

Department of Civil and Structural Engineering

Managing Strategic Service Networks

Contingency View of Integration
in the Context of Component Services

Arto Huuskonen

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Component Services

Arto Huuskonen

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The design and management of strategic service networks are key requirements for organizational competitiveness in the modern networked service economy. The understanding of service network management is, however, still in the emergent stages within industrial network and supply chain management research. The study presented here investigates how and why strategic service networks are managed, focusing particularly on the management of integration in component service networks.

The research is grounded in the premises of the structural contingency theory, the information-processing perspective, and the value network framework of three ideal types of strategic networks – stable, established, and emerging. The research consists of an in-depth literature analysis of network management and service supply chain management research and a multiple-case study analyzing a total of 15 component service networks in the context of the residential real estate sector in Finland.

The conclusions are three-fold. First, the common patterns of integration management in the three ideal types of strategic component service networks are to some extent contingent on the network type characterized by different sources and/or overall level of uncertainty. Second, a further contextualization of integration reveals that the management of integration in stable and established component service networks is contingent on service-, network-, and environment-related characteristics, four of them being general across networks and additional four conditioning spatially complex networks. Third, because emerging networks are inherently continuously evolving, the management of integration and its contribution to network evolution is contingent on both initial and changing levels of uncertainty.

The study contributes to industrial network management research by empirically elaborating and refining the original value network framework, thus offering a contingency view of the management of integration in component service networks. The study also advances service supply chain management research by revealing patterns of integration mechanisms in component service supply networks during ongoing service exchange as contingent on the characteristics of the exchanged services, the supply network structure, and the supply environment. In general, the findings support the emerging contingency views of network and supply chain management.

Keywords Strategic network, service network, network management, component service, integration, contingency theory

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Tekijä

Arto Huuskonen

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Strategisten palveluverkoston johtaminen: kontingenssinäkökulma integraatioon komponenttipalveluissa

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Strategisten palveluverkoston muodostaminen ja johtaminen ovat organisaatioiden kilpailukyvyyn avaintekijöitä nykyaikaisessa verkottuneessa palvelutaloudessa. Ymmärrys palveluverkoston johtamisesta on kuitenkin vasta varhaisessa kehitysvaiheessa liiketoimintaverkoston ja tuotantoketjujen johtamisen tutkimuksessa. Tämä tutkimus selvittää miten ja miksi palveluverkostoja johdetaan, keskittyen erityisesti integraation johtamiseen komponenttipalveluverkostoissa.

Tutkimus pohjautuu rakenteelliseen kontingenssiteoriaan, informaation prosessoinnin näkökulmaan ja arvoverkkoviitekehukseen, joka jakaa strategiset liiketoimintaverkostat kolmeen ideaalitapaukseen, sisältäen vakiintuneet tuotantoverkostat, liiketoimintaa kehittävät verkostat ja innovaatioverkostat. Tutkimus koostuu verkostojohtamisen ja palvelutuotantoverkkojen tutkimusalueiden perusteellisista kirjallisuuskatsauksista sekä tapaustutkimuksesta, jossa analysoidaan yhteensä 15 asuinkiinteistöalan komponenttipalveluverkosta Suomessa.

Tutkimuksessa havaitaan, että integraation johtaminen ideaalitapausten mukaisissa komponenttipalveluverkostoissa on tietystä määrin, muttei täysin riippuvainen verkoston tyyppistä, joille kullekin tunnusomaista on tietyn tyyppinen ja tasoinen epävarmuus. Sen sijaan, integraation tarkempi sitominen tutkittavaan kontekstiin osoittaa, että integraation johtaminen vakiintuneissa ja liiketoimintaa kehittämissä komponenttipalveluverkostoissa on riippuvainen kullekin palvelulle, verkostolle ja toimintaympäristölle tunnusomaisista olosuhdetekijöistä. Näistä neljä olosuhdetekijää tunnistetaan vaikuttaviksi kaikille tutkituille verkostoille ja neljä lisätekijää maantieteellisesti hajautuneille verkostoille. Lisäksi, koska nousevat komponenttipalveluverkostat ovat luonteeltaan jatkuvasti muuttuvia, integraation johtaminen ja sen vaikutus verkoston kehittymiseen ovat riippuvaisia sekä epävarmuuden tasosta kehitystyön alkuvaiheesta että sen muutoksesta kehitystyön edetessä.

Tutkimus edistää verkostojohtamisen tutkimusta jatkokehittämällä empiriaan pohjaten yleistä arvoverkkoviitekehystä tarjoten näin kontingenssiteoreettisen näkökulman integraation johtamisesta komponenttipalveluverkoissa. Lisäksi, tutkimus edistää palvelutuotantoverkkojen tutkimusta osoittamalla integraation johtamisen yhdenmukaisuudet riippuvaisiksi palvelujen, verkstorakenteiden ja toimintaympäristön olosuhdetekijöistä. Yleisesti, tutkimuksen löydökset tukevat alati voimistuvaa kontingenssinäkökulmaa liiketoimintaverkoston ja tuotantoketjujen johtamisesta.

Avainsanat Strategiset verkostat, palveluverkosto, verkostojohtaminen, komponenttipalvelu, integraatio, kontingenssiteoria**ISBN (painettu)** 978-952-60-5690-6**ISBN (pdf)** 978-952-60-5691-3**ISSN-L** 1799-4934**ISSN (painettu)** 1799-4934**ISSN (pdf)** 1799-4942**Julkaisupaikka** Helsinki**Painopaikka** Helsinki**Vuosi** 2014**Sivumäärä** 224**urn** <http://urn.fi/URN:ISBN:978-952-60-5691-3>

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*The pleasures are often in the process rather than in the outcome
(March and Simon, 1993: 16)*

My learning process has lasted for about 28 years and six months, the most focused parts of it resulting in this dissertation being dated around the last four years. Without a question, such an undertaking is an outcome of management, or non-management, of a complex network of organizational and individual relations.

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Riihimäki, 6 May 2014

Arto Huuskonen

Contents

Acknowledgements	i
Tables and Figures	v
Concept Definitions	vii
1. Introduction	1
1.1 Background and motivation	1
1.2 Scope and research questions.....	5
1.3 Key assumptions	6
1.4 Research process and methodology	7
1.5 Aimed contribution.....	8
1.6 Structure of the dissertation	9
2. Literature review	11
2.1 Organizational networks.....	11
2.2 Network management research.....	17
2.3 Service supply chain management research	26
2.4 Key notions and the positioning of this research	38
3. Theoretical background.....	41
3.1 The value network framework.....	41
3.2 The management of integration	43
3.3 Theoretical framework and revised objectives for the empirical analysis.....	52
4. Research design.....	55
4.1 Research approach.....	55
4.2 Case study research design	56
4.3 Overall research process	59
4.4 Research context and case selection.....	60
4.5 Data collection	65
4.6 Data analysis	70
4.7 Evaluation of validity and reliability of the research design.....	75

- 5. Results 79**
 - 5.1 Case descriptions 79
 - 5.2 Within-case analysis for the management of integration in the selected component service networks 91
 - 5.3 Study I: The management of integration characterizing stable, established, and emerging component service networks 107
 - 5.4 Study II: Contextualizing the management of integration in stable and established component service networks 122
 - 5.5 Study III: The management of integration and network evolution under changing contingencies in emerging component service networks..... 143
 - 5.6 Summary of results: Inducing general propositions..... 163
- 6. Discussion and conclusions..... 167**
 - 6.1 Assessment of research objectives..... 167
 - 6.2 Theoretical contribution 168
 - 6.3 Implications to practice 172
 - 6.4 Limitations of the research..... 173
 - 6.5 Future research 182
- References 185**
- Appendix 1: List of interviews and informants 201**
- Appendix 2: Interview protocols 204**
- Appendix 3: Examples of empirical data and coding 207**

Tables and Figures

Table 1.	The proportion (percentage) of all and two major services sectors in value added to GPD and total employment in Nordic and major European countries, and the United States in 2007 (source: OECD in Figures, 2009).....	2
Table 2.	Categorization of network management studies.....	19
Table 3.	Categorization of service supply chain management research topics.....	28
Table 4.	A typology of three ideal types of strategic networks (<i>Sources: Möller et al., 2005; Möller and Svahn, 2003</i>).....	42
Table 5.	Sources of uncertainty in organizations and inter-organizational entities.....	49
Table 6.	Contextual conditions associated with purchasing and supply chain management practice.....	51
Table 7.	Sampling and data in the exploratory interview study.....	63
Table 8.	Sampling of cases to represent stable and established component service networks.....	64
Table 9.	Sampling of cases to represent emerging component service networks.....	65
Table 10.	Data collected from the case networks and embedded-cases.....	67
Table 11.	Types of questions asked in the three stages of data collection.....	69
Table 12.	Purpose, data, and focus of analysis in the three empirical studies.....	71
Table 13.	The means of addressing the quality criterion in the study, following Yin (2009).....	75
Table 14.	Summary of value activities, aims, and network structures of the embedded-cases.....	86
Table 15.	Summary of practices for managing integration in the stable component service networks.....	95
Table 16.	Summary of practices for managing integration in the established component service networks.....	100
Table 17.	Summary of practices for managing integration in the emerging component service networks.....	106
Table 18.	Uncertainties in the studied stable component service networks.....	109
Table 19.	Uncertainties in the studied established component service networks.....	113
Table 20.	Uncertainties in the studied emerging component service networks.....	118
Table 21.	The management of integration as well as the sources and level of uncertainty characterizing stable, established, and emerging component service networks.....	121
Table 22.	Summary of contextual conditions in the studied 12 component service networks.....	125
Table 23.	Patterns of integration mechanisms and contextual conditions for operational-impersonal integration.....	129
Table 24.	Patterns of integration mechanisms and contextual conditions for operational-personal integration.....	131
Table 25.	Patterns of integration mechanisms and contextual conditions for strategic-personal integration.....	135
Table 26.	Patterns of integration mechanisms and contextual conditions for strategic-impersonal integration.....	138
Table 27.	Summary of initial and changed conditions and perceived network evolution.....	145
Table 28.	Examples of empirical evidence for matching the embedded-cases with the ideal types of strategic networks.....	207
Table 29.	Summary of integration mechanisms and examples of coding.....	212
Table 30.	Summary of sources and levels of uncertainty and examples of coding.....	214
Table 31.	Summary of contextualized qualitative conditions and examples of coding.....	215

Figure 1. Outline of the dissertation, including main connections between the different chapters and sections..... 10

Figure 2. A framework of network management research at the network level of analysis (sample = 65 scientific, peer-reviewed articles)..... 26

Figure 3. A framework of service supply chain management research..... 37

Figure 4. A framework of four generic types of integration 48

Figure 5. A theoretical framework for the empirical analysis 52

Figure 6. Research process following the logic of systematic combining (Modified from: Dubois and Gadde, 2002)..... 59

Figure 7. Service network structure of Real estate investor 1 (Case network 1, Embedded-cases 1-4)..... 80

Figure 8. Service network structure of Real estate investor 2 (Case network 2, Embedded-cases 5-9)..... 81

Figure 9. Service network structure of Municipal housing company (Case network 3, Embedded-cases 10-12) 82

Figure 10. Service network structure in seniors' housing concept development 1 (Case network 4, Embedded-case 13) 83

Figure 11. Service network structure in seniors' housing concept development 2 (Case network 5, Embedded-case 14) 84

Figure 12. Service network structure in seniors' housing concept development 3 (Case network 6, Embedded-case 15) 85

Figure 13. Types of integration management identified in the studied case networks 123

Figure 14. Model of integration management in stable and established component service networks 141

Figure 15. A framework of integration management and network evolution in emerging component service networks 162

Concept Definitions

Organizational network	<p>“Two or more organizations connected with each other through some type of exchange relationships (information, resources, or services), which collaborate in the pursuit of individual and common objectives while remaining autonomous and independent”</p> <p><i>(Hibbert et al., 2008: 391)</i></p>
Strategic network	<p>“Intentional inter-organizational structures that firms try to design deliberately for specific purposes”</p> <p><i>(Modified from: Möller & Svahn, 2003: 213)</i></p>
Network management	<p>“A series of managerial activities undertaken by an individual, or a team of individuals, with various skills and capacities, that are focusing on defining both the direction to be taken by an inter-organizational network and the allocation and implementation of resources towards those ends”</p> <p><i>(Modified from: Hibbert et al., 2008: 391)</i></p>
Service	<p>“A process consisting of series of more or less intangible activities that normally, but not necessary always, take place in the interactions between the customer and service employees and/or physical resources or goods and/or systems of the service provider, which are provided as solutions to customer problems”</p> <p><i>(Grönroos, 2007: 52)</i></p>
Component service	<p>Services that are produced downstream in the supply chain in the buyer’s customers and hence become part of the buyer’s value proposition without being transformed by the buying company (e.g. external field maintenance professionals contracted by the manufacturer of production machinery).</p> <p><i>(Combined from: van der Valk et al, 2009; van der Valk & Wynstra, 2012)</i></p>
Service network	<p>“Complex interdependent relationships between actors who are either traditional service providers (actors that hold an underlying services logic, such as hospitals, telecommunications, and consultancy firms) and that provide services to other firms, or that are traditional industrial companies which provide tailored solutions to their clients by integrating a service into the core product that they offer”</p> <p><i>(Ramos et al., 2013: 952)</i></p>

Management of integration	<p>“The process by which the state of collaboration that exists among organizations is achieved and the organizational devices used to achieve it”</p> <p><i>(Modified from: Lawrence and Lorsch, 1967: 11)</i></p>
Achieved integration	<p>“The quality of the state of collaboration that exist among organizations that is required to achieve unity of effort by the demands of the environment”</p> <p><i>(Modified from: Lawrence and Lorsch, 1967: 11)</i></p>
Uncertainty	<p>“The difference between the amount of information required to perform the task and the amount of information already possessed by the organization”</p> <p><i>(Galbraith, 1973: 5)</i></p>
Integration requirement	<p>The need for integration, varying on a scale from low to high (also referred to as: requisite integration)</p> <p><i>(Lawrence & Lorsch, 1967)</i></p>
Integration mechanism	<p>Structural mechanisms implemented to facilitate the processing of the amount and richness of information needed to cope with or reduce uncertainty and achieve desired task performance</p> <p><i>(Modified from: Daft & Lengel, 1986)</i></p>

1. Introduction

The topic of this dissertation is the management of strategic service networks. More specifically, the empirical analyses of the dissertation examine the management of integration in component service networks within the context of the residential real estate sector in Finland. This chapter introduces the empirical and theoretical motivations for the research, focusing especially on those deriving from industrial network management and service supply chain management research¹. The scope of the study, the overall research question, and more specific research objectives are then presented. The chapter also describes the main assumptions underlying the research, the overall research design, and the intended contribution. Lastly, the structure of the remainder of the dissertation is overviewed.

1.1 Background and motivation

1.1.1 Empirical motivation

We live in a networked service economy. A prevailing trend in the modern economic landscape is the formation and development of inter-organizational networks in business, public administration, non-profit sectors, and across sectorial boundaries. The drivers of forming and operating in organizational networks are numerous: lowering transaction costs in comparison to market-based exchanges or the building of organizational hierarchies (Williamson, 1985); focusing on the firm's core competencies and acquiring the non-core resources from the firm's external environment (Pfeffer and Salancik, 1978; Barney, 1991); accessing of specialized knowledge of other actors (Grant and Baden-Fuller, 2004); improving the firm's innovation performance (Powell et al., 1996); improving the firm's overall competitiveness by collaborating with competitors through strategic alliances (Hamel et al., 1989; Doz and Hamel, 1998; Gulati et al., 2000). In general, it has been recognized and well documented that operating in, and nurturing organizational networks is an im-

¹ Addressing the topic within two separate research fields was considered important. Focusing only on general network management research might neglect some of the special features of service supply chains and networks, whereas focusing solely on service supply chain management research might ignore much of the understanding and previous research conducted at a more general level on organizational networks and their management. At the same time, the choice enables a diffusion of the research findings to a broader audience and scholarly discussion than those provided by only one specialized domain.

portant source of competitive advantage in any organization (e.g., Achrol, 1997; Håkansson and Snehota, 1989; Gomes-Casserez, 1994; Gulati et al., 2000; Jarillo, 1988; Kanter, 1994; Powell et al., 1996; Ritter et al., 2004).

Another related trend in the current business landscape is the rise of the services sectors in industrial economies during the past decades. By 2007, services already accounted for the majority, approximately 70 percent, of the total value added and total employment in industrial economies (Table 1). On one hand, the increases in service consumption and supply have been driven by the outsourcing of many of the non-core business functions and processes to external suppliers (Axelsson and Wynstra, 2002; Ellram et al., 2007; Fitzsimmons and Fitzsimmons, 2011; Tate and Ellram, 2012). On the other hand, in both the consumer and business service markets, companies increasingly adopt service-dominant logics for creating value and facilitating customers' value activities (Grönroos and Ravald, 2011; Lusch, 2011; Sampson, 2000; Sampson and Froehle, 2006; Vargo and Lusch, 2004, 2008), moving the supply chain downstream by taking over some of the customers' value processes through service (Björkdahl, 2009, 2011; Wise and Baumgartner, 1999).

Table 1. The proportion (percentage) of all and two major services sectors in value added to GDP and total employment in Nordic and major European countries, and the United States in 2007 (source: OECD in Figures, 2009)

Country	Services in total		Real estate, renting and other business services		Education, health, social work and other services	
	Value added	Employment	Value added	Employment	Value added	Employment
Denmark	72.4	73.6	19.2	12.9	20.5	28.6
Finland	64.2	69.7	18.4	11.4	16.7	26.4
Norway	55.9	76.0	14.3	12.0	16.0	30.7
Sweden	70.3	76.1	21.7	12.7	20.2	32.9
France	77.4	74.2	29.0	15.5	17.3	25.1
Germany	68.7	67.7	25.0	14.2	16.2	23.5
UK	76.3	76.3	24.3	17.5	17.9	26.1
United States	76.9	78.8	24.9	14.8	15.8	26.7

Because of the increased outsourcing of business processes and downstreaming to the customers' value processes, understanding and managing service supply chains and networks have become increasingly crucial for firms (Axelsson and Wynstra, 2002; Heskett et al., 1994; Ellram et al., 2007). More generally, operating within networks of organizations instead of hierarchies or individual market-based exchanges appears to be inherently difficult. For instance, up to 70 percent of alliances and 60 percent of partnerships ultimately fail (Gulati 2007). Hence, understanding how to manage the networks of organizations, particularly for supplying and developing services, becomes a key managerial issue in the contemporary business environment.

1.1.2 Theoretical motivation

Given the importance of operating in, and nurturing organizational networks, researchers have shown an increasing interest in studying how to design, manage, and control such inter-organizational arrangements (Grabher and Powell, 2004; Järvensivu and Möller, 2009). In the 21st century, research on **network management** has increased across a variety of disciplines, exam-

ining numerous research contexts, and offering different ideas and views regarding how companies should manage within network settings. As a result, although the literature on the management of inter-organizational networks has become rich, the research is scattered into a contextual and disciplinary jungle (Hibbert et al., 2008).

As the amount of research on the topic has increased, disagreements regarding a number of issues in network management research have prevailed, including the very ontological assumptions about networks and their management. Whereas some scholars suggest that networks are serendipitously emerging constellations that cannot be formed and managed by any individual organization (e.g., Andersson et al., 1994; Ford et al., 2009; Håkansson and Snehota, 1995), others perceive networks as key business resources that firms can and should form, coordinate, and control much like the firm's physical or human resources (e.g., Child et al., 2005; Gulati, 2007; Jarillo, 1988). Recently, an intermediate view has been presented, which considers networks and network management to be contingent on the characteristics of the network and its environment, influencing the way and the extent to which networks can be managed by individual actors or groups of actors (Järvensivu and Möller, 2009). However, this contingency-based theory of network management is only emerging, introducing conceptual frames yet lacking empirical elaboration (e.g., Järvensivu and Möller, 2009; Möller and Rajala, 2007; Möller and Svahn, 2006).

In the particular context of services, research examining the management of service supply chains and networks is only emerging. Despite the development of industrial economies to those of “networked service economies”, much of the operations and supply chain management research as well as the industrial network management research concern the making and selling of products, service supply chains and networks receiving only a minor slice of the attention (Henneberg et al., 2013; Machuca et al., 2007; Metters and Marucheck, 2007; Ostrom et al., 2010). In response, streams of research on service operations and **service supply chain management** (e.g., Sampson and Spring, 2012; Spring and Araujo, 2009, 2013; van der Valk et al., 2009) as well as **industrial service networks** (e.g., Gebauer et al., 2013; Ramos et al., 2013; Zaefarian et al., 2012) have recently begun to proliferate to create an understanding of the special features of managing service supply chains and networks.

Different views have been suggested, however, regarding the direction of developing service-related research, especially within operations and supply chain management scholarship. Some researchers have suggested that services differ from goods in ways that pose distinct challenges and requirements for management (Baltacioglu et al., 2007; Ellram et al., 2004; Sengupta et al., 2006). Consequently, the traditional manufacturing-based supply chain models may not enable a complete understanding of service operations; instead, distinctive models must be developed for services (Baltacioglu et al., 2007; Cook et al., 2001; Field and Meile, 2008; Giannakis, 2011). It is even suggested that the widely accepted frameworks and models of supply chain management

may function as obstacles to the development of service supply chain frameworks and theory (Nie and Kellogg, 1999; Roth and Menor, 2003). Other scholars are more hesitant to indicate the need for a separated service operations research stream, suggesting instead that present manufacturing-based management models should be extended to services with service-related constructs (Chen and Paulraj, 2004).

