isolated value propositions in BSRs and SORs (Gerybadze, 2003, p. 452). While operational control mechanisms lose their effectiveness in a strategic setting, knowledge interconnection, trust, and informal control become decisive for performance management (Nassimbeni, 1998, p. 548; 158; Pernot and Roodhooft, 2014, p. 168).

***Operational interdependence***

An increasing economic value of the cooperation and strategic relationship objectives lead to strong interdependence in CMRs (Zhang et al., 2013, p. 1082). Hence, the relationship extends across several management layers, whose involvement must be coordinated (Nassimbeni, 1998, p. 540; Zentes, J.: Swoboda, B., Morschett, 2003, p. 21).

Since relationship activities in BSRs and SORs are primarily standardized, relationship intensity is significantly lower in these cases.

***Contract form***

Joint capital investment in facilities and development is typical for CMRs, unlike BSRs and SORs, and increases the relationship's commitment intensity and switching barriers (Morschett, 2003, p. 394). Therefore, financial interdependence needs to be considered in performance management to incentivize value-preserving use of dedicated equipment.

## 4.2 Empirical findings

The analysis of the case studies revealed nine management features that practitioners from different industries and management layers consider distinctive of CMR management which are displayed in figure 1. Among the nine characteristics stated, three extend the features already identified by the literature review, while the others can be attributed to them, thus validating them.

***Product Ownership***

Unlike in BSRs, the buyer in CMRs is the product owner. Therefore, product management and production management are dispersed between the contractual partners and coordinated along the product life cycle. Product ownership affects communication and planning of market and product launches, pricing strategies, quality, and knowledge management. Knowledge management can be especially crucial in the case of coopetition when the CMR also comprises competitive aspects. Additionally, performance management is affected since it is necessary to incentivize CMOs to actively support product development and improvement.

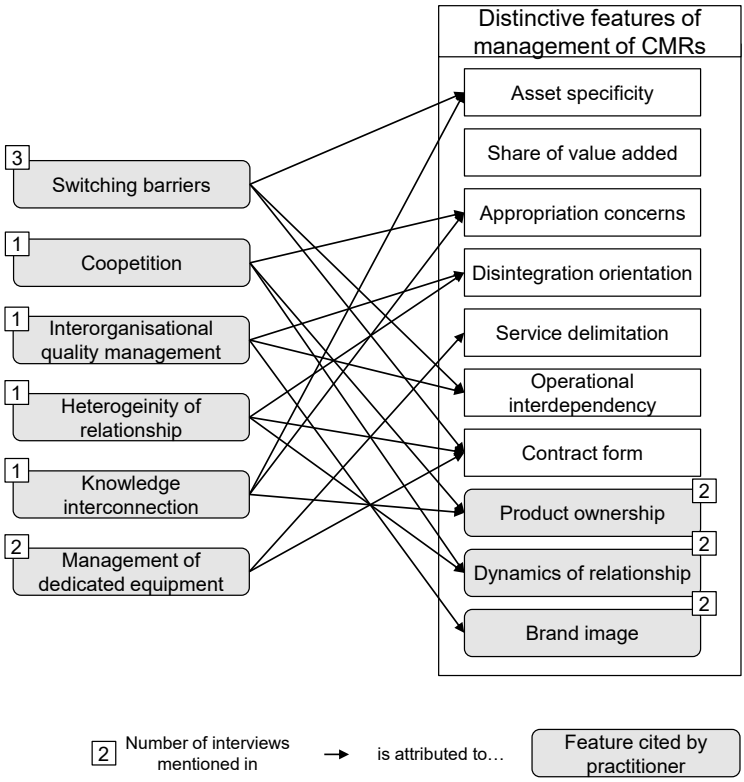


Figure 1: Empirical findings and validation of identified features

***Relationship dynamics***

Relationship dynamics have already been identified as management challenges in IORs in the literature, but the empirical findings have highlighted their particular intensity in CMRs. Due to the strategic nature of CMRs and the highly intertwined activities within the relationship, CMRs are particularly sensitive to dynamics. For example, sales dynamics are countered in CMRs by alternating contract forms and time-limited production

campaigns with varying relationship intensity. Changes in product and process maturity, routine and relational trust influence formality and control intensity in CMRs significantly. Finally, coopetition causes a particular dynamic, as competitive factors can fluctuate strongly even in the short term due to the activities of the contractual partner (new product launches, forward integration, partner portfolio). Relationship dynamics are a crucial challenge in CMRs as they require continuous adjustment of management activities across all management layers.