Given the growth of the services sectors in industrial economies, the current state of research leaves the researchers an open playfield of important topics to select from and explore. In addition to the general debate regarding how and in which direction to advance service operations and supply chain management theory, research is called for to examine different types of service contexts (Wynstra et al., 2006; van der Valk et al., 2009; van der Valk and Wynstra, 2012), adopting the perspective of the business that is purchasing the services instead of the service firm (Maull et al., 2012; Tate et al., 2010; van der Valk and Rozemeijer 2009). Furthermore, limited understanding exists regarding service network management during ongoing service exchange (van der Valk et al., 2009; van der Valk and Wynstra, 2012), in comparison to the more widely assessed service-outsourcing decisions (e.g., Agndal et al., 2007; Balakrishnan et al., 2008; Tate and Ellram, 2012) and the early stages of the service-purchasing processes (e.g., Wittreich, 1966; Day and Barksdale, 1994; Jackson et al., 1995; van der Valk and Rozemeijer, 2009).

In summary, networks and services are a prevailing phenomenon in the current business landscape. The majority of organizations are involved in purchasing or supplying a variety of services that exist in the core of their offering, complement their product offering, or support their business functions. More importantly, all organizations are engaged in networks of inter-organizational relations because of their dependence on external resources or the economic or competitive benefits of networking. Consequently, designing and managing service networks have become key managerial requirements and the sources of competitive advantage in the networked service economy. ***The contingency-based view of network management*** shows a promising direction for advancing the understanding of management behavior in different types of organizational networks, its further development requiring empirical elaboration (Järvensivu and Möller, 2009; Möller et al., 2005; Möller and Rajala, 2007; Möller and Svahn, 2006). Furthermore, there is a perceived need to investigate the special characteristics of ***managing service supply chains and networks*** for different types of services, from the service buyer's perspective, and during ongoing exchange relations. This type of research would respond to the call for contingency considerations both within industrial network management (Järvensivu and Möller, 2009) and operations management research (Sousa and Voss, 2008), potentially enabling also the formulation of managerially interesting frameworks and guidelines.

1.2 Scope and research questions

The ultimate aim of this research is to develop ***a contingency view of service network management***. Within this overall aim, two aspects of service network management are of particular interest. First, in relation to the phenomenon of managing service networks, this research focuses particularly on ***the management of integration*** (Lawrence and Lorsch, 1967), integration referring here to external integration (Barki and Pinsonneault, 2005; Flynn et al., 2010). Second, with regards to the context of service networks, the research focuses on a type of services referred to as ***component services*** (Wynstra et al., 2006).

The two focus areas appear particularly relevant for assessing network management in the services context for the following reasons. First, it is widely suggested that service supply is inherently difficult to specify, manage, and evaluate (Fitzsimmons et al., 1998; Smeltzer and Ogden, 2002; Ellram et al., 2004, 2007) and that extensive bidirectional information transfer is required between buyers and service suppliers (Parasuraman, 1998; Sampson, 2000; Baltacioglu et al., 2007; Field and Meile, 2008). Consequently, service buyers must develop effective ways of integrating their networks of service suppliers to achieve the targeted service performance (Cannon et al., 2010). Although a significant amount of research has been conducted on integration in the context of goods manufacturing (e.g., Das et al., 2006; Flynn et al., 2010; Rosenzweig et al., 2003; Swink et al., 2005, 2007), quite surprisingly, the concept of integration is nearly absent in service supply chain and network research. The present study assesses this gap and attempts to understand “*how the customer integrates the network of providers and [...] coordinates and controls this network to produce a suitable outcome*” (Maull et al., 2012: 73).

The integration of the network of service suppliers and partners is particularly relevant for component services (Wynstra et al., 2006), in which services are purchased or developed in favor of a third-party customer instead of a buyer’s internal consumption and production. Such situations are generally referred to as service triads (Li and Choi, 2009; Niranjana and Metri, 2008). Examples of services include customer contact services, capital equipment or real estate maintenance services, and privatized public services. Component services are increasingly present in the course of outsourcing business processes and forming partnerships with service suppliers. Furthermore, these services provide a particularly challenging context for network management; whereas the services are contracted and specified between the buyer and the suppliers, the end-customers ultimately experience the service and in some cases are involved in the service process (Niranjana and Metri, 2008). In addition, the suppliers contribute directly to the service delivery to the buyer’s customers and hence to service performance (Baltacioglu et al., 2007). From the buyer’s perspective, effective integration of information about the service needs, service specifications, and service performance within the triadic relations becomes crucial for achieving system performance (cf. Sahin and Robinson, 2002). Although knowledge is increasing regarding the buying of services for a buyer’s

own use, there is little understanding regarding situations in which a buyer purchases or develops an offering involving component services.

In general, the decision to focus on the management of integration aligns with and supports recent developments and suggestions both in the fields of network management (Möller and Svahn, 2006; Saz-Carranza, 2012) and service supply chain management (Maull et al., 2012) as a valuable perspective for understanding management across formal organizational boundaries. The research question for the study can be formulated as follows:

RQ: How and why is integration managed in strategic component service networks?

To respond to the overall research question and to develop an understanding regarding the contingency view of managing strategic service networks, the management of integration in component service networks in particular, the following more specific objectives were established:

1. *To synthesize current knowledge on network management and service supply chain management;*
- 2a. *To examine the management of integration in component service networks; and*
- 2b. *To explore the contingencies of integration management in component service networks.*

1.3 Key assumptions

1.3.1 Ontological and epistemological considerations

In any type of research, the underlying philosophy of science informs the ontological and epistemological choices by which the researcher interprets the meanings, logical relations, and consequences of the observational data and theoretical statements (Van de Ven, 2007). The philosophical standpoint underlying this study is most closely related to that of ***realistic pragmatism*** (Rescher, 2000), found under the umbrella concept of realism. Realism contends that a real world exists independently of our attempts to know it, however, accepting that there are also unobservable entities that lie beyond human perception (Van de Ven, 2007). According to realistic pragmatism, science is considered to progress cumulatively step by step to closer approximations of reality, in which the aim is to provide a useful model of reality (Rescher, 2000).

In line with realistic pragmatism, this study adopts ***objective ontology*** and ***subjective epistemology***. Although the networks of organizations and their management are perceived as real-life phenomena that occur independently of the observer, attempts to know and understand them are limited (Van de Ven, 2007), imperfect (Guba and Lincoln, 2000), and dependent to a certain extent on the researcher's interests, values, and cultural background. Because of these perceptions, any given theoretical framework is only a partial

representation of a complex phenomenon that reflects the perspective of the researcher.

This study adopts a **functionalist paradigm** as its epistemological standpoint for conducting the empirical examinations (Burrell and Morgan, 1979). For functionalists, the goal of analysis is replication, meaning that data should be collected and analyzed in such a way that another researcher collecting and analyzing similar data under similar conditions will find similar results (Gioia and Pitre, 1990). The study aims to achieve this goal primarily through a rigorous description of the methodology used to arrive at theoretical arguments, aiming to produce findings that other researchers should also arrive at when replicating the study. For comparison, an alternative would be an interpretive paradigm, in which replication is not the goal. Instead, the results should be representative of the interpretations of those experiencing the phenomenon under study, embodying a plausible interpretation of the phenomenon, and thus gaining deeper understanding of the phenomenon.

1.3.2 Assumptions about organizations, networks, and network management

The present study perceives organizations as **open-rational systems** (Scott and Davis, 2007), emphasizing the contingent design of an organization's formal structure. More specifically, the study builds on the premises of the structural contingency theory for understanding the structures of organizations (e.g., Donaldson, 2001; Lawrence and Lorsch, 1967; Mintzberg, 1979; Thompson, 1967). Moreover, organizational integration – a key concept for understanding the structure of organizations – is viewed from an information-processing perspective (Galbraith, 1973).

In line with open-rational system view of organizations, organizational networks are viewed as strategic, intentionally created arrangements between three or more organizations, instead of serendipitously emerging structures. Based on this view, strategic networks are deliberately designed, managed, and controlled by a focal actor or “hub”, a group of focal actors, or an external member to the network (e.g., Möller and Halinen, 1999; Provan and Kenis, 2008; Saz-Carranza, 2012). Organizational networks are then viewed as external resources that firms (should) leverage and manage similarly to those of a firm's physical and human resources (Kanter, 1994; Gulati, 2007).

1.4 Research process and methodology

This study is about theory development, developing a contingency theoretical view of integration management in component service networks by applying existing conceptual frameworks to view the objective empirical world through subjective assessment. The research process in the study can be best described as systematic combining (Dubois and Gadde, 2002). In systematic combining, the theoretical directions and frameworks evolve as a combination of the researcher's initial personal motivations and interests and the interplay of theoretical and empirical insights gained during the research process. The research

begins by synthesizing extant literature on network management and service supply chain management into a research framework, identifying gaps in current knowledge, and positioning the research in the wider scholarly discussion. In addition, a theoretical framework is developed to guide empirical analysis based on a vast amount of technical literature, however, as suggested in Dubois and Gadde (2002), leaving space for the empirical evidence to offer emerging constructs featuring the studied context.

The empirical analyses follow multiple-case, partly embedded-unit designs (Yin, 2009), theoretically sampling a total of 15 cases and using a total of 84 open-ended and semi-structured interviews as the main data source. The context, or *the units of observation*, in the study are the *networks of exchanging and collaborating actors* purposefully created for supplying and developing different types of component services or service concepts. Often, these networks center on a focal organization that is purchasing the services or take the form of a multiparty network, in which a number of focal organizations jointly develop and offer service concepts. Thus, the studied networks can be perceived as ego-networks (e.g., Borgatti and Foster, 2003), in which the network is identified and investigated from the perspective of a focal organization or organizations, complemented with the perceptions of first-tier suppliers or partners.

Because management within organizational networks occurs at multiple levels (Möller and Halinen, 1999), *the unit of analysis* is three-fold, including *a dyad, a portfolio, and a (whole) network*. For each studied network, several units of analysis may occur, depending on which analysis level the management of integration occurs. The choice to use multiple levels of analysis seemed important given the study's objective to examine the use and to explore the contingencies of all identified practices for integration management within the studied component service networks. For this purpose, it seemed crucial not to lock oneself into a specific level of analysis, instead allowing the unit of analysis to evolve as the empirical analysis proceeded. Conversely, if the perspective had been locked into only one level of analysis in advance, for instance, the whole network (Provan et al., 2007), some essential integrative structures occurring at the dyad level might have been neglected, possibly leaving the analysis with only a partial picture of reality. A further discussion of the methodological choices is reported in Chapter 4, and possible limitations occurring from the methodological and theoretical choices are discussed in Chapter 6.

1.5 Aimed contribution

Given the presented objectives and the ontological, epistemological, and methodological choices, the research seeks to contribute to industrial network management research and service supply chain management research, engaging in middle-range and context-specific theorizing (Merton, 1949; Burgeois, 1979). At the level of middle-range theorizing, the research attempts to develop understanding regarding the management of different types of intentionally

created organizational networks, referred to as strategic networks, contributing to the emerging contingency-based theory of network management within industrial network management research (Järvensivu and Möller, 2009; Möller et al., 2005; Möller and Rajala, 2007; Möller and Svahn, 2003, 2006). Because the network management theory is only at an emerging stage and fragmented across disciplines and research contexts, there is a need, first of all, to synthesize current understanding on network management, and second, to provide empirically grounded contingency theory of integration management in service networks.

At the level of context-specific theorizing, the research aims to create a more fine-grained understanding of contingencies associated with service supply chain management, contributing to the call for contingency theories in operations and supply chain management research (Flynn et al., 2010; Sousa and Voss, 2008; Turkulainen and Ketokivi, 2012; van der Valk and Wynstra, 2012). In particular, the research seeks to create understanding regarding the management of integration in component service networks during ongoing exchange (Wynstra et al., 2006).

1.6 Structure of the dissertation

The remainder of the dissertation manuscript is structured as follows (Figure 1). Chapter 2 presents the perspectives for understanding organizational networks and reviews two streams of literature that are closely related to the topic of managing strategic service networks. These include a systematic review and meta-analysis of network management literature and a review of relevant literature on service supply chain management. Chapter 3 describes the theoretical background of the research, including the typology of ideal types of strategic networks (i.e., the value network framework), the structural contingency theory, and the organizational information-processing theory, based on which a theoretical framework and revised objectives for the empirical analysis are presented. Chapter 4 presents the overall research design and the methodology used in the empirical analyses. In addition, the assessment of validity and reliability issues in the research design are discussed. Chapter 5 presents general case descriptions and the results of three empirical analyses, constituting the empirical part of the dissertation. Chapter 6 assesses the findings of the study in relation to the original research question and objectives and discusses the study's contributions to industrial network management and service supply chain management research, as well as implications for management practice. In addition, the main theoretical and methodological limitations of the research are discussed and directions for future research are proposed. References and appendices are located at the end of the manuscript.

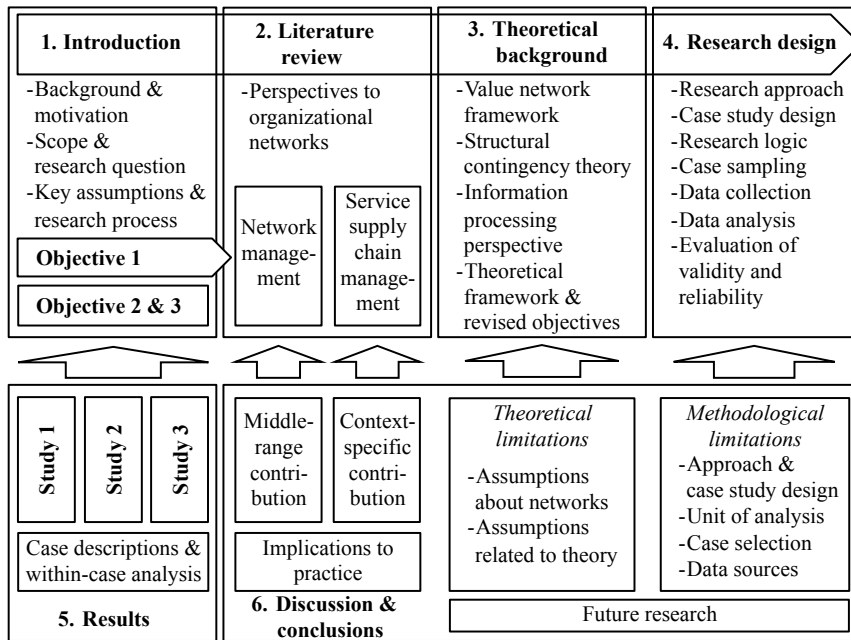


Figure 1. Outline of the dissertation, including main connections between the different chapters and sections

2. Literature review

This chapter presents a review of relevant literature in the topic area of this dissertation. The chapter is divided into three sections. The first section presents alternative perspectives in the study of organizational networks and outlines the perspectives taken in this study. In sections two and three, the discussion proceeds from a broader context of network management research to research on service operations and supply chain management. Two streams of literature are reviewed, forming a body of knowledge and research frameworks regarding the management of organizational networks generally and in the services context specifically. The chapter concludes by summarizing key notions from the literature analysis, showing relevant gaps in knowledge, and positioning the present research within the two theoretical discourses.

2.1 Organizational networks

2.1.1 Networks as governance structures

Organizational networks refer to a type of governance structure, a mode of organizing and governing economic exchange. The classic distinction regarding structural alternatives for economic institutions is made between markets and hierarchies, i.e., coordinating and controlling economic exchanges internally or externally to formal organizational boundaries (Coase, 1937; Williamson, 1975). To complement the dichotomous view of markets and hierarchies, *networks, hybrids, clans, or quasi-firms* (Eccles, 1981; Ouchi 1980; Powell, 1990; Thorelli, 1986; Williamson, 1985) have been proposed as a third, intermediate form regarding the organization of industries (Richardson, 1972; Williamson, 1991). Whereas market-based exchanges rely on price-based governance and hierarchies rely on formal authority, a network form of governance represents a hybrid form, constituting a mix of price-based, authoritative, and social mechanisms for controlling economic exchange, the aim of which is to exploit the advantages and to minimize the weaknesses of the market-based and hierarchical modes of governance (Bradach and Eccles, 1989). Contemporary scholars also distinguish the network mode as a form of “relational governance” (Dyer and Singh, 1998; Zaheer and Venkatraman, 1995).

At the most general level, a network is defined as “*a set of actors connected by a set of ties*” (Borgatti and Foster, 2003: 992). In an organizational setting, researchers refer to networks as

“two or more organizations connected to each other through some type of exchange relationships, whether it is information, resources, or services” (Scott and Davis, 2007: 278), “which collaborate in the pursuit of individual and common objectives while remaining autonomous and independent” (Hibbert et al., 2008: 391).

Networks can be then perceived as social structures that permit the inter-organizational interaction of exchange, concerted action, and joint production (Alter and Hage, 1993). The network perspective for studying organizations and organizing assumes that actors are embedded within networks of interconnected relationships that provide opportunities but also constrain their actions (Brass et al., 2004).

Research on networks as governance structures is grounded in transaction cost economics (Williamson, 1975; Williamson, 1985), explaining organizational boundaries based on asset specificity, uncertainty, and exchange frequency, and is widely used to understand the make-or-buy decisions adopted by firms (Scott and Davis, 2007). Another essential stepping stone for understanding organization outside of firms is the resource dependency theory, which explains the management of power-dependence relations between the organization and its environment (Pfeffer and Salancik, 1978). Other important theoretical bases developed for or used in understanding organizational networks include the resource-based theory (Das and Teng, 2000; Eisenhardt and Schoonhoven, 1996), the social exchange theory (Emerson, 1976), the social capital theory (Nahapiet and Ghoshal, 1998), and the interaction approach (Håkansson, 1982), among others.

Along with the notions of the “network economy” (e.g., Achrol and Kottler, 1999; Snow et al., 1992; Raab and Kenis, 2009), organizational networks and inter-organizational entities have remained in the focus of scholarly interest across a variety of disciplines and research contexts². The major disciplines include economic sociology (e.g., Coleman, 1988; Granovetter, 1973, 1985; Uzzi, 1996, 1997), institutional economics (e.g., Jones et al., 1997; Park, 1996), strategic management (e.g., Gulati, 1995; Jarillo, 1988), industrial marketing and purchasing (e.g., Ford et al., 2011; Håkansson and Snehota, 1989; Möller and Halinen, 1999), and operations and supply chain management (Chen and Paulraj, 2004; Lambert et al., 1998). The research contexts include strategic alliances and joint ventures (Gulati et al., 2000; Kogut, 1988), supply networks (Knight and Harland, 2005; Svahn and Westerlund, 2007), innovation networks (Dhanaraj and Parkhe, 2006; Powell et al., 1996), policy and governance networks in public administration (Agranoff, 2007; Kickert et al., 1997), non-profit collaboratives (Provan and Millward, 1995; Provan et al., 2004), and cross-sector collaboration (Austin, 2000; Bryson et al., 2006).

² For more comprehensive reviews on organizational network research, see, e.g., Brass et al. (2004),

In addition to the differences in theoretical bases and research contexts, studies on organizational networks and their management occupy a number of opposite worldviews and perspectives for understanding and analyzing inter-organizational entities. Focusing on organizational networks, instead of, for instance, social networks between people, the following three essential features of network analysis can be identified: the underlying assumption about networks, the focus of network analysis, and the levels of analysis in network studies.

2.1.2 Assumptions about organizational networks

An essential feature of organizational network analysis relates to the difference in the underlying assumptions about networks and their management in general. Depending on these assumptions, researchers adopt differing views about the formation and evolution of networks and organizations' capability to manage the network, i.e., to exert coordination and control over their surrounding network of organizations. In general, two opposing views prevail regarding the assumptions about networks and their management.

The first view perceives "networks as markets" consisting of autonomous but interdependent actors, resources, and activities that emerge and evolve serendipitously. Based on this view, organizational networks cannot be designed, managed, and controlled by any individual actor (Håkansson, 1982). Instead, actors operate within a network (Ford and Håkansson, 2006), aiming to influence other actors' perceptions and actions, and thus the evolution of the network, through their relationships and interaction (Håkansson and Snehota, 1995). Thus, rather than managing, actors interact with each other to influence and be influenced by others when pursuing their goals (Ford et al. 2003: 189). This view is particularly promoted by the proponents of the interaction approach developed in the industrial marketing and purchasing literature (Andersson et al., 1994; Håkansson, 1982; Håkansson and Snehota, 1995; Ford et al., 2011) but can also be found in the governance network literature within public administration and policy network studies, with interaction then referring to game management or bargaining games within networks (Kickert et al., 1997; Agranoff, 2007).

The second ontological view perceives "networks as organizations" or "network organizations" (Achroll, 1997; Achroll and Kottler, 1999; Baker, 1992), which are purposefully or intentionally created, goal-directed, and designed to fulfill certain business or policy purposes (Human and Provan, 2000), aiming to provide network members with individual and mutual benefits (Khanna et al., 1998). Based on this view, strategic networks or nets are deliberately designed, managed, and controlled by a focal actor or "hub", a group of focal actors, or an external member to the network (e.g., Möller and Halinen, 1999; Provan and Kenis, 2008; Saz-Carranza, 2012). Grounded in strategic networks literature, alliances, and joint ventures (e.g., Dhanaraj and Parkhe, 2006; Gulati et al., 2000; Jarillo, 1988; Kogut, 1988; Parolini, 1999), inter-organizational entities are then viewed as strategic constellations in which "network resources" are, or at least should be, leveraged and managed similar-

ly to those of physical and human resources within firms for achieving competitive advantage (Kanter, 1994; Doz and Hamel, 1998; Gulati, 2007). In addition to a group of scholars in industrial marketing and management (e.g., Möller et al., 2005; Ritter et al., 2004), certain research streams in the public administration and non-profit sector also adopt a similar strategic view about networks (Human and Provan, 2000; Provan and Kenis, 2008; Ospina and Saz-Carranza, 2010).

The distinction between emergent and strategic networks relates closely to the distinction between network governance as distributed to authorities and as featured in different types of networks (Grabher and Powell, 2004: xvii). Whereas distributed authority and the associative regulation of interaction and relations characterize emergent, heterarchical networks, in strategic or hierarchical networks, control is often exerted by an identifiable center or hub. Furthermore, the former is a feature of informal and regional types of networks, whereas the latter applies to numerous project and business networks (Grabher and Powell, 2004).

2.1.3 Focus of organizational network analysis

Organizational network analysis includes the following two perspectives for understanding social structures: a structural perspective and a governance perspective. The structural perspective, generally referring to a research stream in social network analysis, focuses on the structural properties of networks – the nodes and the pattern of ties among nodes, investigating “*the constraining and enabling dimensions of patterned relationships among social actors*” (Grabher and Powell, 2004: xii). Key concepts in social network analysis include centrality and density (Freeman, 1977, 1979), the strength of ties (Granovetter, 1973; Krackhardt, 1996), and structural holes and closure (Burt, 1992, 2009). Studies using the structural perspective regarding organizational networks aim to explain the relations between patterned relationships within the overall network structure and firm innovativeness (Capaldo, 2007; Powell et al., 1996; Teece, 1992), as well as overall network performance (Provan and Milward, 1995; Soda et al., 2004), to name a couple of examples.

The governance perspective on networks focuses on the mechanisms by which social structures called “networks” are governed, i.e., initiated, coordinated, controlled, and terminated. The governance perspective can be further divided into two streams of research, one focusing on the formation of networks and network configurations (e.g., Ebers, 1993; Oliver, 1990) and the other on the more managerial aspects of designing, managing, and controlling networks (e.g., Gulati, 1995; Park, 1996; Ring and Van de Ven, 1992). Whereas early studies on network formation aimed to identify factors associated with engaging in inter-organizational networks (Oliver, 1990), later studies have examined the relation of pre- and post-alliance formation factors in alliance performance (Nielsen, 2007). Research adopting the managerial perspective on network governance seeks to understand the antecedents, consequences, and evolution of different governance mechanisms for coordinating and controlling economic exchange within networks. Some of the key issues in these

networks include the dynamics of formal and informal or relational contracts (Macaulay, 1966; Poppo and Zenger, 2002; Ring and Van de Ven, 1994) and the role of inter-organizational trust in the choice of governance mechanisms and, further, in firm performance (Gulati, 1995; Gulati and Nickerson, 2008; Malhotra and Lumineau, 2011).

2.1.4 Levels of analysis in organizational network research

The third feature of network research is the choice regarding the level of analysis. In general, the following three levels of analysis may be adopted when examining networks and their management: a dyad level, a portfolio level, and a network level. The distinctions among a dyad, a portfolio, and a network level of analysis correspond to the study of inter-organizational relationships, chains, and networks (Harland, 1996; Johnsen et al., 2008).

First, the most common level of analysis adopted in studies on inter-organizational relations and networks is that of a *dyad*. Using this approach, the unit of analysis is individual inter-organizational relations between two organizations. In industrial contexts, the dyad often refers to buyer-supplier relations (e.g., Håkansson, 1982). Network research at the dyadic level of analysis has developed understanding on dyadic inter-organizational relations between industrial companies (Håkansson, 1982; Håkansson and Snehota, 1995), relationship formation (Ebers, 1993; Oliver, 1990), evolution (Ariño and de la Torre, 1998; Ring and Van de Ven, 1992), governance (Gulati, 1995; Park, 1996; Uzzi, 1997), and performance consequences (Gulati and Nickerson, 2008).

Second, rather than studying individual relations between exchanging and cooperating actors, the focus may be a *portfolio* or portfolios of inter-organizational relations (e.g., Bensaou, 1999; Hoffman, 2007; Wassmer, 2010). The portfolio level of analysis is often applied in supply chain research, investigating operational problems regarding how to achieve the integration of business processes across the chain of relationships producing specific product or service offerings (Johnsen et al., 2008). More recently, research on alliance portfolios has emerged, aiming to develop an understanding of the emergence, configurations, and management of inter-organizational arrangements, where-in firms engage in multiple simultaneous strategic alliances with different partners (Wassmer, 2010).

Third, networks and their management can be studied at the *network level* of analysis, often referred to as “whole networks” (e.g., Koka and Prescott, 2008; Phelps et al., 2012; Provan et al., 2007; Saz-Carranza, 2012). Achrol (1997) suggested that there is a fundamental shift in business marketing and management in the 21st century from a dyadic perspective of inter-organizational exchange relationships towards a network perspective of value creation involving different types of network organizations. A similar argument has been proposed by Provan et al. (2007), who suggested that “*only by examining the whole network can we understand such issues as how networks evolve, how they are governed, and, ultimately, how collective outcomes might be generated.*” (Provan et al. 2007: 480). Whereas the dyadic

and portfolio approaches to networks and their management emphasize relationship management activities, the network perspective extends the focus to managing an entire network, i.e., how individual organizations, network members, or a collection of network members act to induce an effect at the network level (Möller et al., 2005; Provan et al., 2007).

The three levels of analysis are closely related to the other previously discussed perspectives in network analysis. The micro-level perspective on network dyads and portfolios is often associated with the governance perspective in network analysis and the strategic view of networks as purposeful constellations of actors. The aim of such studies is often to develop an understanding of how a focal organization in the network should manage or orchestrate the network to realize network benefits. Similarly, research at the macro or whole network level of analysis is closely related to the structural perspective of studying networks and the emergent view of networks as serendipitous social and economic structures, aiming to develop a holistic understanding of the interconnectedness of network actors, their actions and behavior, and the evolution of relational patterns within the network.

2.1.5 Perspectives taken in this study

The following perspectives on organizational networks have been chosen as the underlying premises of this research. First, organizational networks are perceived as intentionally created and purposeful, i.e., strategic arrangements between organizations, in which one or more focal organizations aim to initiate, govern, and develop the network and its individual relations to achieve its objectives. Second, the study investigates the managerial issues in networks, thus focusing on the governance perspective in network analysis. Third, the level of analysis in the study is three-fold. Although the ultimate aim of the study is to understand how a focal organization or organizations in the network manage the network as a whole, the study recognizes the multi-layered nature of managing networks and the limited ability of any single level of analysis to offer a sufficient understanding of how networks are managed (Möller and Halinen, 1999). Thus, it is perceived that one cannot fully understand network management when locking oneself into a specific level of analysis, for instance, by only looking at management activities that consider the whole network and neglecting those that occur at a dyadic level in the same network. Instead, because managerial activities in networks occur at all three levels – relationship, portfolio, and whole network – the study aims to understand how and why a focal organizations in the network use management activities to govern the network, whether at the dyadic, portfolio, or network level.

Having introduced the different perspectives for studying and analyzing organizational networks and positioning this inquiry within that framework, the next section offers a more in-depth analysis of the managerial aspects of organizational networks as approached in the previous literature.

2.2 Network management research

Although networks and various types of inter-organizational entities have been one of the key interests in organizational analysis for nearly three decades, the focus on managerial aspects of networking is relatively new and diverse (Ritter et al. 2004). As network scholars have generated valuable insights into the literature and “the emerging theory” of network management, the research field has become fragmented (Hibbert et al., 2008; Järvensivu and Möller 2009), resulting in a somewhat limited understanding of network management (Ritter et al. 2004). Across disciplines, it is suggested that a more holistic understanding is needed concerning the behavior and management of inter-organizational networks (e.g., Achrol 1997, Ritter et al. 2004, Möller and Rajala 2007, Rethemeyer and Hatmaker 2008). Although numerous efforts have been made to assess and synthesize knowledge about networks in general, few systematic assessments have thus far been conducted on the managerial aspect of networks³. In other words, there is a lack of uniform vocabulary and analytical frameworks to integrate the knowledge on managing organizational networks.

This section reviews the previous literature on organizational network management, aiming to form a body of knowledge regarding the “emerging” theory of network management and thus establishing a context and framework for the research. Network management is defined as follows:

“A series of (managerial activities) undertaken by (an individual, or) a team of individuals, with various skills and capacities, that are focusing on defining both the direction to be taken by an inter-organizational (network) and the allocation and implementation of resources towards those ends” (cf. Hibbert et al., 2008: 391).

A research review was conducted to identify the different perspectives of network management, the key constructs of network management, and the relationships among them. Network management is here defined as “*a series of processes undertaken by a team of individuals, with various skills and capacities, that are focusing on defining both the direction to be taken by an inter-organizational entity and the allocation and implementation of resources towards those ends*” (Hibbert et al., 2008: 391). The analysis follows a research agenda for network management proposed by McGuire (2002: 599), including the following: (1) the identification of network management behaviors or choices, (2) the explanations regarding why such choices are made, and (3) an evaluation of the consequences of these choices.

³ One exception is the study by Järvensivu and Möller (2009), which used studies from a variety of research streams to develop a meta-theoretical framework of network management. However, the study does not rely on a systematically collected sample of articles, and the framework thus reflects the authors’ preferences rather than a neutral representation of the variety of dimensions in network management research. Another example is an assessment of literature on the management of inter-organizational entities by Hibbert et al. (2008). Here, however, the focus was to assess the different theoretical backgrounds and the levels of analysis in extant literature, rather than to build frameworks from the different findings in these studies.

Hart (1998) defines the principles of selectivity and neutralism as the success factors for a research review. Selectivity refers to limiting the potentially original scope of a targeted review by selecting basic criteria for eligible concepts and defining a unit of review. Conversely, the principle of neutralism protects the validity of a review from biases such as a preference for only one paradigm of methodology, research traditions, business or market contexts, or ways of assessing the theoretical advancement and practical applicability of concepts. To meet these two criteria, the following boundaries were established for the review. First, rather than focusing on one or few well-known and established streams of literature, the study draws from a cross-disciplinary sample of literature that examines managerial issues in networks. Second, the study assumes that some type of deliberate management action occurs in any network of organizations, instead of assuming that networks are only emergent and serendipitous constellations of organizations that cannot be managed by any individual actor. Third, to better understand the features of management in inter-organizational arrangements above the relationship management of individual network relations, the review focuses on studies that examine management from a network or a relationship portfolio perspective, instead of examining single network dyads⁴.

For the review to correspond with these boundaries, literature for the analysis was sampled in the following fashion. “EBSCO Business Source Complete” was used as a data source to systematically compile a sample of academic articles from a variety of research fields. The keywords for the search included “network” and “management” appearing simultaneously either in a title as a keyword or in the abstract of an article. The end boundary of the literature search was the year 2010, with no limit for the first year. The literature search yielded a total of 330 articles out of a total population of 1,670 articles in which the term “network management” appears anywhere in a research article.

The abstracts of the 330 selected articles were read to remove publications that did not relate to organizational networks but that discussed other types of networks such as computer networks. The remaining 106 articles in the sample were fully read. Of these articles, as many as 41 research papers did not meet the criteria of discussing inter-organizational arrangements, instead discussing intra-organizational issues such as the management of subsidiaries by a multinational corporation. In addition, although an organization perspective was chosen in some papers, particularly within operations and supply chain management, the actual analysis and resulting findings discussed the management of organizational networks other than social ones, such as the analyses of resource flows in manufacturing and logistics, and thus were removed from the sample. Finally, from the remaining articles, two discussed only the management of individual network dyads and thus were excluded from the review. The final sample used in the analysis consisted of 65 peer-reviewed, scholarly journal articles published between 1986 and 2010. In the sample, 21 articles were conceptual and 44 were empirical.

⁴ For a comprehensive review of managing inter-organizational relations, see, for instance, Hibbert et al. (2008).

A review of the topics, aims, findings, and arguments of the articles reveal network management as a multi-faceted and multi-layered concept. Network management and its antecedents and consequences have been studied from multiple perspectives. In particular, five different perspectives or *dimensions of network management* can be identified (Table 2). These include the following: (1) management tasks, (2) network and management strategies, (3) network and management structures, (4) network roles and positions, and (5) network and management capabilities. In the following section, the essence of each of the five perspectives is described along with their antecedents and consequences as proposed in the literature.

Table 2. Categorization of network management studies

Category	Concept(s) of interest	Reference(s)
1. Management tasks		
Visioning, planning, and setting objectives	Visioning; Identifying opportunities, Planning, Framing, communicating objectives	Agranoff and McGuire (1999); Ritter (1999); McGuire (2002); Ojasalo (2004); Goeizen (2005); Tikkanen and Renko (2006); Rethemeyer and Hatmaker (2008); Sotarauta (2010); Wegner and Padula (2010);
Forming, resourcing, and developing the network structure	Network formation; Network structuring; Initiating; Mobilizing; Acquiring and selecting actors; Creating social relations; Creating variation; Broadening internal and external relations; Reconfiguring; Resourcing; Building capacity; Staffing; Leveraging periphery;	Koppenjan and Termeer (1995); Ritter (1999); McGuire (2002); Albrechts and Lievois (2004); Ojasalo (2004); Heikkinen and Tähtinen (2006); Ruokonen et al. (2006); Czischke (2007); Rethemeyer and Hatmaker (2008); Cross et al. (2009); Schell and Saxby (2010); Sotarauta (2010); Wegner and Padula (2010);
Coordinating, controlling and integrating	Integrating; Synthetizing; Bridging boundaries; Coordinating; Cooperating; Networking; Game management; Consensus building; Controlling; Monitoring	Koppenjan and Termeer (1995); Ritter (1999); Agranoff and McGuire (1999); Klijn and Koppenjan (2000); Sotarauta (2001); McGuire (2002); Meier and O'Toole (2003); Björk and Virtanen (2005); Möller and Svahn (2006); Möller and Rajala (2007); Svahn and Westerland (2007); Rethemeyer and Hatmaker (2008); Murillo and Lozano (2009); Cross et al. (2010); Rampersad et al. (2010); Roseira et al. (2010); Sotarauta (2010); Svahn and Westerland (2007); Wegner and Padula (2010)
Managing information and knowledge	Raising awareness; Minimizing insularity; Creating transparency; Creating meta-knowledge; Managing perceptions; Promoting/facilitating knowledge-sharing, learning and innovating	Koppenjan and Termeer (1995); Goeizen (2005); Evanschitzky et al. (2007); Cross et al. (2010); Sotarauta (2010); Schell and Saxby (2010);
Activating, motivating and committing actors	Activating/De-activating; Building community; Developing commitment and motivation	McGuire (2002); Goeizen (2005); Heikkinen and Tähtinen (2006); Evanschitzky et al. (2007); Rethemeyer and Hatmaker (2008); Ruokonen et al. (2006); Ospina and Saz-Carranza (2010); Wegner and Padula (2010)
Managing network stability	Assuring continuity; Building stability	Goeizen (2005); Heikkinen and Tähtinen (2006); Schell and Saxby (2010)
Managing value distribution	Ensuring profit-distribution	Goeizen (2005); Sotarauta (2010);

Table 2. continues

Category	Concept(s) of interest	Reference(s)
2. Network and management strategies		
Strategies for forming and developing the network structure	Outsourcing decisions; Alliance / partnership strategy; Strategies for network structuring	Koppenjan and Termeer (1995); Klijn and Koppenjan (2006); Ruokonen et al. (2006); Hsiao et al (2010)
Strategies for coordinating and controlling the network	Contractual and relationship-based governance; Bureaucratic, community-based, or entrepreneurial strategic orientations; Proactive and reactive management; Strategies for network development	Ojasalo (2004); Goerdel (2006); Keast and Hampson (2007); Herranz (2008, 2009)
Strategies in general	The number of network management strategies employed	Klijn et al. (2010a, 2010b)
3. Network and management structures		
Authority	Administrative structure; Decision-making structure	Holmen et al. (2007); Schell and Saxby (2010); Wegner and Padula (2010)
Level of formalization	Formalization of coordination and information transfer	Sotarauta (2001); Goeizen (2005); Heikkinen and Tähtinen (2006); Holmen et al. (2007); Dilk et al. (2009); Wegner and Padula (2010)
Rules and norms	Network's institutional structure	Agranoff and McGuire (1999); Johnson (2005)
Network relations	Network's tie composition	Capaldo (2007)
4. Network roles and positions		
Member roles	Network position; Diplomat, adversary, equal partner; Producer, compromiser, aspirant, accessory provider	Thorelli (1986); Harland and Knight (2001); Goeizen (2005); Heikkinen et al. (2007); Heen (2010)
Managerial roles	Webber, instigator, gatekeeper, advocate, planner, facilitator; Coordinator, advisor, information broker, relationship broker, and innovation sponsor	Harland and Knight (2001); Heikkinen et al. (2007)
5. Network and management capabilities		
Management task-related capabilities	Visioning capability, Mobilizing capability, Integration, coordination and monitoring capability, Influencing capability, Positioning capability	Möller et al. (2005); Tikkanen and Renko (2006); Svahn and Westerlund (2007)

2.2.1 Management tasks

Based on the analyzed literature, the majority of studies on network management investigate network management functions and tasks, their antecedents, and consequences. Management tasks represent, to some extent, the basic unit of analysis in network management studies, referring here to different managerial activities that are needed for designing and managing value creation and captured in inter-organizational entities. Among the studied management tasks include the following:

- Visioning, planning, and setting network objectives;
- Forming, resourcing and developing the network structure;
- Coordinating, integrating, and controlling the network;
- Managing information and knowledge within the network;
- Activating and committing actors;
- Managing network stability; and
- Managing value distribution

A variety of antecedent conditions have been proposed to explain network management task execution. In particular, the structural characteristics of the

task, the network, and the surrounding environment dominate empirical and conceptual analysis. For instance, the difficulty of the task and the clarity of objectives are shown to relate to and explain operational network management differences (McGuire, 2002; Meier and O'Toole, 2003). It is also proposed that different types of networks require different network management tasks. The differences may relate to a particular network's underlying value creation logic (Järvensivu and Möller, 2009; Möller et al., 2005; Möller and Rajala, 2007), the structural properties of the network, such as the level of bureaucracy (Björk and Virtanen, 2005), the network's institutional characteristics (Simmons and Birchall, 2008), or power distribution within the network (Rampersad et al., 2010; Simmons and Birchall, 2008). Taking a broader look beyond the boundaries of the network, the environment's economic and institutional properties and the network's dependence on the resources in the environment have been associated with differences in the management tasks employed (Järvensivu and Möller, 2009; McGuire, 2002; Sotarauta, 2001).

The consequences of employing different network management tasks occur both at network and organizational levels. An example of network-level consequences is a study of two Australian high-technology industries by Rampersad et al. (2010), which reveals the significant impact that communication and R&D efficiencies have in achieving network effectiveness. Ospina and Saz-Carranza (2010) examined how the leaders of organizational networks use various practices to manage the contradicting demands of the unity and diversity of networks as organizational forms; effective management facilitates interaction and promotes openness within the network, thereby managing credibility and cultivating relationships outside the network. At the organizational level, Capaldo (2007) examined lead firms' capabilities to sustain their innovativeness in the Italian furnishing industry, finding that firms can achieve innovativeness by creating and managing the overall architecture of their network and the proportion of weak and strong ties over time.

2.2.2 Network and management strategies

The second largest group of studies, based on the analyzed sample of articles, investigates network and management strategies, referring to the strategic choices or orientations to execute different management tasks. Three groups of studies could be identified from the analyzed literature. The first group investigates *strategies for forming and developing the network structure*, including studies on outsourcing decisions (Hsiao et al., 2010), alliances or partnership strategies (Ruokonen et al., 2006), and structuring governance networks in public administration and policy making (Koppenjan and Termeer, 1995; Klijn and Koppenjan, 2006). The second group investigates different *strategies for coordinating and controlling the network*, such as choices between contractual and relationship-based governance (Keast and Hampson, 2007), coordination based on bureaucratic, community-based, or entrepreneurial strategic orientations (Herranz, 2008; 2009), and choices between proactive and reactive management activities (Goerdel, 2006). The third group of stud-

ies has investigated *the number of management strategies employed* (Klijn et al., 2010a, 2010b) rather than the differences in strategy contents.

Network and management strategies are shown to be dependent on the structural characteristics of the organization, the network, and the environment. First, it is suggested that the selection of a suitable network strategy should be based on a thorough evaluation of the company's products, its own resources, and its requirements for potential partners (Ruokonen et al., 2006). Second, the different types of networks are characterized by differing values, making them responsive to respective managerial strategic orientations (Herranz 2008). For instance, the choice of institutional design strategies will depend on the institutional characteristics of networks and the imitation behavior and dominant discourses in or outside the networks (Klijn and Koppenjan 2006). Third, it is suggested that management strategies depend on the operating environment. For instance, McGuire (2002) proposes that network managers employ linear strategies when operating in a largely technical environment involving clear objectives, broad-based support, and ample resources, and employ recursive strategies in institutional environments in which immediate goal achievement is impossible because of a lack of goal consensus or undesirable if the network must build long-term linkages within a community.

The network and management strategies employed are shown to be associated with network and organizational performance, as well as the evolution of the entire network. Examples of performance analyses at the network level include two studies by Klijn et al. (2010a, b), using the same dataset of 337 survey respondents involved in environmental projects in the Netherlands. The researchers suggest that network management strategies differ in their effectiveness to facilitate and guide interaction in governance networks, further relating to the effectiveness of the network to deliver outcomes. At the organizational level of analysis, Meier and O'Toole (2001, 2003) analyzed more than 500 U.S. school districts in Texas to show the relation between network management and overall organizational performance, in which a strategy of networking outwardly with multiple actors and with frequency strengthens educational program performance in the short run and builds a baseline for future enhancements. Goerdel (2006) conducted a similar type of study longitudinally, examining the influence of proactive management strategies on organizational performance within networked environments. Using survey data from superintendents in Texas school districts pooled for six years, the researcher found that a proactive management strategy contributes positively to higher performance outcomes, particularly in the case of average overall pass rates and the pass rates of low-income and minority students.