***Brand image***

Another distinctive feature to consider is the brand image, as brand-leading companies are held responsible by their customers for failures of the CMO. In addition, it can be observed that product-independent misconduct on the part of the CMO also impacts the company, as the consumer expects them to ensure compliance with ethical and ecological standards. Concerning the management of CMRs, this has a considerable impact on the necessary basis of trust, strategic fit, and inter-organizational quality management in the relationship.

***Validation of findings from the literature***

Practitioners cited barriers to switching as the most common differentiating characteristic of CMRs. The reasons given by the companies were joint investments, complex unbundling, and dependence on specific resources of the CMO, which are represented through asset specificity, operational interdependency, and the contract form. The management of dedicated equipment was separately named and can be attributed partially to service delimitation and the contract form.

Coopetition was particularly significant in the food industry, as there are virtually no pure CMOs, but brand-leading companies cooperate for resource and capacity reasons. Coopetition underpins both appropriation concerns and relationship dynamics in CMRs. The same applies to the need for inter-organizational quality management, which arises in CMRs because customers must not recognize any differences in quality regardless of the manufacturer. Systematic knowledge exchange is another differentiation factor covered by asset specificity, product ownership, and appropriation concerns. Ultimately, the heterogeneity of CMRs, which are all unique from a management perspective, was

argued. This point is taken up by the disintegration orientation, the contract form, and relationship dynamics. However, the empirical results could neither confirm nor disconfirm the value-added share as a distinctive feature of the management of CMRs.

## 4.3 Explorative framework

The identified features show that there are particular challenges in the management of CMRs. While some of the distinctive features are well established in relationship management, they require special consideration in the management of CMRs. Other features such as product ownership, investment-based contract forms, and relationship dynamics have not received sufficient attention.

Following the depiction of supply chain processes by Croxton et al. (2001), it can be concluded that the management of CMRs involves strategic and operational activities that exceed the scope of traditional supplier relationship management.

***Cornerstones of management of CMRs***

Consequently, a dedicated management approach has to be devised, which considers the particular challenges of CMRs. For this purpose, knowledge, risk, lifecycle, quality, contract, performance, asset, project and communications management, and sales & operations planning can be understood as essential cornerstones, as shown in figure 2.

Coordinating these cornerstones holistically is complex and poses significant challenges to companies due to the variability of the relevant features. In addition, each dyad is highly individual, and changes in planned and unplanned ways, causing high contingency. A dedicated management approach for CMRs must therefore consider contingency and dynamics as structural cornerstones.