From the perspective of network evolution, the study of workforce development networks (Herranz, 2009) revealed that different network coordination strategies are associated with differences in the balance of the informal and formal processes of network development. Whereas a network with more formal processes is related to more stable network development, a network with more informal processes is related to more flexible network development. In another example, Klijn and Koppenjan (2006) identified management strate-

gies aimed at changing institutional rules within networks. The strategies for changing network structure and processes in terms of prevailing rules included direct interventions by reframing strategies and indirect interventions by influencing the perceptions and thus creating long-term changes in interaction patterns. Similarly, the choice between relationship-based and bureaucratic management strategies influences the development of understanding and trust within the network, which is further associated with the network's innovation outcomes (Keast and Hampson, 2007).

2.2.3 Network and management structures

Network management structures focus on how governance, administration, authority, and decision-making are organized within the network to execute management tasks and processes. The issues studied in relation to management structures include the dynamics of permanent rule- and routine-based and temporary project-based *administrative structures* for managing collective action (Holmen et al., 2007), the network's *decision-making structure* (Wegner and Padula, 2010), and the *formalization of coordination* (Goeizen, 2006; Heikkinen and Tähtinen, 2006; Dilk et al., 2009; Wegner and Padula, 2010). In addition, a group of studies in the public administration domain have investigated networks' *institutional structures* that guide or constrain network members' actions (Agranoff and McGuire, 1999; Johnson, 2005).

Only a few investigations include the antecedents, mainly strategic, for different network management structures; the remainder of the studies focus on describing the structures in relation to positive network performance. Among the few studies including antecedents, Goeizen (2005) found that firms are developing multifaceted, multilevel responses to the task of managing alliance networks that vary in hierarchy and formality. Furthermore, a firm's strategic intent and motives appear to provide overarching coherence to the different structures of alliance network management.

The consequences of employing different network management structures relate mainly to network efficiency. For instance, Wegner and Padula (2010) report that there is a trade-off in which member firms of a network agree to delegate greater decision-making power to managers, referring to the choices in management structures, in exchange for greater network efficiency and competitiveness. From the perspective of formalizing network coordination and information transfer, Sotarauta (2001) examined urban development networks and how their efficiency can be promoted by the use of modern information systems.

2.2.4 Network roles and positions

The fourth dimension of network management involves studies that investigate different roles and positions that actors adopt or seek to adopt within networks in their pursuit to exert influence on the network's direction and to extract value from the network. In his prominent article about networks as a form of organizing between markets and hierarchies, Thorelli (1986) did not

discuss network roles, but rather positions that companies occupy in a given network to obtain influence over the network. Later studies, building on classic research regarding organizational roles, such as Mintzberg (1975) and Miles and Snow (Snow et al. 1992), have begun to elaborate on different management roles that organizations occupy in a given network. These roles can be further divided into network *member roles* and more *managerial roles*; however, the distinction between the two is not always clear. The identified and proposed network and managerial roles in networks include the following:

- Diplomat, adversary, and equal partner (Heen 2009);
- Webber, instigator, gatekeeper, advocate, producer, planner, facilitator, compromiser, aspirant, and accessory provider (Heikkinen et al. 2007); and
- Coordinator, advisor, information broker, relationship broker, and innovation sponsor (Harland and Knight, 2001).

The studied antecedents of network and management roles primarily include organizational characteristics, whereas the consequences are assessed through role performance and network evolution. The position that a company occupies in a given network depends on, at least, the domain of the company, the position of the company in other networks, and the power of the company relative to other participants in the focal network (Thorelli, 1986). Factors affecting the role performance in supply networks include the network setting, such as network member relationships, interaction and the sharing of information; and the organizational setting, such as the organizational culture or systems and processes, team competence, and role expectations including role legitimacy (Harland and Knight, 2001). Furthermore, the way an actor can influence the network varies from one role to another, depending on the importance of the resources possessed by an actor. Some roles are able to radically influence not only the network composition but also the task of the network, whereas others may only incrementally influence either the task or the network composition (Heikkinen et al., 2007).

2.2.5 Network and management capabilities

The fifth and final dimension of network management includes a capability perspective to understand the management of organizational networks. Often grounded in the notion of dynamic capabilities (Martin and Eisenhardt, 2000; Teece et al., 1997), the studies in this group investigate organizations' capabilities to perform different management tasks and processes. In the studied sample of literature, topics include network visioning, positioning, and mobilizing capabilities (Tikkanen and Renko, 2007), and the capabilities to coordinate, control, and integrate networks (Möller et al., 2005; Svahn and Westerlund, 2007). In addition to indicating capabilities that organizations and network managers must possess to successfully perform management tasks, network capability or competence is also used as an outcome variable, referring to

the degree of network management task execution and qualification (Ritter, 1999).

The network and management capabilities of a network member are derived from the technical, legal, political, and cost properties internal to a specific organization (Agranoff and McGuire 1999). More specifically, some of the organizational preconditions of a company's network competence, including the availability of resources, the network orientation of human resource management, the integration of intra-organizational communication, and the openness of corporate culture, account for the development and establishment of network competence within the networking company (Ritter, 1999). Network management capability or competence is closely related to the notion of an actor's power to assert influence over the network, the sources of which include the organizations' economic base, technology, expertise, trust, and legitimacy (Thorelli, 1986).

2.2.6 A framework of network management research

The findings of the review can be summarized as follows:

- The contingency-based theory of network management builds on five interrelated dimensions of network management, each associated with a number of antecedents and consequences of network management practice (Figure 2).
- The five dimensions of network management include (1a) management functions and tasks, (1b) network and management strategies, (1c) management structures, (1d) network roles and positions, and (1e) network and management capabilities.
- The antecedents of network management include (2a) behavioral characteristics within the network and (2b) the structural characteristics of the task, the managing organization, the network, and the environment. The behavioral characteristics are composed of organizational strategies and objectives, network members' activities, and network members' perceptions and expectations. In addition to these "exogenous" antecedents, the five management dimensions are suggested to be interrelated, a practice in one dimension functioning as an antecedent for practice in at least one other dimension.
- The consequences of network management include different types of (3a) performances and (3b) network evolution. The performance construct can be further divided into four categories as follows: network effectiveness, network efficiency, organizational performance, and the effectiveness of network management. The network evolution and development construct refers to the evolution of network structures or network processes.

Based on the reviewed sample of literature on network management, the majority of empirical and conceptual studies on network management focus on the following three management dimensions: identifying management functions and tasks, explaining network and management strategies, and classify-

ing network roles and positions. Similarly, network characteristics appears to be the most frequently used factor to explain practices in different management dimensions, whereas network effectiveness is the most frequently explained consequence of network management. Far less appears to be known about (1) management structures and management capabilities within networks; (2) the behavioral, task, and environment characteristics that explain network management practice; and (3) the consequences of network management on network efficiency and the evolution of network processes.

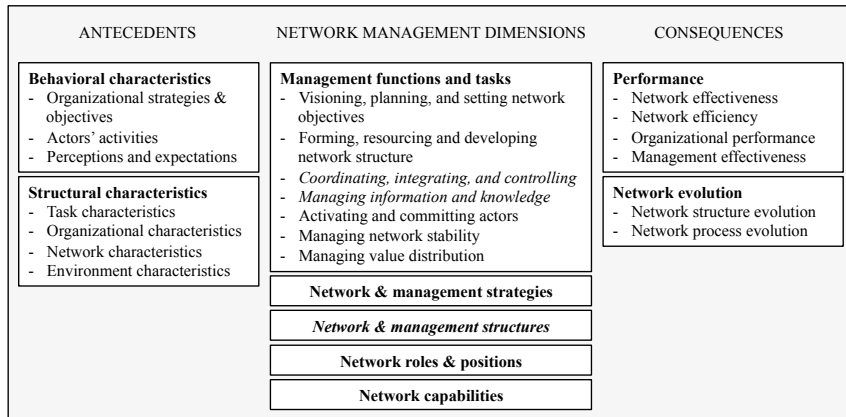


Figure 2. A framework of network management research at the network level of analysis (sample = 65 scientific, peer-reviewed articles)

This research position, particularly in the **management structure dimension** of understanding network management behavior, is combined with a focus on the **task of integration**, including the closely related tasks of coordination, monitoring, and information and knowledge management. The study seeks to explore how integration is managed through different network management structures within strategic service networks. Furthermore, because the ultimate aim is to provide contingency-theoretical explanations on why different management structures are used to manage integration, the study focuses particularly on **structural characteristics** as the antecedents of network management behavior. After outlining this general framework of network management research, the remainder of the chapter turns to assessing literature regarding the more specific context of the inquiry of managing service supply chains and networks.

2.3 Service supply chain management research

The second stream of literature relevant in relation to the objectives of this research includes research on service operations, particularly service supply chain management. Services and service operations have been suggested as one of the key agendas within the research on operations and supply chain management (Roth and Menor, 2003). Despite the growing practical importance and perceived importance in academia, a series of reviews on opera-

tions management research shows that the field of service operations has remained thin, lagging manufacturing-based operations research (Amoako-Gyampah and Meredith, 1989; Heineke and Davis, 2006; Machuca et al., 2007; Metters and Marucheck, 2007; Miller et al., 1981; Pannirselvam et al., 1999).

In the latest extensive review of literature on service operations management, Machuca et al. (2007) revealed that only 7.5 percent of articles published in 10 main operations management outlets from 1997 to 2002 covered service-related topics. Of these articles, seven topics dominate service operations management research. These topics include:

- Selection and design of the service delivery system;
 - Planning, scheduling and control in supply chains;
 - Service productivity;
 - Capacity planning, scheduling and control;
 - Inventory management and control;
 - Short-term scheduling and control; and
 - Strategic quality issues in services
- (Machuca et al., 2007).

The focus of this study is the management of organizational networks, particularly service networks and supply chains, and then most closely related to the second topic of *planning, scheduling, and control in service supply chains*. Although it is recognized that the term ‘*chain*’ may not be the most descriptive term to visualize the complexity of the service processes and systems involved in service production *networks*, it is often used merely for the convention of aligning with the manufacturing-based supply chain management literature (Giannakis, 2011)⁵. This study uses the following definition of strategic service networks:

“Service networks are complex interdependent relationships between actors who are either traditional service providers, i.e., actors that hold an underlying services logic, such as hospitals, telecommunications, and consultancy firms, and that provide services to other firms, or that are traditional industrial companies which provide tailored solutions to their clients by integrating a service into the core product that they offer” (Ramos et al., 2013: 952).

To enable a sufficiently comprehensive understanding about the research field, topics, and possible avenues for further research, a second research review was conducted in the specific context of managing service supply chains and networks. Because the research field is in the emergent stages, a qualitative approach for the review and an in-depth analysis of representative studies appeared to be more suitable than a quantitative approach. A review of the previous literature on operations, supply chain, marketing, and service research with a specific focus on service supply chains and their management

⁵ In this research, the terms “service supply chain”, “service supply network”, and “service network” are used interchangeably.

reveals five primary groups of research topics. These groups include the following: (1) the categorization and classification of services and service supply chains; (2) service supply chain management frameworks; (3) the antecedents of service supply chain management practice; (4) service supply chain performance; and (5) the comparison of goods and services supply chain management (Table 3). The essential content of these topics will be reviewed next, along with exemplary studies that characterize each group. The section ends by positioning the present study within service supply chain management research.

Table 3. Categorization of service supply chain management research topics

Focus of research	Concepts of interest	Example references
1. Characterization of services and service supply		
Characteristics of services as distinguished from goods	Intangibility, Heterogeneity, Inseparability, Perishability, Labor-intensity, Stockability, Intensity of interaction, Simultaneousness of consumption, Ease of performance assessment; Complexity of purchase	Baltacioglu et al. (2007); Correa et al. (2007); Jackson et al. (1995); Smeltzer and Ogden (2002); Spring and Araujo (2009)
Theorizing the nature of service supply and service supply chains	Bi-directionality of service supply chains; Customers as suppliers of raw material	Sampson (2000); Sampson and Froehle (2006); Spring and Araujo (2009)
Translating supply chain management constructs from goods to services	Backorders as the equivalent to inventory; Inventory as the equivalent to effective capacity; Capacity as the equivalent to long-term capacity	Akkermans and Vos (2003); Anderson and Morrice (2000); Niranjan and Weaver (2011)
2. Classifications of services		
Distinguishing consumer services from business services	Specialization/Customization; Technological intensity/complexity	Jackson and Cooper (1988)
Distinguishing professional services from goods or non-professional services	Knowledge intensity, Capital intensity, Professional workforce, Customer interaction, Service customization, Process throughput and variability	Lewis and Brown (2012); Silvestro et al. (1992); von Nordenflycht (2010); Wittreich (1966)
Distinguishing between different types of business services	Customer involvement and influence in the service process; Application of the service in the production process; Properties of the service task (complexity, importance, customization, focus of the output)	Chase (1981); Chase and Tansik (1983); Fitzsimmons et al. (1998); Jackson and Cooper (1988); Kellog and Nie (1995); Schmenner (1986); Wynstra et al. (2006)
3. Service supply chain management frameworks		
Service sourcing decision and practices	Purchase vs. in-house; Trends in service sourcing practices; Sourcing and procurement management	Agndal et al. (2007); Balakrishnan et al. (2008); Sengupta et al. (2006); Giannakis (2011); Jackson et al. (1995)
The structure of the service supply chain/network	Centralization; Formalization; Complexity; Decoupling of activities	Giannakis (2011); Tate and Ellram (2012); Sacconi et al. (2007); Sengupta et al. (2006)
Service supply chain management tasks	Coordination of supply and delivery processes; Demand management; Service performance management; Information and technology management; Customer/Supplier relationship management; Capacity and skills management; Supplier development; Cash flow management	Akkermans and Vos (2003); Baltacioglu et al. (2007); Ellram et al. (2004); Giannakis (2011)

Table 3. continues

Focus of research	Concepts of interest	Example references
4. Antecedents of service supply chain management		
Service outsourcing decision	Completeness/Quality of information about the task environment available; Type of customer contact; Intensity of information	Balakrishnan et al. (2008)
Service supply chain structure	Attractiveness of the service business; strategic priorities; Characteristics of the physical product and the services offered; Configuration of the manufacturing and distribution supply chain; Service outsourcing strategy	Saccani et al. (2007); Tate and Ellram (2012)
Buyer-supplier interaction	Type of service (consumption, instrumental, semi-manufactured, consumption)	Van de Valk (2008); Van der Valk et al. (2009); Wynstra et al. (2006); Van der Valk and Wynstra (2012);
Mode of control	Type of service (mass service, professional service)	Stouthuysena et al. (2012)
	Relation between types of contracts and monitoring	Van der Valk and Iwaarden (2011)
	Behavioral uncertainty, Human and process asset specificity, Contractual governance	Vandaele et al. (2007)
Supplier development	Goods- vs. service-based firms	Krause and Scannel (2002)
5. Service supply chain performance		
Measures of service performance	Operational performance (speed, delivery, flexibility, service quality, process quality); Financial performance (service productivity, costs and profits); Supplier performance; Customer satisfaction; Supplier satisfaction; Success of service process and outcome (relative to the expectations in advance of the purchase)	Field and Meile (2008); Froehle (2006); Gummeson (1998); Schmenner (2004); Sengupta et al. (2006); Stouthuysena et al. (2012); Tate and Van der Valk (2008); Vandaele and Gemmel (2007); Van Mossel and Van der Valk (2008); Van der Valk et al. (2009); Wynstra and Van der Valk (2012)
Outsourcing decision	Customer satisfaction	Vandaele and Gemmel (2007)
Service supply chain structure	Financial performance	Sengupta et al. (2006)
Buyer-supplier interaction and information-sharing	Operational performance; Customer satisfaction; (Perceived) success of service exchange	Froehle (2006); Sengupta et al. (2006); Van der Valk et al. (2009); Van der Valk and Wynstra (2012)
Mode of control	Supplier performance, Service quality, Customer satisfaction	Stouthuysena et al. (2012); Tate and Van der Valk (2008)
Buyer-supplier relations	Supplier performance; Profitability	Field and Meile (2008); Gummeson (1998)

2.3.1 Characterization of services and service supply

The first group of studies focuses on *characterizing services in comparison to goods* and on how the characterizing factors affect service supply chain management. The classic characterization of services as intangible, heterogeneous, inseparable or simultaneously produced and consumed, and perishable (Love-lock and Gummeson, 2004; Möller, 2010; Parasuraman et al., 1985; Zeithaml et al., 1985) is often used to describe the challenges of managing service supply chains and networks, in comparison to goods manufacturing. Other complementary or substitutable suggested characteristics include labor intensity, stockability, and the intensity of interaction (Baltacioglu et al., 2007; Correa et al., 2007). Some of the primary challenges created by these characteristics include the incapability to store services to mitigate supply-demand fluctua-

tions, the difficulty of specifying service levels and activities, and the difficulty of objectively specifying and measuring service quality (Baltacioglu et al., 2007; Ellram et al., 2007; Field and Meile, 2008; Giannakis, 2011). For instance, the differences between purchasing materials and purchasing services perceived by purchasing professionals relates to determining total cost, negotiating prices, comparing supplier capabilities, and evaluating performance, one of the most complex areas being the writing of statements of work and service specifications (Smeltzer and Ogden, 2002).

Given the distinct features of services as opposed to goods, researchers have aimed to translate established supply chain management concepts from goods to services or, more generally, to theorize about the nature of service supply in comparison to goods manufacturing. The former studies have focused on exploring the uniqueness of services when pertaining to supply chain management, including inconsistencies in the goods–services equivalents of important operations management constructs, such as inventory and capacity (Anderson and Morrice, 2000; Akkerman and Vos, 2003; Ellram et al., 2004; Niranjana and Weaver, 2011). The latter have attempted to define services as an integral element of a service supply chain. For instance, a sequence of studies by Sampson and his colleagues (Sampson, 2000, 2007; Sampson and Froehle, 2006) proposed service supply and service supply chains as bi-directional, wherein the customer is in fact the supplier of raw material for the supplier, providing bodies, minds, belongings, or information as inputs to the service processes. The main argument is that given the customer-supplier duality, the production flows in both directions, not only from suppliers to customers but also from customers to suppliers. Thus, all services have customers as the primary suppliers of inputs, and thus, customers are also suppliers in all service businesses.

The resulting characteristics of bi-directional supply chains are that the chains are typically short, the suppliers do not typically pay for customer-supplied inputs, the chains are inherently just-in-time (JIT), and the chains inherently communicate value-added expectations. Furthermore, the bi-directionality has at least four types of implications for service management as follows: (1) the major portions of production cannot begin until customers have supplied their inputs; (2) service outputs tend to be heterogeneous because customers present heterogeneous inputs, implying a tendency to a non-standard production of services; (3) services tend to be labor intensive; and (4) service location decisions tend to be customer-based instead of supplier-based. The implications of the bi-directionality with regard to supply chain management practice include decisions about the supply base, integration, partnering, supplier development, and the role of information technology. For instance, in relation to the communication of expectations, service providers must inform customers about process capabilities and limitations to prevent the inadequate fulfilling of unrealistic expectations. (Sampson, 2000)

2.3.2 Classification of services

In addition to characterizing services and service supply as such, a number of studies have aimed to classify different types of services based on the properties that affect their management. It is suggested that one should not consider services as one generic class but that differences may exist in the requirements for supply chain management across service categories (Smeltzer and Ogden, 2002). Proposed distinctions among the different types of services that further influence their management include *business versus consumer services*, *commodities versus professional services*, and *different types of business services*.

First, studies *distinguishing consumer services from business services* emphasize the higher specialization or customization of the business service offering relative to the client's needs, and the technological complexity of numerous business services (Jackson and Cooper, 1988). One implication of this specialization and technology intensity is that industrial buyers must rely on vendors to provide information and assistance in purchasing technically complex services. Second, the *distinction of professional services from goods or non-professional services* emphasizes the distinctive patterns that the different types of services share with respect to the production and delivery processes, varying between 'routine' mass services, service shops, and 'tailor-made' professional services (Silvestro, 1992). Characteristics of a professional service is that the professional–client exchange is variably asymmetrical, that professional service operations are composed of a substantial number of less variable and faster throughput processes, and that professional status and corresponding organizational structures introduce distinctive trade-offs when seeking greater efficiency and effectiveness (Lewis and Brown, 2012). Third, studies *distinguishing between different types of business services* emphasize the involvement of the customer in the service process (Chase, 1981; Chase and Tansik, 1983), the different properties of the service task (Boyt and Harvey, 1997; Fitzsimmons et al., 1998; Schmenner, 1986), and the role of the service in the production process (Jackson and Cooper, 1988; Wynstra, 2006).

The most essential service classification for the present study is the one distinguishing between the *roles of the service in the buyer's production process*. In particular, Wynstra et al. (2006) proposed a classification of business services based on the way in which the buying organization applies the service in its business processes. The application may vary from the internal consumption of the service, the instrumental use of the service for business process improvements, semi-manufacturing in which the service is part of the production process before the output is delivered to the customer, and to a component service in which the service becomes part of the offering and is delivered directly to, or in favor of the buyer's customer. This study focuses on the fourth type of service, *component services*, which can be defined as follows:

Services that are produced downstream in the supply chain in the buyer's customers and hence become part of the buyer's value proposition without being transformed by the buying company (van der Valk et al. 2009; van der Valk and Wynstra, 2012).

The type of service is also referred to as front-end services (Balakrishnan et al., 2008), or triadic services, in which the service provision is purchased from an external supplier in favor of a third-party customer (Li and Choi, 2009; Niranjana and Metri, 2008; Wynstra et al., 2006). An example of such services includes external field maintenance professionals contracted by the manufacturer of production machinery.

In summary, service supply chains are characterized by the requirements that the special characteristics of services, as opposed to goods, create for their management. Furthermore, it is suggested that service supply chain management and effective service supply chain management models are contingent on three essential characteristics that distinguish among the different types of services. These include the special characteristics of business versus consumer services, the distinct characteristics of professional versus commodity services, and the positioning of the service in the supply process, as reflected in the way the service is applied in the buyer's business processes and the way or degree that the customers are involved in the service process. The way in which the different types of service supply chains are managed or should be managed is reflected in the general frameworks proposed for understanding the unique characteristics of managing service networks.

2.3.3 Service supply chain management frameworks

A number of general frameworks have been proposed for service supply chain management. Two often-cited frameworks include those developed and proposed by Ellram et al. (2004) and Baltacioglu et al. (2007), and a more recent one by Giannakis (2011). For the purpose of indicating later in the section the essential supply chain management tasks assessed in this study, the three frameworks are briefly introduced.

First, Ellram et al. (2004) compared the applicability of three common manufacturing-based supply chain management models to the context of services. The models include the supply chain operations reference model (SCOR model), the global supply chain forum framework (GSCF), and Hewlett-Packard's supply chain management model. The researchers define service supply chain management as "*the management of information, processes, capacity, service performance and funds from the earliest supplier to the ultimate customer.*" (Ellram et al., 2004: 25) Based on the existing models and an assessment of fundamental differences and similarities in the supply chains for goods versus services, the researchers proposed a new model for understanding service supply chains, particularly in the context of professional services. The model includes the following elements for, or services processes in service supply chain management: information flow, capacity and skills management, demand management, customer relationship management, supplier relationship management, and service delivery management.

Second, Baltacioglu et al. (2007) seek an integrated supply chain management approach for managing service businesses, requiring high involvement in the supply chain and close relations with both suppliers and customers to gain

the synergy advantages of cooperation. They further developed the service supply chain management framework proposed by Ellram et al. (2004), combined with the SCOR model, and applying it to the healthcare sector. In addition to those proposed by Ellram et al. (2004), the following elements were added to or modified in the framework: order process management, service performance management, and information flow and technology management.

Third, Giannakis (2011) developed a conceptual framework for service supply chain management, applying the SCOR, GSCF and a 3S-model (Giannakis and Croom, 2004) for supply chain management, and focusing particularly on the intangibility of supply chain processes and exchange outcomes. The main arguments are that the characteristics of services influence the management of several processes in different service supply chains and that successful management of those processes enhances services' supply and delivery performance. The impact of intangibility on supply chain processes touches upon three major decision-making areas, including: the structure of the supply network, the management of business relationships, and the coordination of the supply and delivery processes. The following elements are proposed as central to service supply chain management: sourcing and procurement management, capacity management, relationship management, and order fulfillment processes.

A common argument in supply chain management conceptualizations is that because of the known special characteristics of services as intangible, heterogeneous, inseparable, and perishable, services are inherently more difficult to specify and manage than goods (Ellram et al., 2007; Smeltzer and Ogden, 2002), have different managerial emphases (Fitzsimmons et al., 1998), and thus require different types of management than goods manufacturing requires (Ellram et al., 2004; Field and Meile, 2008). In addition, in the three proposed frameworks, information management plays a central role, mainly because many of the other service supply chain management elements, including capacity, demand, order process, and relationship management, are dependent on the effective flow of information throughout the supply chain (Baltacioglu et al., 2007).

2.3.4 Antecedents of service supply chain management practice

Four supply chain management concepts or tasks are analyzed in previous literature to explaining their use in the services context: *outsourcing decision and practices*, *organizational and supply network structure*, *buyer-supplier interaction*, *control and monitoring service exchange*, and *supplier development*. For this study, the three latter are of particular interest, which is why essential studies for each of them are reviewed next more thoroughly.

First, regarding the antecedents of buyer-supplier interaction, a series of subsequent Dutch studies investigated the relation between the type of the service, in terms of application by the buyer, and effective *interaction patterns between the service buyers and suppliers* (van der Valk, 2008; van der Valk et al., 2009; van der Valk and Wynstra, 2012; Wynstra et al., 2006). The main argument is that the type of service – consumption, instrumental, semi-

manufactured and component – is related to, and hence requires different interaction patterns between the service buyer and the service supplier. In addition, the services differ with regards to required organizational resources in terms of required supplier capabilities and buyer-supplier interfaces in terms of representatives involved at both the supplier and the buying firm. Finally, services that have a major potential impact on the buying firm's customers or on the buying firm itself and its internal clients are likely to demonstrate more explicitly defined interaction structures than those that have little impact. (Wynstra et al., 2006)

van der Valk et al. (2009) elaborated the conceptual framework empirically, including process measures for adaptation and institutionalization in the analysis proposed in van der Valk (2008). Based on the empirical analysis of nine ongoing service exchanges at two different buying companies, the researchers found support for the conceptual proposal that buying companies consistently differentiate their interactions for different types of services. These interactions can be described in terms of the key objectives, buyer and supplier capabilities, buyer representatives involved, and communication. For instance, an effective pattern of interaction for component services is one in which the key objective is to ensure that the service fits with the buying firm's offering, the end-customer demands are translated, marketing involvement is present on both sides of the relationship, and the important communication topics include customer requirements and service performance. In their latest study, van der Valk and Wynstra (2012) refined the analysis by incorporating quantitative and qualitative data from 23 cases of service exchange in six buying organizations. The analysis revealed that for all four types of service, at least a certain degree of pattern similarity to the "ideal" pattern is required to achieve a certain level of exchange success. Moreover, the findings suggest that successful component exchange is more easily achieved than successful exchange for the other service types.

Second, with regards to explaining the controlling and monitoring service activities in service supply chains, van der Valk and Iwaarden (2011) studied the types of contracts and monitoring activities used to govern service exchanges in buyer-supplier-customer triads, as well as the moderating effect of social contracts on supplier behavior. Grounded in agency theory and empirical evidence from two cases of service triads consisting of an exhibition center as the buying organization, its technical facility supplier and a security organization, and exhibitors as end-customers, the researchers propose that the contract applying to the buyer-supplier dyad is similar in type to the contract applying to the buyer-customer dyad. Specifically, when outcomes can be measured, outcome-based contracts are applied, with some behavioral elements in case the exchange has an important social character, whereas immeasurable outcomes are associated with micro-level social agreements between the buyer and the customer. In the presence of such social contracts, it is proposed that the supplier will behave according to the social contract. Finally, in relation to monitoring, outcome-based contracts between a buyer and a supplier are ac-

accompanied by output monitoring, whereas behavior-based contracts are accompanied by behavior monitoring.

Adding a performance consideration to the choice of control in inter-firm service exchange, Stouthuysena et al. (2012) examined the combinations of context and control in relation to positive or negative perceptions of buyers' on their supplier's performance. An analysis of 252 service-buying organizations in the context of mass service exchanges and professional services revealed that the buyer's reliance on high output control has a more positive effect on perceived supplier performance in mass service exchanges than in professional service exchanges. In addition, the tendency for informal control to improve the perceived supplier performance effect of formal control is stronger when an exchange involves professional services and high behavior control than when an exchange involves mass services and high output control.

Finally, Krause and Scannel (2002) examined differences in *supplier development* approaches between product-based and service-based firms. In their analysis of 312 product firms and 200 service firms, the researchers found that service firms placed a significantly higher degree of importance on improving the financial strength of suppliers than the product firms did. In addition, whereas product-based firms emphasized quality in supplier development more than service firms did, service firms emphasized cost, delivery performance, and service/responsiveness more than product firms did. In relation to supplier development practices, the researchers found that service firms tended to rely on the competitive pressure of market forces to instigate supplier performance to a greater extent than product-based firms did, whereas product-based firms tended to use assessment, incentives, and direct involvement to enhance supplier performance to a greater extent than service firms did. Finally, both product-based and service-based firms appeared to be reasonably satisfied with the outcomes of their supplier development efforts, suggesting that the chosen practices, at least by perception, improve supplier performance.

In summary, in addition to strategy considerations, these studies support the call for contingency theories in operations and supply chain management research (Sousa and Voss, 2008) and in the context of service operations. In particular, the characteristics of services and the type of service are emphasized as important contingencies that affect managerial choices and activities and further supply network performance.

2.3.5 Practice-performance relations in service supply chains

Similar to traditional operations research, one of the main interests in service supply chain management literature is the assessment of practice-performance relations. The studied supply chain performance concepts in the services context include the following:

- Service productivity, costs and profits;
- Service quality (technical and functional/process);
- Delivery speed and flexibility;

- Supplier performance;
- Customer and supplier satisfaction; and
- Perceived overall success of service exchange

These are associated and aimed to explain with service sourcing behavior, supply network structure, coordination and integration, buyer-supplier interaction and information sharing, the modes of control, and the quality of buyer-supplier relations.

Regarding integration and related supply chain management concepts, a few considerations have been proposed that lead to high supply chain performance. It is argued that the more a firm has invested in an integrated information technologies infrastructure, it is suggested that the more likely it is that the firm will achieve integration both internally across functional areas and externally with suppliers and customers, leading to higher firm performance (Vickery et al., 2003). High levels of information sharing seem to be particularly related to a service firm's operational performance (Sengupta et al., 2006). However, technology-based information integration might not improve the supplier's performance. Rather, satisfaction with overall supplier performance is shown to be associated with partnering types of components of the relationship, including cooperation and long-term commitment, but not with operational components of the relationship such as a high degree of coordination, information sharing and feedback (Field and Meile, 2008). Moreover, from the end-customer's perspective, relevant satisfaction elements for the external supplier's service, which is consumed but not purchased by the end-customer, include only those elements that can be observed directly by the end-user, such as the visibility of and direct contact with the service provider's employees (Vandaele and Gemmel, 2007).

The effect of integration, in terms of coordination and control mechanisms, on supply chain performance is further dependent on the type of service exchanged. First, it is suggested that a buyers' reliance on high output control has a positive effect on perceived supplier performance in mass service exchanges but a negative effect in professional service exchanges. In addition, the buyers' reliance on high behavior control exerts a more positive effect on perceived supplier performance in professional service exchanges than in mass service exchanges but only in the presence of informal control. (Stouthoysena et al., 2012) Second, for different types of business services, differing interaction patterns between the buyer and the supplier can be identified for different types of business services. However, the impact of effective interaction on success in the ongoing service exchange is negatively moderated by risk, where deviation from effective interaction patterns affects success in the ongoing service exchange for high-risk services but not as strongly for low-risk services (van der Valk et al., 2009).

2.3.6 A framework of service supply chain management research

Based on the review, a framework of service supply chain management research can be crafted, including a service supply chain management frame-

work, antecedents and the consequences of service supply chain management practice, and three crosscutting themes (Figure 3). The service supply chain management framework includes (1) service sourcing, (2) service supply chain/network structure, and (3) service supply chain management tasks. The three cross-cutting themes include attempts to characterize services and to theorize about the nature of service supply and service supply chains in general, to classify different types of services and service supply chains, and to operationalize and translate supply chain management concepts from goods to services contexts.

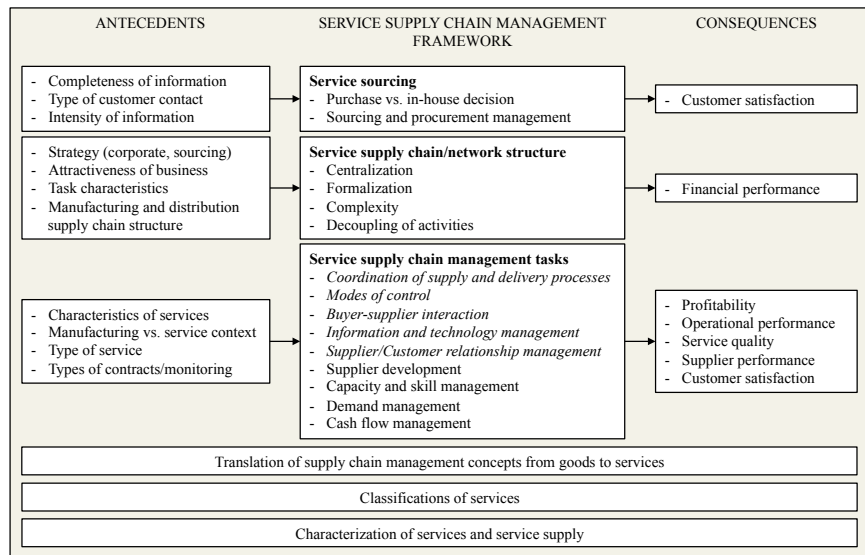


Figure 3. A framework of service supply chain management research

This study is positioned in the stream of research by aiming to describe the conduct of service supply chain management tasks related to integration. In the framework, such tasks relate most closely to the *coordination of supply and delivery processes*, the *modes of control*, *buyer-supplier interaction*, *information and technology management*, and *supplier and customer relationship management*. The novelty of the research relates to the contingency-theoretical investigation of structural antecedents distinct from those previously studied for management task execution. Because the study focuses on examining integration in the context of component services, the interest lies more in the characteristics of different services or service networks within that service type rather than the general characteristics of services, the types of services, or the comparison between manufacturing and service contexts, more extensively investigated within service supply chain management research.

2.4 Key notions and the positioning of this research

This section summarizes key notions from the literature analysis, reveals some of the important research gaps in network management and service supply chain management research, and indicates where this study aims to contribute. The field of **network management research** is to a large extent in an exploratory stage, identifying the different management tasks that are required for managing organizational networks, explaining the contingent nature of these tasks with different contextual characteristics of the network, and associating task execution with network performance. What has lagged is the way in which different tasks are executed, i.e., the network management strategies, structures, roles, and capabilities. In particular, research appears to be needed to explain task execution under different tasks, networks, and environmental contexts. Although much of the empirical research has aimed to provide such explanations in specific network contexts, an understanding of management differences across different types of organizational networks has remained conceptual.

This research aims to contribute to the stream of literature in industrial network management that focuses particularly on *the task of managing integration* in networks and the *management structures* for accomplishing this task. Whereas the previous conceptual frameworks have examined required differences in network management tasks among stable, established, and emerging networks (Möller and Rajala, 2007; Möller et al., 2005; Möller and Svahn, 2003, 2006), this study aims to further **elaborate and refine the framework** by empirically investigating patterned similarities and differences in network management structures for managing integration across different types of strategic service networks. The focus on network management structures instead of strategies, roles or capabilities, is mainly because of the author's personal interests and because management structures are also the key focus in contemporary integration research conducted to explain intra-organizational integration⁶. The broader aim is to further develop the emerging contingency-based theory of industrial network management (Järvensivu and Möller, 2009) within the context of service networks.

The contingency view is relevant to network management research for a couple of reasons. Setting aside the debate over whether networks can and should or cannot and should not be managed, the contingency-based view on network management shows a promising direction to bridge the gaps among network management scholars adopting different ontological assumptions about organizational networks. Even more importantly, this view enables researchers to link research on network management into a wider discussion on the well-established structural contingency theory of organizations (e.g., Donaldson, 2001) in organization and management theory. Finally, contingency-based theories on network management could provide practitioners with direct rec-

⁶ For reviews of contemporary research on organizational structures, see, for instance, Donaldson (2001), Mintzberg (1979, 1983), and Scott and Davis (2007).

ommendations regarding how to manage within their networks under different contextual conditions to develop their network and firm performance.

Regarding **service supply chain management research**, four important avenues can be identified for further investigation. First, the current stage of research on service supply chain management aims to pursue understanding regarding the special characteristics of services, as opposed to goods, and their implications for service supply chain management. This approach further reflects the aim to develop general frameworks for service supply chain management tasks and to translate supply chain management concepts from goods manufacturing to services supply. More recently, research has begun to explain the execution of these different management tasks and their performance effects in different types of service contexts.

An area that appears to require more refined understanding and further exploration is the management of different *types of services*. Given that services represent high heterogeneity in offering and production processes, it is rather unrealistic to presume that all services in some classification, for instance, component services, feature the same properties and managerial requirements. This finding was also shown in the studies by van der Valk et al. (2009) and van der Valk and Wynstra (2012), in which the interaction patterns differed among the studied component services although a similar pattern had been expected. Thus, although the general service supply chain frameworks provide a holistic view of supply chain management tasks in the context of services, the differences in the management of different types of services, rather than services as opposed to goods, require further exploration.

Second, in addition to the service context, quite surprisingly, one of the key concepts of supply chain management and performance, supply chain integration (SCI), is nearly absent in service-based supply chain research. Although a significant amount of research has been conducted on supply chain integration in the context of goods manufacturing (e.g., Das et al., 2006; Flynn et al., 2010; Rosenzweig et al., 2003; Swink et al., 2005, 2007), only a few studies have examined the management of integration in relation to services. The most closely related research in the services context includes studies focusing on buyer-supplier interaction (van der Valk et al., 2009; van der Valk and Wynstra, 2012), the modes of control (Stouthuysena et al., 2012; van der Valk and Iwaarden, 2011), buyer-supplier relations (Field and Meile, 2008), and supplier development (Krause and Scannel, 2002). A more holistic approach to investigating the management of integration could provide an understanding of the different combinations of coordination, control, interaction, and network relationship activities in different types of service exchanges and networks.

Third, studies from the service buyer's perspective, rather than the manufacturer or service provider's perspective, are needed (Maull et al., 2012). The buyer perspective is closely related to the perceived need for integration research in the context of services. Given the central role of buyers to develop ways of integrating their suppliers for achieving the targeted service performance (Cannon et al., 2010), research is needed that focuses on "*how the cus-*

tomers integrates the network of providers and [...] coordinates and controls this network to produce a suitable outcome" (Maull et al., 2012: 73). The role of the buyer in integrating the network of service suppliers is particularly relevant in cases in which services are purchased or developed in favor of a third-party customer within service triads (Li and Choi, 2009; Niranjana and Metri, 2008) instead of the buyer's internal consumption and production. Examples of such component services (Wynstra et al., 2006) include, for instance, customer contact service (Tate and van der Valk, 2008) and real estate management and maintenance services (Lehtonen, 2006; Vandaele and Gemmel, 2007; van Mossel and van der Valk, 2011).

Fourth, previous studies that consider the buyer's perspective in service operations have mainly focused on practices in the early stages of purchasing, such as outsourcing strategies (e.g., Agndal et al., 2007; Balakrishnan et al., 2008; Tate and Ellram, 2012), supplier selection (e.g., Day and Barksdale, 1994; Fitzsimmons et al., 1998), or supplier involvement in crafting service specifications (e.g., Van der Valk and Rozemeijer, 2009). Less is understood about buyer-supplier interactions and information transfer during ongoing service exchange, referring to the period after the contract has been signed (Roth and Menor, 2003; Van der Valk et al., 2009; Van der Valk and Wynstra, 2012). However, it is during the service processes after the contract has been signed that customer contacts occur (Chase and Tansik, 1983) and in which designing and controlling the service encounters, including interactions between the buyers and suppliers, becomes important (Roth and Menor, 2003; Johnston, 2005).

To fill the gaps in service supply chain management research, this study focuses on the increasingly important and expanding context of *component services*, in which the focal organization in the network buys or partners with service suppliers to offer services in favor of third-party customers. Within this context, the study elaborates the concept of integration, and more precisely, external integration (Barki and Pinsonneault, 2005; Flynn et al., 2010). The intended contribution of this study to the service supply chain management literature is three-fold. First, the research aims to offer **a holistic view of the management of integration** in the context of component service networks during ongoing service exchange relations (Wynstra et al., 2006). Furthermore, the study explores **the patterns of integration management** and contextual characteristics across different types of component service networks, further developing the previously identified patterns (van der Valk et al., 2009; van der Valk and Wynstra, 2012). More generally, the research aims to create a more fine-grained understanding of the contingencies associated with service supply chain management, contributing to the call for contingency theories in operations and supply chain management research (Flynn et al., 2010; Sousa and Voss, 2008; Turkulainen and Ketokivi, 2012) in the context of strategic service networks.

3. Theoretical background

This chapter presents the theoretical background of the research. First, a typology of different types of strategic networks according to the value network framework is presented. Second, a framework of integration management is presented, building on the structural contingency argument for organizational integration and the information-processing perspective. The chapter concludes by summarizing the theoretical framework and presenting revised objectives for the empirical analysis.

3.1 The value network framework

The first part of the theoretical background underlying the research is a typology of strategic networks. During a decade-long stream of research within the industrial marketing and management literature, a value system continuum and related value network framework has been developed to understand and distinguish the characteristics of different ideal types of strategic networks (Möller and Rajala, 2007; Möller et al., 2005; Möller and Svahn, 2003). The main argument of the framework is that “*different types of nets involve and require different types of management in terms of their coordination and control mechanisms*” (Möller and Rajala, 2007: 896), the classification thus reflecting the types of management mechanisms that can be identified for each type of network.

Möller et al. (2005: 1276) suggest that the following three factors are central to understanding the nature of different types of strategic networks: (1) the level of determination of the value activities and actors forming the network; (2) the goal of the strategic network or its focal organization; and (3) the structure of the network. Based on these three factors, the researchers propose a value system continuum reflecting three ideal types of strategic networks as follows (Table 4). On one side of the continuum are stable, clearly specified networks with relatively well-known value activities, actors, technologies, and business processes that aim for production efficiency. On the other side are emerging networks or innovation networks that seek to develop and commercialize new technologies, products, or services, and to achieve radical changes in current value systems. In between are established, relatively well-determined business renewal nets that aim to bring forth local and incremen-

tal modifications such as business-process modifications in the current value activities within existing value systems.