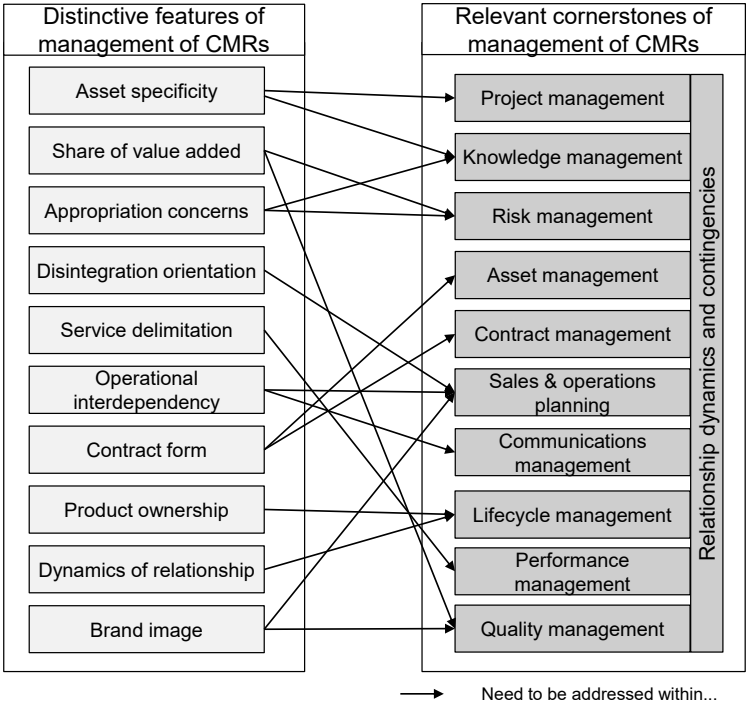


Figure 2: Distinctive features and cornerstones of management of CMRs

Although Dekker (2004) and Nordigården (2014) emphasize the almost infinite number of forms of collaboration in practice and that each of these places individual demands on management, it does not follow that there must be an endless number of according management approaches. By systematically identifying and analyzing the distinctive features of CMRs, "management archetypes" can be discovered, i.e., forms of CMRs whose management follows a similar pattern. It is expected that some of these archetypes will be geared toward the management of BSRs and SORs under traditional supplier relationship management. Also, the management approach needs to be adaptive to change over time along with the dynamic changes of the relationship,

possibly switching between different archetypes of management of CMRs (Meira et al., 2010, p. 158).

***Theoretical Grounding***

Since research on the management of CMRs is viewed as an exploratory research topic, looking at it through an established theoretical lens can help situate it in the research landscape. In supply chain management and outsourcing, transaction cost economics is the most commonly used theory (Busi and McIvor, 2008, p. 187). However, the explanatory power of transaction cost economics for value creation partnerships with intertwined ownership structures is viewed critically in the literature (Dekker, 2004, p. 30). Similarly, other standard theoretical lenses such as the resource-based view and principal-agent theory can be challenged because they might overemphasize certain aspects of relationship management at the expense of a holistic management perspective (Miles and Snow, 2007, p. 460; Busi and McIvor, 2008, p. 187).

In the context of increasing strategic integration of CMRs, Dyer & Singh's relational view (1998) may provide a valuable contribution to understanding the management of CMRs. They argue that competitive advantages can be generated from inter-firm resources and identify four potential levers: relationship-specific assets, knowledge-sharing routines, complementary resources/capabilities, and effective governance (Dyer and Singh, 1998, 663). The relational view explains how the success of a business relationship can be achieved by considering specific relational sub-processes that relate to the identified cornerstones. Due to CMR management's high heterogeneity, the contingency theory approach seems suitable as well (Drazin and van den Ven, 1985, 514). Likewise, consideration of relationship dynamics has emerged as a dominant background issue in the management of CMRs and should be integrated into theoretical considerations. Looking at CMRs as systems, an insightful approach from the engineering sciences could be the theory of complex adaptive systems, which assumes open systems with weak ties, continuous dynamic micro-changes, and decentralized actors (Friedli, 2005, p. 104).