Table 4. A typology of three ideal types of strategic networks (Sources: Möller et al., 2005; Möller and Svahn, 2003)

Type of network	Stable networks	Established networks	Emerging networks
Value activities	Well-known and specified technologies and business processes	Well-known and specified technologies and business processes	Unknown/Uncertainty about value activities
Aims	Business-process / production efficiency	Changes through local improvements and incremental modifications within the existing value activities	Radical changes in old value activities / Creation of new value activities
Network structure	Well-known actors	Old and new actors	Old and new actors
Example networks	<ul style="list-style-type: none"> • Vertical demand-supply networks • Horizontal market networks 	<ul style="list-style-type: none"> • Business renewal networks • Customer solution networks 	<ul style="list-style-type: none"> • Application networks • Dominant-design networks • Innovation networks

Möller and Svahn (2006) further developed the conceptual model by associating the different types of strategic networks with differing requirements for managing knowledge within the networks. Based on the distinction between exploitative and explorative learning (March, 1991) and various studies on organizational and inter-organizational learning and knowledge management, they conceptually proposed the following:

1. For **stable value systems**, exploiting current actor competencies through effective knowledge transformation and sharing is essential. The key requirement for knowledge management is then to reach a high level of knowledge codification and transparency to achieve an efficient integration of components and the coordination of the related value activities.
2. For **emerging value systems**, making sense of the emerging opportunities and the co-creation of knowledge through exploration dominates the issues of transferring existing explicit knowledge. The key knowledge management requirements include recognizing the dispersed and vague ideas of the actors, making sense of them, and processing them into a systemic vision or agenda.
3. **Established value systems** reside somewhere in between the two former systems, requiring a balanced position between knowledge exploitation and exploration. Key requirements for knowledge relate not only to exploiting the specialized knowledge held by each actor but also to expanding this knowledge through collaborative learning.

Hence, because of different goals and value-creating activities, the three ideal strategic networks pose different requirements for management (Järvensivu and Möller, 2009; Möller and Rajala, 2007). Thus, at a more general level, accessing information across organizational boundaries through transfer, transmission, and transformation becomes a key distinguishing factor (cf. Carlile, 2004). In this study, the framework of the three ideal types of strategic networks is applied to investigate the management of integration in different types of strategic service networks in the context of component services.

3.2 The management of integration

3.2.1 Structural contingency theory

The study is theoretically grounded in research on organizational structures, building on the structural contingency theory. In general, organizational structures are established to coordinate and control networks, knowledge and activities (Child, 1972; Mintzberg, 1979). The structure of an organization can be defined as the ways in which labor is divided into distinct tasks and coordination is achieved among them (Mintzberg, 1979). The design of any organization considers then two fundamental and opposing decisions, including the division of tasks and integration or coordination among those tasks.

The division of tasks is derived from the efficiencies gained from specializing work (Mintzberg, 1979). However, specialization or differentiation yields differences in skills and knowledge, orientations, goals, and a formality of structure between organizational units. In order to the organization to function effectively, integration among the differentiated organizational units needs to be achieved. (Lawrence and Lorsch, 1967) Organizational integration has been defined as “*the quality of the state of collaboration that exists among organizations (departments) that are required to achieve unity of effort by the demands of the environment [...] and the organizational devices used to achieve it*” (Lawrence and Lorsch, 1967: 11). The definition involves the view of integration both as an outcome and a process. The former is also referred to as *achieved integration*, whereas the latter refers to *integration mechanisms*, which are used for achieving unity in diverse organizations (Saz-Carranza, 2012; Turkulainen and Ketokivi, 2012). Integration as an activity or process is closely related to and often used interchangeably with the concept of coordination, referring to the management of activities that occur in various units to accomplish the organization’s overall task (Child, 1977; Galbraith, 1973; Mintzberg, 1979; Van de Ven et al., 1976).

A basic goal of research on organizational design has been to discover which types of organizational structures are most effective under different contextual conditions (e.g., Burns and Stalker, 1961; Chandler, 1962; Lawrence and Lorsch, 1967; Miles and Snow, 1978; Mintzberg, 1979, 1983; Woodward, 1965). One of the dominant perspectives for viewing organizations and their design is the structural contingency theory (e.g., Donaldson, 2001; Lawrence and Lorsch, 1967; Scott and Davis, 2007). The overarching hypothesis of the structural contingency theory is that organizational effectiveness results from fitting the organization’s structure to contingencies that reflect the context of the organization. A number of such contextual characteristics have been proposed, including the rate of environmental change (Burns and Stalker, 1961; Lawrence and Lorsch, 1967), the firm’s strategy (Chandler, 1962; Miles and Snow, 1978), the firm’s size (Child and Mansfield, 1972; Pugh, 1969) and the applied production technology and resulting interdependencies among the tasks (Thompson, 1967; Perrow, 1967; Woodward, 1965).

This study focuses on the management of different types of strategic service networks, and more particularly, the management of integration in component

service networks. *The management of integration* is defined here as “*the process by which the state of collaboration that exists among (organizations) is achieved and the organizational devices used to achieve it*” (Lawrence and Lorsch, 1967: 11). Furthermore, the focus of this research is the management of integration among organizations, rather than among organizational units within an organization, such as between marketing and sales, production, and research and development (cf. Lawrence and Lorsch, 1967). In an attempt to understand the management of organizational networks, the research focuses on integration across formal organizational boundaries, also referred to as *external integration* (Barki and Pinsonneault, 2005; Pagell, 2004). The management of integration may involve the coordination of daily, short-term flows and cooperative, long-term joint development activities, may consider operational or functional activities, and may occur in customer, supplier, or horizontal partner directions (Barki and Pinsonneault, 2004; Frohlich and Westbrook, 2001; Swink et al., 2007).

3.2.2 Information-processing perspective

The study approaches the management of integration from an information-processing perspective (Galbraith, 1973). Following Kogut and Zander’s (1992) categorization, *information* refers in this study both to declarative and procedural aspects. Using this categorization, declarative information is something “*which can be transmitted without loss of integrity once the syntactical rules required for deciphering it are known*” whereas procedural information refers to know-how, “*a description of knowing how to do something*”, “*a description of what defines current practice inside a firm*”, or “*the understanding of how to organize a firm*” (ibid., 386-387). The distinction closely follows the distinction between the explicit and tacit dimensions of knowledge (Polanyi, 1966). *Information processing*, in turn, refers to gathering, interpreting, and synthesizing information in the context of organizational decision-making (Galbraith, 1973).

The two focal ideas in the organizational information-processing theory are as follows. First, the main task of any organization is to integrate dispersed information in the organization to accomplish the organization’s overall task (Galbraith, 1973; Mintzberg, 1979). Thus, according to the theory, organizations have information needs produced by the differentiation of the organization into specialized units (Lawrence and Lorsch, 1967). Second, organizations differ in their needs and requirements for processing information and hence use different strategies for building a sufficient information-processing capacity (Daft and Lengel, 1986; Galbraith, 1973; Tushman and Nadler, 1978). Strategies to reduce the need for information processing include the creation of slack resources and self-contained tasks, whereas strategies to increase the organization’s information-processing capacity include investments in vertical information systems and the creation of lateral relations (Galbraith, 1973). Taken together, to achieve a sufficient level of integration within the organization and hence to accomplish the organization’s tasks, there must be a fit between the integration requirements caused by the contextual conditions of the

organization and the information- processing capacity of the organization structure, whereas “misfit” leads to low effectiveness.

The information-processing perspective appears to provide a suitable framework for assessing the management of different types of strategic service networks, with a particular focus on the management of integration for the following reasons. From the perspective of service supply in stable networks, information integration plays an essential role in effective supply chain management. First, managing service quality is primarily a matter of aligning expectations and perceptions about service delivery through information transfers among the buying organization, the customers, and the supplying organizations (Grönroos, 2007). Because of the human centrality and resulting heterogeneity of service supply (Gummesson, 1998; Grönroos, 2007) and the fact that service specifications are difficult to make (Ellram et al., 2004, 2007), matching the perceptions of each individual regarding service levels and quality are crucial in achieving the desired technical and functional quality, and hence, customer satisfaction. Second, service logistics and capacity management are based on the effective information sharing of demand and supply within the network (Field and Meile, 2008). Because of the inherent characteristics of services and the resulting incapability to store services (e.g., Möller, 2010), managing demand and supply relies on effective interaction and communication between the customers’ needs and the suppliers’ supply capabilities (Baltacioglu et al., 2007; Field and Meile, 2008; van der Valk et al., 2009). Third, in component service networks, the suppliers contribute directly to service performance and therefore to the buyers’ business performance (Baltacioglu et al., 2007). It is also found that higher levels of information sharing between the buyer and the suppliers will improve operational performance in service supply chains (Sengupta et al., 2006), whereas strategic supplier integration will directly affect the buyer’s business performance (Swink et al., 2005, 2007; Paulraj et al., 2008). Thus, exchanging information and knowledge effectively at different levels between the buyers and suppliers becomes essential for system performance (Sahin and Robinson, 2002).

From the perspective of service development in established and emerging networks, integrating knowledge effectively within the network is a key element in creating competitive success over time (Dyer and Nobeoka, 2000; Kogut and Zander, 1992, Nonaka, 1994). The majority of innovations occur at the boundaries between specialized domains (Carlile, 2004; Leonard-Barton, 1995). For instance, the technological diversity of alliance partners increases a firm’s exploratory innovation (Phelps et al., 2012). In particular, the horizontal linkages of a firm promote innovativeness in its products compared to innovations introduced using vertical linkages or single-firm strategies (Kotabe and Swan, 1995). A strong significant positive relation also exists between organizational knowledge transfer and innovativeness (van Wijk et al., 2008). Knowledge networks and alliances offer advantages in knowledge application by increasing both the efficiency of knowledge integration and utilization in ambiguous and uncertain conditions by accessing the specialized knowledge of network members (Grant and Baden-Fuller, 2004). At the same time, howev-

er, there appears to be a disadvantage in cooperating with other firms to develop and introduce more innovative new products. One suggested explanation for this finding is the inherent difficulty of managing inter-organizational networks and alliances and failure to balance the competing demands of cooperation and competition among the cooperating firms (Kotabe and Swan, 1995). Knowledge proves to be both a source of and a barrier to innovation in new product development, because working across development functions may generate problematic knowledge boundaries (Carlile, 2002). It is proposed that focal actors in an innovation network should deliberately orchestrate knowledge mobility to improve the network's innovation output and therefore create and extract value from the network (Dhanaraj and Parkhe, 2006).

In summary, integrating the information and knowledge of the specialized actors effectively within networks is essential for achieving efficiency and effectiveness in stable service production, local improvements in established service networks, and innovation outputs in emerging networks. In this study, the aim is to understand how and why integration is managed through the use of various *integration mechanisms* under different contingencies creating *uncertainty*.

3.2.3 Integration mechanisms

The first key concept in the information-processing theory includes integration mechanisms. Integration mechanisms refer to the structural mechanisms implemented to facilitate the processing of the amount and richness of information needed to cope with or reduce uncertainty and achieve desired task performance (Daft and Lengel, 1986). This concept must be distinguished from integration requirements or requisite integration and achieved integration (Turkulainen and Ketokivi, 2012); the contextual characteristics of the organization create integration requirements, whereas integration mechanisms are organizational devices used to respond to those requirements, creating sufficient information-processing capacity to achieve integration within the organization or the network of organizations.

Previous literature on organizational integration and supply chain integration has identified a number of different integration mechanisms, such as enterprise resource planning (ERP) and other information systems, standardized processes and guidelines, and cross-functional teams (e.g., Das et al., 2006; Flynn et al., 2010; Narasimhan and Kim, 2002; Swink et al., 2007; Terjesen et al., 2012; Wong et al., 2011). These mechanisms can be classified into two types of *integration media*. Impersonal integration mechanisms refer to programmed practices for coordinating and monitoring suppliers' activities, reducing the need for continuing communication (March and Simon, 1958), including, for example, contracts and service specifications, process blueprints and service schedules, or the use of information and communication technologies for information transfer across the value network. Personal integration mechanisms refer to information sharing through direct interaction and communication. These mechanisms can be further classified into formal and informal personal mechanisms (Daft and Lengel, 1986). The formal personal

mechanisms include programmed interaction, for instance, taking a form of scheduled meetings according to the management system. The informal personal mechanisms are by nature more ad hoc and needs based, including, for instance, occasional telephone or email conversations.

The two main mechanisms are not mutually exclusive (Galbraith, 1973; Daft and Lengel, 1986). In general, whereas the impersonal mechanisms aim to economize the transfer of information between organizations, the personal mechanisms are used for more complex situations such as problem solving and the creation of new knowledge (Galbraith, 1973; Grant, 1996). This occurs because of the differing information-processing capacities or media richness (Daft and Lengel, 1986) possessed by the different integration mechanisms. Simultaneously, however, the costs of using personal mechanisms are higher than the costs of impersonal integration (Galbraith, 1973). Thus, organizations must balance between integration efficiency and sufficient information-processing capacity to effectively integrate information within the organization or a network of organizations.

In addition to the distinction between impersonal and personal mechanisms, integration can also be assessed in terms of operational and strategic *integration orientation* (Swink et al., 2007). Operational integration orientation refers to “*a set of operational activities, mostly concerned with better coordination of daily or short-term flows, including transactions, material movements, and ordering processes*”, whereas strategic integration orientation is more “*long-term and collaborative, including relationship building, joint development activities, and sharing of cost and capability information*” (Swink et al., 2007: 150). Whereas operational integration seeks primarily to improve the firm’s production capabilities (Rosenzweig et al., 2003; Swink et al., 2005), strategic integration seeks product-process development and relationship building and has been associated with satisfaction in overall supply chain performance (Field and Meile, 2008).

For analysis purposes, the study combines integration media and orientations to a framework of four generic types of integration mechanisms (Figure 4). Each of the four cells reflects an exchange relation characterized by different types of integration. Type 1 refers to operational integration, for instance, between the buyer and suppliers using impersonal integration mechanisms and aiming to maximize the efficiency of information transfer between the organizations. Type 2 refers to operational integration using personal integration mechanisms, seeking flexibility to handle unintended issues in the exchange relation through direct communication. Type 3 refers to strategic integration using personal integration mechanisms, aiming at jointly developing products, services, and cooperation in general at individual and organizational levels by interacting, sharing and combining knowledge between the exchange partners. Type 4 refers to strategic integration using impersonal integration mechanisms, such as relation-specific investments in operating systems, sharing cost and quality information, and creating incentive systems for evaluating and sharing costs and benefits.

Integration type		Integration media	
		<i>Impersonal</i>	<i>Personal</i>
Integration orientation	<i>Operational</i>	Type I	Type II
	<i>Strategic</i>	Type IV	Type III

Figure 4. A framework of four generic types of integration

Like integration mechanisms, the integration types are also not mutually exclusive; an exchange relation characterized by collaborative activities often includes economizing and problem-solving types of integration. In this study, the aim is to develop an understanding of the use of different integration mechanisms to manage integration in the context of component service networks. This is important because achieving integration requires a sufficient information-processing capacity generated by the use of integration mechanisms. At the same time, building this information capacity is not a cost-free activity but rather can be considered as an investment that requires significant managerial and financial resources. (e.g., Galbraith, 1973) Thus, a balance must be found between the benefits of integration in terms of integration effectiveness and the costs of integrating in terms of integration efficiency. According to the information-processing perspective, the use of integration mechanisms, and thus balancing the benefits and costs, is dependent on the organizational context creating uncertainty.

3.2.4 Uncertainty

The second key concept in the information-processing theory is uncertainty and is defined as “the difference between the amount of information required to perform the task and the amount of information already possessed by the organization” (Galbraith, 1973: 5). The underlying assumption of the information-processing theory is that organizations are open systems that must address work-related uncertainty (Tushman and Nadler, 1978). According to the theory, “the greater the task uncertainty, the greater the amount of information that must be processed among decision makers during task execution in order to achieve a given level of performance” (Galbraith, 1973: 4). A review of the previous research on organizational design, organizational integration, and organizational knowledge transfer reveals five general sources of uncertainty. These include (1) uniqueness, (2) ambiguity/equivocality, (3) complexity, (4) dependence, and (5) difference deriving from specialization (Table 5). For all the five sources, higher levels create higher integration requirements.

Table 5. Sources of uncertainty in organizations and inter-organizational entities

Category	Definition(s)	Description	Example References
Uniqueness, Novelty	The number of exceptions that must be handled; The degree to which stimuli are perceived as familiar or unfamiliar	High uniqueness refers to situations in which exceptions, when encountered, involve different issues to be solved or different methods of completing the work; As novelty increases, the amount of effort required to adequately share and assess knowledge also increases	Perrow (1967); Hill (1972); McQuiston (1989); Adler (1995); Simonin (1999); Carlile (2002, 2004)
Ambiguity/ Equivocality	The degree of analyzability of the work and predictability of work methods; Lack of clarity about the meaning and implications of particular events or situations; The existence of multiple and conflicting interpretations about an organizational situation	High ambiguity refers to a situation in which the tasks and problems are poorly defined and vague; Ambiguity arises from unknown cause-effect relations and lack of recurrent, institutionalized patterns of relations and actions; Ambiguity of knowledge hampers its transfer and acquisition, but makes it also hard to imitate.	Lefton and Rosengren (1966); Perrow (1967); Van de Ven and Delbecq (1974); Rumelt and Lippman (1982); Daft and Lengel (1986); Simonin (1999); Davis et al. (2009)
Complexity	The number of variables/factors taken into consideration in decision making; Task variety	High complexity indicates that the factors in the decision unit's environment are large in number	Perrow (1967); Duncan (1972); Hill (1972); Galbraith (1973); Tushman and Nadler (1978); McQuiston (1989); Simonin (1999); Barki and Pinsonneault (2005); McEvily and Marcus (2005)
Dependence	The degree to which an organizational unit is dependent upon other units in order to accomplish their tasks	Types of dependence from low to high: pooled, sequential, and reciprocal; As the number of dependencies increase between actors, the complexity and the amount of effort required to share and assess knowledge at a boundary also increases	Litwak and Hylton (1962); Thompson (1967); Van de Ven et al. (1976); Tushman and Nadler (1978); Daft and Lengel (1986); Grant (1996); Lubatkin et al. (2001); Carlile (2002, 2004); Barki and Pinsonneault (2005)
Difference, Distance, Specialization	The degree of difference between organizations (in goals and frames of reference); The degree of common knowledge / overlap of knowledge bases	At very high levels of knowledge overlap partners have little to learn from one another, while at very low levels of overlap partners find it difficult to communicate with and learn from each other	Pennings (1975); Daft and Lengel (1986); Hitt et al. (1993); Grant (1996); Mowery et al. (1996); Lane and Lubatkin (1998); Simonin (1999); Lubatkin et al. (2001); Carlile (2002, 2004); Barki and Pinsonneault (2005); Nooteboom et al. (2007)

Most research on organizational integration takes a static perspective to contingencies and the fit between the management of integration and uncertainty. However, the organizational contingencies also may change, possibly causing change in the level of uncertainty. For instance, in the project type of networks, tasks and/or the network composition may change from one development stage to another, generating differing requirements for management (Adler, 1995; Turkulainen et al., 2012). In such a case, a longitudinal approach would be required to discern how and why uncertainty and the management of integration in the networks evolve over time. This notion is in line with the structural adaptation to regain fit (SARFIT) model by Donaldson (1987, 2001) suggesting that the level of one or more contingency variables of the organization may change over time, also requiring changes in the organization struc-

ture for the organization to regain “fit” with the new contingency level and, hence, its effectiveness.

The notion of change in the level of uncertainty might be particularly relevant for emerging networks. Although a cross-sectional investigation may provide a somewhat realistic representation of uncertainty and the management of integration in stable networks, which are by definition stable over time, this might not be the case with emerging networks. Aimed at scanning the operating landscape for future business opportunities, making sense of the environment, and continuously engaging in learning and development to produce new business solutions or technologies (Möller, 2010), emerging networks are by definition continuously evolving and developing. In such a case, a refinement to the original value network framework for emerging component service networks would require the adoption of a longitudinal perspective to understand the management of integration as the network’s contextual conditions evolve.

To examine the management of integration and its contribution to network evolution under changing levels of uncertainty, the study adopts the three concepts of innovation network processes proposed by Dhanaraj and Parkhe (2006). These concepts include network stability, knowledge mobility, and innovation appropriability. Network stability refers to the unity of the network towards mutual goals, in which network instability decreases the network’s value creation capability. Knowledge mobility refers to the efficiency of mobilizing knowledge-creating resources across organizational boundaries such that the enhanced mobility of knowledge promotes value creation. Innovation appropriability refers to an equal distribution of captured value within the network, which might be threatened by opportunistic behavior and free riding.

3.2.5 Contextualizing the management of integration

The third component in the information-processing theory is the notion of the cost of integration, suggesting that integration is not a cost-free activity. Instead, establishing organizational structures to increase the organization’s information-processing capacity involves investments requiring significant managerial and financial resources (Galbraith, 1973). The organizational design consideration balances then between the benefits of specialization and resulting differentiation with the costs of integration (Galbraith, 1973; Thompson, 1967).

The cost consideration may provide additional insight, particularly in understanding the management of integration between stable and established component service networks. In the context of services, it may be difficult to distinguish between stable and established networks. Unlike in manufacturing environments, service supply is by nature bilateral (Sampson, 2000; Sampson and Froehle, 2006); improvements in service mean improvements in the service processes, often involving joint development between the buyers and the suppliers. For instance, in manufacturing environments, the incremental development of value systems may involve a completely separate development project, for instance, a new technology development occurring internally within the buying or supplying company, before the improvement is actually em-

ployed in the current value system. Conversely, in service development, the development of the service process is in many cases continuous and occurs during ongoing service exchange. Consequently, it may be difficult to completely distinguish the established from the stable service networks. In fact, aimed at producing incremental improvements in the stable value systems, established service networks are mere extensions of the stable ones.

A more realistic approach, and a second refinement to the value network framework for the stable and established networks, would be to investigate a set of stable and established component service networks and to compare networks that adopt similar integration management practices with those that adopt different ones. Identifying the patterned differences between such groupings could yield insights into the factors that necessitate or constrain the use of integration mechanisms in different component service networks. For this type of more in-depth elaboration of the value network framework for stable and established networks, it is important to identify context-specific contingencies that create integration requirements.