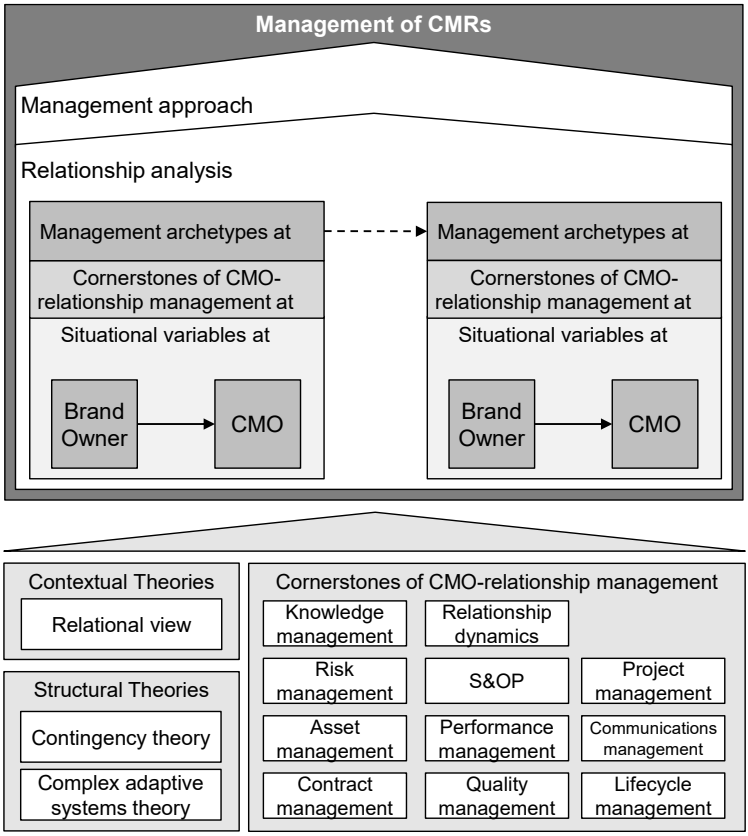


Figure 3: Exploratory research framework for the management of CMRs

The use of theoretical frameworks in outsourcing operations is considered an underexplored field as it is, and the combination of theories through an eclectic approach has already been suggested (Busi and McIvor, 2008, p. 192). The combined choice of relational view, contingency theory, and complex adaptive systems theory as context and structure theories is proposed, as they integrate approaches whose explanatory power is complementary (Friedli, 2005, p. 113).

As seen in figure 3, the developed research framework includes the derived cornerstones to translate the identified distinctive features of CMRs to their management task. The strong relevance of contingency and relational dynamics poses a challenge for research that could be addressed by management archetypes either in the development of management profiles or management approaches. Along the trajectory of a dynamic CMR, these archetypes must either be dynamic themselves or enable dynamic transitions. A theoretical foundation should structure further research in pursuit of a holistic, dedicated management approach for CMRs. Since the fit of the most used theories of the research field is debatable, the relational view is proposed for content structuring, complex adaptive systems theory is proposed for temporal structuring, and contingency theory is proposed for linking them together. The proposed exploratory research framework aims to capture the most relevant issues and challenges in managing CMRs and provide guidance to researchers to contribute to supply chain management and contract manufacturing management in both theory and practice.

# 5 Conclusion

This paper started from the assumption that, beyond the visual complexity, the management of CMRs is fundamentally different from the management of other business relationships and, therefore, needs a dedicated management approach. In the beginning, an overview of the theoretical and practical relevance of this issue was given. Subsequently, distinctive features of management of CMRs were identified through an exploratory literature review and case studies. Finally, fundamental cornerstones of the management of CMRs were derived and integrated into an exploratory research framework. In this way, the paper contributes to a deeper understanding of the management of CMRs, points out research gaps, and elaborates approaches for further research.

The study results should be subjected to further validation against the literature on the management of IORs and practice to address the limitation of the study design. The exploratory approach was chosen to map relevant research fields and include unstructured information from primary and secondary sources. While the semi-

structured approach to reviewing the literature helps identify relevant research fields and terms, it does not allow for in-depth analysis, limiting the rigor of the results and transparency of the research process. Exploratory literature analysis can be used in the research process as a preliminary step to systematic literature analysis, which is also recommended concerning the results of this study. Further research opportunities exist, for example, in a targeted classification of CMRs in IOR typologies and taxonomies, taxonomies on types of CMRs, and the analysis of management challenges in CMRs without the pretense of differentiation from other types of IORs.

Despite the early research stage, complementary empirical validation was chosen in line with the exploratory literature review to cover the method's weakness regarding the relevance and rigor of the results. Therefore, only a tiny sample with limited representativeness could be drawn compared to stand-alone studies. Broader empirical studies could reduce industry bias and increase projectability through a widened observed sample and specification and analysis of the settings of the CMRs. Further empirical research could focus on the management process and tasks in CMRs compared to other IORs, ideally within specific industries or even organizations, to detect differences in management approaches.

Conceptual research has the opportunity to deepen the understanding of CMRs by developing a holistic understanding of CMR management, exploring internal coordination and the role of cornerstones, or examining the theoretical foundations of CMR management.

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