In addition to the five general sources of uncertainty, the context of supply chains and networks has been associated with a number of contextual conditions that influence their management. A further review of extant literature on purchasing and supply chain management both in the context of manufacturing and services reveals three main antecedent categories and important contextual conditions that are associated with purchasing and supply chain management practice: task characteristics, supply network characteristics, and supply environment characteristics (Table 6).

Table 6. Contextual conditions associated with purchasing and supply chain management practice

Antecedent category	Contextual condition	Definition	Example references
Task characteristics	1. Task importance	Degree and type of risk perceived in the purchasing situation and purchase volume	Fitzsimmons et al. (1998) McQuiston (1989) Parker et al. (2008)
	2. Task complexity	Degree to which the service is simple or complex, referring to high specialization, customization, or technology-intensity	Hill (1972) Jackson and Cooper (1988) McQuiston (1989) Narayanan et al. (2011) Schmoltzi and Wallenburg (2012), Wallenburg (2009)
	3. Task novelty	Experience the firm has on purchasing the item	Hill (1972) McQuiston (1989) Parker et al. (2008)
	4. Type of end-customer contact	The way end-customers are involved in service provision: process involvement / perceives only technical quality	Chase and Tansik (1983) Grönroos (1984, 2007) Wynstra et al. (2006)
Supply network characteristics	5. Relational complexity of the supply base	The number of suppliers in each production function	Choi and Krause (2006) Schmoltzi and Wallenburg (2012)
	6. Spatial complexity of the supply base (dispersion)	Distribution of work across geographical locations	Stock et al. (2000) Choi and Krause (2006)
	7. Significance of individual suppliers	Degree of dependency on a supplier	Ganesan (1994) Peterson et al. (2008)
Supply environment characteristics	8. Demand fluctuation/ volatility	Degree to which the demand of the purchased item changes across periods	Axelsson and Wynstra (2002) Walker and Weber (1984) Wong et al. (2011)
	9. Operating culture	Institutionalized cultural properties inherent in the industry	Cai et al. (2010) Liu et al. (2010)

The three main categories follow closely the ones proposed by Tushman and Nadler (1978). From the perspective of the information-processing theory, these task-, network-, and environment-related conditions featuring the purchasing and supply chain context may create integration requirements across the supply chain. Furthermore, to achieve integration effectiveness and efficiency, and consequently, effective task execution, the conditions must reflect the information-processing capacity in the supply chain.

3.3 Theoretical framework and revised objectives for the empirical analysis

The overall aim of the research was to investigate *how and why integration is managed in strategic component service networks*. This general research question was further divided into two empirical research objectives as follows:

- 2a. To examine the management of integration in component service networks; and
- 2b. To explore the contingencies of integration management in component service networks

To answer the question and the two objectives, a theoretical framework is created to guide the empirical analysis (Figure 5). The framework builds on the information-processing perspective, the value network framework, the types of integration, the sources of uncertainty, the contextualized conditions associated with purchasing and supply chain management, and the notion of changes in the levels of uncertainty.

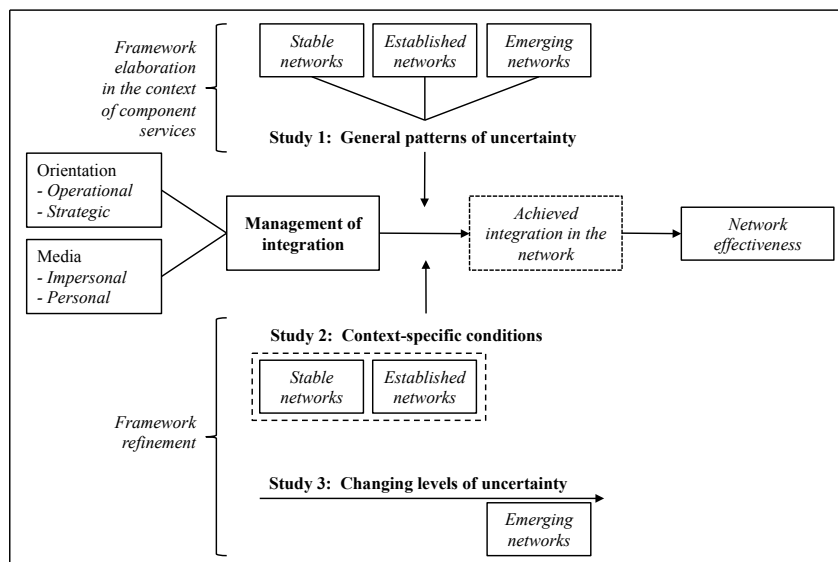


Figure 5. A theoretical framework for the empirical analysis

Based on the theoretical framework and for the purpose of arranging the analysis in a logical manner, the original empirical research objectives can be revised as follows:

- 2a. To elaborate the management of integration and uncertainties that characterize stable, established, and emerging component service networks (*Study 1*);
- 2b. To examine the management of integration and context-specific conditions in component service networks composed of stable and established sub-networks (*Study 2*);
- 2c. To examine the management of integration and its contribution to network evolution under changing levels of uncertainty in emerging component service networks (*Study 3*).

The next chapter describes how the three objectives were empirically assessed.

4. Research design

The empirical part of the dissertation consists of three empirical analyses that address the three research objectives. This chapter presents the methodological choices for the empirical analyses. These include the research approach and case study design, the overall research process, the research context and case selection, data collection, and data analysis. The validity and reliability of the research design are also evaluated.

4.1 Research approach

The research approach in the study can be best described as theory-elaboration (Vaughan, 1992; Lee et al., 1999). In theory-elaboration, the research begins without precise hypotheses or propositions. Instead, pre-existing conceptual ideas or a preliminary framework drives the study's design. The theory-elaboration approach begins then with a formal theory to arrive at middle-range theory of the formal theory in a new research context, strengthening the argument of the formal theory, or modifying it to suit to the new empirical context. (Lee et al., 1999) In this study, the value network framework (Möller et al., 2005; Möller and Svahn, 2003) provides the baseline model for understanding the management of strategic service networks. The theory elaboration approach as applied in this dissertation aims at **refining** the value network framework by **elaborating** the management of integration in stable, established, and emerging networks in the context of component services.

In comparison, inductive, grounded theory based research (Glaser and Strauss, 1967; Eisenhardt and Graebner, 2007) would aim to develop new theories, if existing theories do not exist, or are not able to fully explain the phenomenon under study. However, as the theories of organizations and organizing have developed over the course of the time, it is suggested that it is naïve to presume complete knowledge gaps for understanding contemporary organizations, but in most cases, formal theories need further development of a middle-range type (Gioia and Corley, 2011; Siggelkow, 2007). The problem of using a theory testing approach is that studies on strategic network management and service supply chains are to some extent in their exploratory stage, and, aside from general characteristics, standardized operational measures have not been developed for different types of services (Chen and Paulraj, 2004) or strategic networks (Möller et al., 2007). Thus, a theory-elaboration approach appeared to be a suitable research approach to exploit the established formal organization and network theories as theoretical ideas and empirically arrive

at qualitative service- and network-specific constructs and measures for further studies to use and test.

Aligned with theory elaboration approach, the study follows the logic of systematic combining (Dubois and Gadde, 2002). Systematic combining is a process whereby the theoretical framework, empirical fieldwork, and empirical analysis evolve simultaneously. The aim of systematic combining is that of theory development, referring to the refinement of existing theories rather than inventing new ones. Following the principles of the realistic pragmatic view, the objective is to find the most suitable model to describe and explain the phenomenon in question (Rescher, 2000). It is a nonlinear, path-dependent process of combining efforts with the ultimate objective of matching theory and reality (Dubois and Gadde, 2002).

Systematic combining involves two main processes: matching theory and reality as well as direction and redirection (Dubois and Gadde, 2002). Matching involves moving back and forth between the framework, data sources, and empirical analysis. The empirical investigation is motivated and guided by an initial theoretical framework, after which further data collection and analysis and development of the theoretical framework occur in a number of sequential cycles as an interplay between theory and data. The original framework is successively modified, partially as a result of unanticipated empirical findings but also of theoretical insights gained during the process. Conversely, direction and redirection involve shifts in the theoretical interest, data analysis, and data collection, wherein new insights in the data analysis may cause a change in the theoretical focus and further changes in data collection; new data may add new dimensions to the subject, which may result in a new view of the phenomenon itself.

4.2 Case study research design

The empirical analysis follows a case study design (Yin, 2009[1994]). Developing a theory from case studies is a research strategy that involves using one or more cases to create theoretical constructs, propositions or middle-range theory from case-based, empirical evidence (Eisenhardt, 1989). The classic definition of the case study is stated as follows:

“A case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident” (Yin, 2009: 18).

In this study, the *phenomenon* is the management of integration within the network of organizations, aimed at achieving the focal organization’s and/or the network’s objectives effectively and efficiently. The *context* includes the different types of component service networks in which the actors buy and supply component services or develop service offerings or concepts including component services such that the efforts of each actor are required to achieve the network’s outcomes. Thus, as characteristics for a case study inquiry, the

boundary between the phenomenon and the context is not clearly distinguishable, but is interrelated.

A case study approach was selected for conducting empirical research for three primary reasons. First, the case method lends itself to early, exploratory investigations in which the variables are still unknown or the phenomenon is not understood (Benbasat et al., 1987). This scenario is reflected in the state of current understanding on service networks and their management, where empirical investigations are sought to determine service-related constructs (e.g., Chen and Paulraj, 2004). More generally, understanding regarding management similarities and differences in strategic networks has remained conceptual, encouraging comparative studies and empirically grounded theoretical explanations for network management practice (Möller and Rajala, 2007; Möller et al., 2005). Using case study methodology, the phenomenon can be studied in its natural setting, facilitating the generation of meaningful, relevant theories from the understanding gained through observing actual practice (Benbasat et al., 1987). Second, a case study is particularly useful for answering questions that take the form of “how” and “why” by facilitating a relatively holistic understanding of the nature and complexity of the complete phenomenon (Hartley, 2004; Yin, 2009). Third, a case study is suggested to be a particularly suitable method for providing detailed information about inter-organizational structures and processes and for collecting data from multiple network members that may be more difficult to achieve using quantitative research approaches (Kogut, 1988; Meredith, 1998; Stuart et al. 2002; Grabher and Powell, 2004; Halinen and Törnroos, 2005; Dubois and Araujo, 2007).

The following properties of case studies characterize the study’s design. First, the study exploits previously developed theoretical frameworks to guide data collection and analysis. Converse to those conducting inductive case research (e.g., Eisenhardt, 1989) in which theory is developed in a data-driven manner, the theory-elaboration case study design used in this study seeks to illustrate the relationships among the predefined constructs, iteratively sequencing between the framework and data (Siggelkow, 2007), where the data analysis frequently overlaps with data collection (Eisenhardt, 1989). Thus, a process of test, modification, retest, and re-modification is repeated across cases until a “final” model fits across all of the studied cases (Lee et al., 1999), providing the most suitable model of reality (Rescher, 2000). Moreover, instead of suggesting that theoretical constructs and propositions existed in the data a priori, the role of researchers’ cognition in the creation of these entities is acknowledged (Mantere and Ketokivi, 2013). A case study, as applied in this research, is then a linear but iterative process in which the initial theoretical ideas and frameworks guide data collection and evolve as data collection and analysis proceed (Yin, 2009). The outcomes of the analyses can then be classified as middle-range theory (Merton, 1962[1949]; Burgeois, 1979; Van de Ven, 1989; Whetten, 1989; Sutton and Staw, 1995; Corley and Gioia, 2011; Mantere and Ketokivi, 2013), in which the formal theory is expanded to new contexts through refinement and modification.

Second, the study follows a multiple-case design, using embedded units as the unit of analysis. A multiple-case design, or a replication design, is used to collect and analyze data of the same phenomenon from two or more cases, aiming to predict similar or contrasting results across the cases and correspondingly to develop a theoretical framework that states the conditions under which a particular phenomenon is likely or unlikely to be found. (Yin, 2009) Using multiple cases enables both literal and theoretical replication across cases and thus stronger argumentation than what a single-case study can offer (Eisenhardt and Graebner, 2007; Yin, 2009). However, essential for a multiple-case design is that each case serves as a distinct experience and stands on its own as an analytic unit (Eisenhardt and Graebner, 2007).

Third, in relation to the replication logic, the sampling of multiple cases is by nature theoretical. The purpose of theoretical sampling is to replicate or extend the emergent theory to reveal a clear pattern of the central constructs, relationships, and logic of the focal phenomenon (Eisenhardt and Graebner, 2007). This sampling approach seeks to include as many independent variables as possible in the study such that other situations that include these factors will also be included in the theory, ruling out alternative or rival explanations (Meredith, 1998; Siggelkow, 2007). In this study, the theoretical sampling aims to provide both literal and theoretical replication (Yin, 2009) across service networks in their integration management and contextual characteristics, revealing patterns among constructs and relationships within the cases and facilitating cross-case comparison and the generation of theoretical propositions. Furthermore, the theoretical propositions and their discussion in relation to the previous literature provide analytically generalizable arguments over existing theory, such that a previously developed theory is used as a template with which the empirical results of a case study are compared (Yin, 2009).

Fourth, the unit of analysis in the study is three-fold, collecting data on integration management practices occurring at the dyadic, relationship portfolio, and whole-network levels (Möller and Halinen, 1999). In the first stage, data are collected and analyzed from the focal organization's perspective, aiming to understand the management of integration that the focal organization employs to integrate the different segments of its network and individual network relations. In the second stage, the management of integration is examined from the focal organization's suppliers' or partners' perspectives, and the unit of analysis focuses particularly on the network dyad in question between the supplier or partner and the focal organization and between the supplier or partner and other network members. This type of multilevel analysis is rarely used in network or network management studies, although it is evident that one cannot understand management behavior in networks without examining the practices from the different levels of occurrence (Möller and Halinen, 1999). Moreover, the study advances in methodology compared to common purchasing and supply chain management research, in which data are often collected only from one side of the network dyad (cf. Choi and Hong, 2002; van der Valk et al., 2009; Wu and Choi, 2005).

4.3 Overall research process

As characterized in systematic combining, an evolving theoretical framework has been used throughout the study to guide data collection and analysis. During the course of the research resulting in this dissertation, three framework - data collection - analysis cycles occurred (Figure 6). During these cycles, the framework continuously evolved from a loose format into a tighter and more structured format whenever empirical observations inspired changes in the view of theory and vice versa (Dubois and Gadde, 2002; Miles and Huberman, 1994). The overall research process is overviewed next, after which the methods of context selection, case sampling, data collection, and data analysis will be described more profoundly.

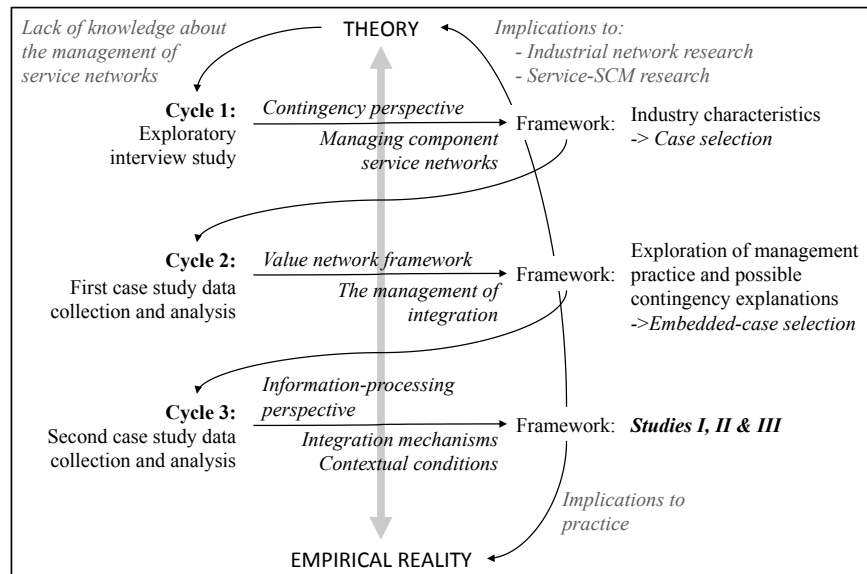


Figure 6. Research process following the logic of systematic combining (Modified from: Dubois and Gadde, 2002)

In the **first cycle** of empirical analysis, an initial interview study was conducted to gain a sufficient understanding of the empirical context of the study – the residential real estate sector in Finland – and to select suitable case organizations as focal organizations and their service networks as case networks for a more in-depth inquiry. The initial interview study was based on the original idea and research gap of investigating the management of strategic service networks, component service networks in particular, from a contingency perspective. In addition, at this early stage, the interviews took a broad view on the management of networks, aiming to identify such networks which could be considered as strategic, and which were deliberately designed and managed by the focal organization or organizations. Based on the exploratory interview study, six focal organizations and their networks were selected for further investigation.

In the **second cycle**, a first round of case study data collection and analysis was conducted in the selected case networks. Adopting the value network framework, suitable embedded-cases were selected from each case network that fulfilled the properties of the different types of strategic networks. Furthermore, narrowing the focus to the phenomenon of interest in the study, the management of integration, the aim was to identify such embedded-cases that represented both similarities and differences in their integration management practices, enabling literal and theoretical replication. As a result, 15 embedded cases were selected in the final sample. In addition, case descriptions and tentative contingency-theoretical propositions were formulated from the empirical evidence about the management of integration in different types of component service networks. These findings were then compared with further reading of relevant literature on organizational integration. The iteration between data and theory resulted in redirecting the analysis to integration of information, adopting the information processing perspective as the underlying theoretical background. Based on the information processing perspective, a revised theoretical framework (Chapter 3, Figure 3-2) was formulated to systematically analyze the integration mechanisms used to manage integration in the networks and the networks' contextual conditions.

In the **third cycle**, a supplementary case study data collection effort was conducted in those networks and focal or supplying/partnering organizations in which additional data were required to complete the case analyses based on the revised theoretical framework. When iterating between data and theory, supplementary literature on supply chain integration was incorporated to support the theoretical grounding of findings in stable and established component service networks. Similarly, literature on knowledge transfer and inter-organizational learning was reviewed and applied to explain the findings in the emerging component service networks. The third cycle resulted in three case study reports, one for each of the revised research objectives presented in Chapter 3.

4.4 Research context and case selection

4.4.1 Component service businesses in the Finnish residential real estate sector

The empirical context of this dissertation is **the residential real estate sector in Finland**. More specifically, the study focuses on two types of service businesses and related organizational networks within the residential real estate sector: **real estate management and maintenance services**, and **seniors' housing concept developments** that combine housing with a variety of nursing and resident services. In the residential context, real estate management and maintenance includes services such as housing management, technical property maintenance for heating, ventilation, air-conditioning, and cooling equipment, outdoor maintenance, cleaning, waste management, and customer contact service. The other empirical setting, senior housing, can be considered as a newer business field, particularly within

the Finnish real estate context. Senior housing concepts often include different types of resident services in addition to the housing service, such as rental service and customer selection based on service needs, home care services, nursing home services, meal services, welfare services, service assistance or a service manager, and a variety of recreational services.

The following ***theoretical and methodological reasons*** were considered when choosing the residential real estate sector as the study's empirical context. First and most importantly, real estate management, maintenance, and senior housing concepts represent different types of strategic networks, required for answering the third research question. For example, real estate maintenance and cleaning services are rather standardized services and markets in the real estate industry, resembling a stable value system. At the same time, some services such as housing management, customer contact services, and more technical maintenance activities are under development for a more professionalized service, outsourcing practices, and cooperation between the building owners and the service suppliers. In each of the example services, traditional operating models dominate the field, although some of the large, known actors have adopted and are continuously developing more effective and efficient outsourcing and service models. These models are referred to as established networks. Finally, the field is experiencing a shift or expansion from merely maintaining and improving the technical conditions of the properties to serving the residents with value-adding resident service solutions. One such service includes different types of housing concepts targeted particularly towards the elderly. However, during the time of the study, the emerging field of senior housing in Finland lacks standardized models for concepts that combine the different types of housing, services, and financing targeted towards senior residents, enabling an examination of collaboration in emerging value networks. Thus, the use of the context of residential real estate services sector facilitated an examination of network structuring and integration practices in the context of ***stable, established, and emerging service networks*** (Möller et al., 2005; Möller and Rajala, 2007; Möller and Svahn, 2006).

Second, both real estate management and maintenance and resident services in senior's housing concepts are typical ***component services*** in which the focal organizations, the real estate investors, either buy the services or collaborate with service suppliers to provide value to the end-customers, i.e., residents (Wynstra et al., 2006). Real estate management and maintenance are typical types of component services (Axelsson and Wynstra, 2002) in which a buyer – a real estate investor or some other type of residential property owner – purchases real estate management and maintenance services as support services to maintain the physical conditions and to develop the value of their properties. The housing management service includes not only the management responsibility of service supply on behalf of the real estate investors but also direct services for the residents and responsibilities for handling the end-customer relations. The real estate maintenance services sustain the physical conditions of the properties, thus affecting the real estate investors' business

performance but also have a direct influence on the living comfort and even the well being of the residents living in the properties. In senior's housing concepts, the different types of services functioning as additional components of the housing product are mainly offered to provide value for the residents without being transformed by the buying company.

Third, real estate management and maintenance services represent ongoing service exchanges between the buyer and the suppliers instead of one-time purchases (van Mossel and van der Valk, 2008). Thus, the use of the context of the residential real estate services sector facilitated an examination of supply network management during *ongoing service exchange*, an area that lags studies on the early stages of the service-purchasing process (van der Valk et al., 2009; van der Valk and Wynstra, 2012).

Finally, the data for the research were collected between the fall of 2010 and the fall of 2012 during a two-year research project on managing and developing service business within the Finnish residential real estate sector. The research project enabled access to the focal organizations and to their supplier and partner organizations for conducting interviews with multiple informants from multiple positions in the focal organizations' networks. Even for those in the sampled organizations who were not involved in the original research project, a general interest towards the larger research project, rather than an individual dissertation research, enabled access to the companies external to the project. Thus, the use of the context of the residential real estate services sector facilitated data triangulation through access to multi-party and multi-informant data (Yin, 2009).

4.4.2 Case networks and embedded-cases as the units of analysis

Sampling in qualitative case studies is by nature theoretical for serving the purpose of analytical rather than statistical generalization (Yin, 2009; Meredith, 1998). In theoretical sampling, cases are selected that are particularly suitable for illuminating and extending relationships and logic among constructs (Eisenhardt and Graebner, 2007). The purpose of theoretical sampling is to identify extremes, polar types, opposite situations along some dimension, or candidates for niche situations to help discover categories, properties, and interrelationships that will extend the theory (Meredith, 1998). The sampling of cases and data collection for the case studies evolved iteratively in three subsequent stages, following the overall research process.

In the first stage of the research between November 2010 and January 2011, an exploratory interview study was conducted. The interview study had two primary purposes. First, the interview study sought to provide general understanding about the context of the study – the residential real estate services sector in Finland – and its contextual characteristics, including supply market characteristics, the types of services and actors involved, and challenges and opportunities inherent in the field. Second, the interview study sought to identify suitable case networks around the focal organizations, “screening” the candidate cases (Yin, 2009: 91) for more in-depth case studies.

The study was conducted by interviewing senior managers from 17 large and known organizations within the residential real estate industry in Finland (Table 7). The organization set included residential real estate investors, housing developers, housing management companies, property service providers, and domestic service providers. In addition, the characteristics of the surrounding environment were mapped by interviewing representatives from the public sector, including the housing section in the Ministry of the Environment, the public Housing Funding and Development Agency, and housing development agencies in two large municipalities in Finland. In total, 31 interviews were conducted with 43 informants in 21 organizations closely engaged with the residential real estate sector in Finland. The interviews varied between 1.5 and 2 hours in duration and were conducted together with another researcher, with both researchers present in the majority of the interviews.

Table 7. Sampling and data in the exploratory interview study

No.	Organization	All		Not utilized in case studies	
		<i>Int.</i>	<i>Inf.</i>	<i>Int.</i>	<i>Inf.</i>
1	Real estate investor 1	2	2	-	-
2	Real estate investor 2	1	1	-	-
3	Real estate investor 3 ²	31	31	1	1
4	Municipal housing company 1	1	2	-	-
5	Municipal housing company 2	1	2	-	-
6	Municipal housing company 3 ³	1	2	1	2
7	Housing foundation ³	1	3	1	3
8	Residential real estate developer 1 ³	1	1	1	1
9	Residential real estate developer 2 ³	1	1	1	1
10	Residential real estate developer 3 ³	1	1	1	1
11	Housing management provider ¹	2	2	-	-
12	Maintenance and cleaning provider 1	2	2	-	-
13	Maintenance and cleaning provider 2	1	2	-	-
14	Insurance company and real estate investor	31	41	-	-
15	Nursing service provider ³	21	21	2	2
16	Grocery delivery service provider ³	1	1	1	1
17	Municipality 1: Finance and planning agency ³	1	4	1	4
18	Municipality 2: Housing agency ³	1	2	1	2
19	Ministry of the Environment: Housing section ³	1	1	1	1
20	Public housing funding and development agency ³	3	4	3	4
	TOTAL	30	42	15	23

1 One or more of the interviews conducted in a prior study in year 2009

2 One of the interviews and informants not utilized in the case studies

3 The organization, interviews, and informants not utilized in the case studies

The informants were asked to briefly introduce (1) their organization and its service businesses in general, (2) the perceived characteristics of the residential real estate service sector in Finland, (3) the organization's network structure, and (4) practices for managing the network and evaluating the network's performance. Based on the interview study, suitable organizations and their networks of service exchanges and service concept developments were selected for further case study analysis as follows.

The selection of **stable and established service networks** proceeded in two stages. First, three real estate management and maintenance service supply networks of three large residential property owners were selected as *case networks*. Only networks of large, professional service-buying organizations were selected because they could be expected to more purposefully define their business processes, including structuring and managing their supply chains

and networks (cf. van der Valk et al., 2009). In addition, based on the exploratory interviews, the selected companies present leading supply chain management practices in the field, enabling them to formulate propositions that have practical value for other companies (Wu and Choi, 2005).

Second, within the three case networks, three to five service networks from different service exchange categories were selected as embedded units of analysis, hereafter referred to as *embedded cases*. The embedded cases include service supply networks for outsourced housing management service, maintenance and caretaking service, technical maintenance service when separated from the previous, cleaning service, apartment renovation service, and customer contact service. Because of the different outsourcing strategies for the selected service exchanges adopted by the service buyers, the final sample consisted of 12 service networks of outsourced and ongoing service exchanges (Table 8).

Table 8. Sampling of cases to represent stable and established component service networks

Case	Focal org. (buyer)	Range of operations	Number of apartments (properties)	Property value, M€ (turnover)	Embedded-case: Service network
Case 1	Real estate investor 1	National, 9 municipalities	23,510 (760)	1,854 (286)	HM1 Housing management
					MC1 Maintenance and caretaking
					CL1 Cleaning
					AR1 Apartment renovations
Case 2	Real estate investor 2	National, 31 municipalities	13,914 (609)	1,186 (124)	HM2 Housing management
					CS2 Customer contact service
					TM2 Technical maintenance
					MC2 Caretaking
Case 3	Municipal housing company	Municipal, 3 larger regions within the municipality	8,570 (168)	290 (57)	AR2 Apartment renovations
					MC3 Maintenance and caretaking
					CL3 Cleaning
					AR3 Apartment renovations

The embedded cases were selected for three primary reasons. First, the networks consist of continuous service exchange relations rather than one-time purchases, enabling to study the management of integration during ongoing service exchange. Second, and most importantly, the networks represented some variation in the integration mechanisms used between the buyers and suppliers, facilitating cross-comparison and building theoretical propositions. Third, all of the networks represent high-volume or otherwise significant ongoing service supply for the buying firms and thus can be assumed to receive significant attention from the buyers for designing and managing the service encounters.

Representing *emerging service networks*, three senior housing concept development collaborations were identified as suitable cases for the analysis (Table 4-3). In the selected cases, three or more organizations and a varying number of peripheral actors were closely involved in joint development efforts from the concept idea stage until the concept development was finished and service operations in the seniors' housing location were launched. The concepts under development for the three selected cases were highly unique in the

Finnish context, and varying stages in the service concept development required joint development efforts within the networks (Table 9). More in-depth case descriptions of all the case networks and embedded cases are reported in Chapter 5.

Table 9. Sampling of cases to represent emerging component service networks

Case	Initiated	Network objectives	Concept elements	Focal org.	Key stakeholders/suppliers
Case 4 (SH1)	Concept idea: 2000 --- Pilot project: 2006-2008	To develop a unique seniors' housing concept in Finland that can be duplicated into several locations after receiving experiences from a pilot project and location.	Different types of housing (owner-occupied, rental, nursing home), home care services, nursing services, as well as a variety of additional resident services, such as a luncheonette, hairdresser and massage, a service manager, etc.	Insurance company/ Real estate investor, Residential real estate investor, Nursing service supplier	Municipal land use planning agency, Municipal social and welfare agency (geriatric care, daycare)
Case 5 (SH2)	Concept idea: 2000 --- Project: 2006-2011	To develop a novel nursing home concept in Finland that unifies individual living and home care with nursing services in a nursing home within the same building.	Rental individual and assisted living, home care and nursing home services, and additional resident services, such as a luncheonette, a spa, hairdresser and massage, a service manager for organizing recreational services, etc.	Residential real estate investor, Nursing service supplier, Municipal financing and planning agency	Housing Funding and Development Agency, Architect agency, General contractor, Municipal geriatric care agency
Case 6 (SH3)	Concept idea: 2005 --- Project: 2006-2011	To develop a novel nursing home concept in Finland that unifies individual living and home care with nursing services in a nursing home within the same property.	Rental assisted living, home care and nursing home services, and additional resident services organized by the nursing service supplier from customers' requests.	Municipal housing company, Municipal geriatric care agency, Nursing service supplier	Municipal urban planning agency, Housing Funding and Development Agency, The Finnish Funding Agency for Technology and Innovation, General contractor

4.5 Data collection

4.5.1 Primary data sources

The primary data sources in all of the empirical analyses include the *open-ended exploratory interviews* and *semi-structured case study interviews* conducted with informants in the focal case organizations and their supplying or partnering organizations in the studied networks. Open-ended interviews have no predetermined set of questions; instead, the researchers and interviewees talk freely based on one theme or several “themes” (Burgess, 1991). Semi-structured interviews are guided by a pre-prepared interview protocol (Rubin and Rubin, 2005) composed of a set of questions, leaving room for the interviewee to openly describe the content and rationale for his or her response in depth. This type of interview is widely used as the qualitative interview method

(Flick, 1998: 76) and is also applied in the two case study data collection stages in this research.

In total, **69 interviews with 63 informants in the case networks** were conducted during the course of the research. Combined with those exploratory interviews in organizations that were not included in the final case studies, the complete data set of the research includes **84 open-ended and semi-structured interviews with 86 informants in 27 organizations** (Table 10).

The case study data were collected in two stages, including the collecting of the main data (*Cycle 2 in the research process*) and the filling of information gaps and ensuring the correctness of previous information (*Cycle 3 in the research process*). In the second stage of data collection, which occurred between March 2011 and May 2011, 33 semi-structured interviews were conducted in 12 organizations. The interviews varied from 1 hour to 2.5 hours in duration. All except six interviews were conducted by the author individually; these six were conducted by the same researcher as in the exploratory interview study (*Cycle 1 in the research process*). This stage represents the main data collection effort for the research. The aim of the second interview round was to delve more deeply into the network structures and integration management practices in the case networks. Following intensive data analysis and writing, the second stage resulted in the composition of a set of drafts and conference papers of the three empirical analyses. In addition, the second stage provided grounds for further refinements into the theoretical framework of the research as a basis for the third interview round.

In the third cycle of the empirical analysis, which occurred between November 2012 and March 2013, 19 semi-structured interviews were conducted in 10 organizations, including two completely new service suppliers. The purpose of this final interview round was to fill in the missing data required to make final analyses based on the refined theoretical frameworks, to ensure that the previously categorized data were correct, and to discuss possible interpretations for the findings with the informants in each case.

Table 10. Data collected from the case networks and embedded-cases

Case	Embedded-case		Network characteristics		Interviews/Informants			
			Type	Actors	Focal org.	Suppliers Partners	Total	
1	1	HM1	Housing management	Established	2 long-term service supplier partners	8/7	6/7 ¹ , 1/1	22/20 ¹
	2	MC1	Maintenance and caretaking	Stable	Multiple suppliers (50-60)		7/5	
	3	CL1	Cleaning	Stable	Multiple suppliers (50-60)		0	
	4	AR1	Apartment renovations	Stable	Multiple suppliers (~20)			
2	5	HM2	Housing management	Established	3 long-term partners	7/3	2/2 ²	13/10 ¹
	6	CS2	Customer contact service	Established	2 service suppliers		2/3	
	7	TM2	Technical maintenance	Established	3 service suppliers		2/2	
	8	MC2	Caretaking	Stable	136 suppliers		0	
	9	AR2	Apartment renovations	Stable	~15 suppliers		0	
3	10	MC3	Maintenance and caretaking	Stable	4 suppliers	4/4	6/5 ³	10/9
	11	CL3	Cleaning	Stable	3 suppliers		0	
	12	AR3	Apartment renovations	Established	~12 suppliers			
4	13	SH1	Seniors' housing concept development	Emerging	3 Focal organizations Municipal land use planning Municipal social and welfare agency (geriatric care, daycare)	6/5	3/2	9/7
5	14	SH2	Seniors' housing concept development	Emerging	2 Focal organizations Municipal economic and planning agency HFDA & MEH ⁴ Architect agency General contractor	5/5	2/3	7/8
6	15	SH3	Seniors' housing concept development	Emerging	3 Focal organizations Municipal urban dev. Property service supplier HFDA & Tekes ⁵ General contractor	4/4	4/5	8/9
Case study interviews						33/27	36/36	69/63
Exploratory interviews (other than in case networks)								15/23
TOTAL								84/86

1 The same housing management supplier, customer relationship, and contract manager for both investors; counted only once

2 Same supplier as in Case 1, but informants related to management of customer contact service

3 Same supplier (and customer relationship manager) providing both maintenance and caretaking, and cleaning service for the buyer

4 HFDA = Housing Funding and Development Agency (operating under the Ministry of Environment), MEH = Ministry of Environment, Housing section

5 Tekes = The Finnish Funding Agency for Technology and Innovation

The informants in each case were identified and selected using snowball sampling (Noy, 2008). In snowball sampling, the researcher accesses informants through contact information that is provided by other informants. This method is by far the most widely employed method of sampling in qualitative research within the social sciences (Noy 2008). In this study, the suppliers, partners, and informants to be included in the study were named by the informants in the focal organizations as potentially valuable sources of evidence given the questions asked. In the buying organizations (Cases 1-3), the first points of contact were (1) directors of the real estate business, who possessed a strategic lens with which to view their organizations' real estate management

and maintenance service activities; (2) procurement directors or managers responsible for contracting the service suppliers; and (3) property managers responsible for operational service management. In the buyers' supplying or partnering service organizations, the informants included (4) top management or directors of the service business in question; (5) customer relationship managers; and (6) purchasing directors or managers. In the senior housing concept development collaborations (Cases 4-6), the informants included (7) contract-owners; or (8) project managers in the studied senior housing concept developments, who named other key informants closely involved in joint development efforts as working-pairs or in development teams both from the focal and the partner organizations.

By collecting data from multiple organizations and informants within the studied service supply chains and networks, the study advances in methodology compared to the more common method of studying supply chain and network management practices from only the focal organization's perspective (cf. Choi and Hong, 2002; van der Valk et al., 2009; Wu and Choi, 2005). More importantly, collecting data from multiple organizations and informants enabled data to be triangulated both within and between the cases, improving the internal validity of the research (Yin, 2009). The use of multiple respondents enables a variety of perceptions and meanings to be captured, which is vital to understanding complex business networks and relationships within them (Dubois and Araujo, 2007).

For assisting the conduct of interviews, an interview protocol was developed for each of the three stages of data collection (see Appendix 1). An interview protocol is one form of conversational guide that assists the interviewer in keeping track of the questions to be asked during an interview (Rubin and Rubin, 2005: 147). The protocol includes the main questions written out fully in advance and can be shared with the conversational partners before the interview. Although an interview guide need not be relied upon during the actual interview, the guide improves the reliability of the case study research as one part of a case study protocol (Yin, 2009: 79). In this study, interview protocols were used during the interviews, particularly when nearing the end of the interviews, to ensure that all of the main topics of interest were discussed with the informants. The interview protocol was sent to the informants in advance whenever requested by the informants themselves.

In each stage, the interviews consisted of three main parts. In the first, exploratory stage, only non-directive questions were asked, as reflected in the use of open-ended or unstructured interviews. In the second and the third stages, both non-directive and directive questions were used (Table 11). This technique of asking different questions (i.e., nondirective and directive) provides a stronger grounding of theoretical insights and mitigates bias (Eisenhardt, 1989; Bingham and Eisenhardt, 2011).

Table 11. Types of questions asked in the three stages of data collection

Part	Themes	Stage	Type
(1)	Background information on the organization as well as the informant's role in the organization	All stages	Non-directive
(2a)	Open description of the business field the organization is operating in and an overall view of the residential real estate services sector in Finland	Stage 1	Non-directive
(2b)	Open description of the studied service exchange(s) or concept development in question, including development path of collaboration in the service exchange(s) or event chronology in the concept development	Stage 2 & 3	Non-directive
(3a)	Open description of the organization's network structure and practices for structuring, governing, and developing the network Direct questions related to the network structures, practices for contracting and specifying, coordinating, and monitoring service activities, evaluating the performance of the supply network and the individual suppliers, joint development efforts with the suppliers and partners, and other possible forms of collaboration and interaction within the network	Stage 1	Non-directive
(3b)	Direct questions related to the characteristics of the network and services exchanged, and practices for integrating information and interacting within the network	Stage 2	Directive
(3c)	Direct questions related to the characteristics of the network and services exchanged, and practices for integrating information and interacting within the network	Stage 3	Directive

During the interviews, the interviewer took continuous notes and drew a figure of the organization's network from the perspective of the informant's organization. The figure was visible to the interviewee at all times and was actively used to focus the attention of the informant on different portions and issues in the supply chain or network, different services, or specific buyer-supplier-customer relations and to fill in initial information gaps during the interview. The network figures were shown and discussed with the key informants in each organization during the last interview round to ensure the correctness of the information gathered, hence improving the study's construct validity (Yin, 2009).

All of the interviews were recorded and transcribed for further analysis. The data from each case, including interview records and transcripts, interview notes and network figures, and supplementary documentation, were electronically stored in *a case study database* available for the researcher and external reviewers to revisit the case study data. In addition, ATLAS.ti software was used not only for data analysis but also for storing the interview transcripts, memo writings and the links between the memos and quotations.

4.5.2 Secondary data sources

The interview data were supplemented with *additional documentation*, supporting data source triangulation (Yin, 2009). Documents can be a corroborative data source for interviews and observations (Stake, 1995: 68). In this study, these included the case organizations' annual reports, web pages on each organization's strategies and services, press releases in relation to the specific business field and partnerships, and brochures, presentation slides, or video clips about the organization or the studied services and concepts under development whenever provided by the informants. In the first stage, the additional documentation was primarily used to identify suitable cases and informants, and in later stages to verify evidence gained from the interviews. It should be noted, however, that this documentation was considered as second-

ary data, whereas the open-ended and semi-structured interviews served as the primary data sources in the case study analyses.

4.6 Data analysis

The case study analysis, as applied in this research, included four main components as follows:

1. Interim case summaries;
2. Case descriptions or histories and causal networks;
3. Within- and cross-case analysis;
4. Case study reports

4.6.1 Interim case summaries

The first stage of data analysis included *interim case summaries* (Miles and Huberman, 1994). Interim case summaries were conducted in the early stages of the analysis, mainly during Cycle 1 and Cycle 2 of data collection and analysis (Figure 4-1). Their purpose is to provide a synthesis of 10 to 25 pages in length of what the researcher knows about the cases and what may remain to be found (Miles and Huberman, 1994: 79). In this study, the purpose of interim case summaries was threefold: to review and compile the empirical findings, deriving a coherent account of the cases; to begin to formulate initial categories and theoretical propositions for enabling the refinement of the theoretical framework in the research; and to set the agenda for the next stages of data collection. The case summaries were particularly useful for continuously cumulating information in the cases received from multiple informants, guiding further interviews within the same cases.

4.6.2 Case descriptions or histories and causal networks

The analysis proceeded by synthesizing the data for each case into more detailed *case descriptions* and *histories* (Yin, 2009; Eisenhardt, 1989). Case descriptions and histories are conducted based on descriptive frameworks used to organize the case study evidence (Yin, 2009: 131). Using data from multiple informants in both the focal and the supplying or partnering organizations, an overall understanding was formed of the network composition, actors and their relationships, value activities, network management practices for forming, coordinating, and controlling the network, and issues or events that appeared to be essential to the network's development, current state, and functioning. In addition, for the three cases of emerging service networks, the case histories included descriptions of the initial conditions and ideas about the concept, events reported and highlighted by the informants that had occurred in the cooperation, possible changes that had occurred in the network, the concept, or cooperation in general, and the final outcome or current stage of development in the concept development by the time of the interview, in-

cluding the informants' perceptions about the outcome of concept development and cooperation in general.

To make sense of the data, reduce it, and begin to formulate relations between different concepts, **causal networks** were drawn between different integration management practices and contextual conditions or events appearing in the data. Causal networks are displays of the most important independent and dependent variables in a field study and the relationships among them (Miles and Huberman, 1994: 153). This technique was primarily used between Cycles 2 and 3 in the overall research process. As characterized in theory elaboration, the analysis was based on a priori conceptual framework, against which empirical evidence was mapped. As the dependent variables, all forms of integration management practices were mapped into a conceptual scheme. In addition, various explanations for the management of integration within the case networks represented in the data were mapped as independent variables and linked with the related dependent variables. As a result, causal network figures of all the cases were drawn in the form of **causal fragments** (Miles and Huberman, 1994: 156), presenting alternative conceptual models for each case of integration and its antecedent conditions. As suggested in Miles and Huberman (1994: 153), the causal networks of each case were supported with analytic text and tables, functioning as the foundation for the within- and cross-case analyses.

4.6.3 Within- and cross-case analysis

Following the logic of systematic combining and the process of matching theory and reality (Dubois and Gadde, 2002), the final data analysis consisted of **three rounds of within- and cross-case analyses**, resulting in **three empirical studies** (Table 12).

Table 12. Purpose, data, and focus of analysis in the three empirical studies

	Study I	Study II	Study III
Purpose	To elaborate the management of integration and uncertainties that characterize stable, established, and emerging component service networks	To examine the management of integration and context-specific conditions in component service networks composed of stable and established sub-networks	To examine the management of integration and its contribution to network evolution under changing levels of uncertainty in emerging component service networks
Unit of analysis	15 embedded-case networks: Stable networks: <i>MC1, MC2, MC3, CL1, CL3, AR1, AR2</i> Established networks: <i>HM1, HM2, CS2, TM2, AR3</i> Emerging networks: <i>SH1, SH2, SH3</i>	12 embedded-case networks: Real estate investor 1: <i>HM1, MC1, CL1, AR1</i> Real estate investor 2: <i>HM2, CS2, TM2, MC2, AR2</i> Municipal housing comp: <i>MC3, CL3, AR3</i>	3 case networks: <i>SH1, SH2, SH3</i>
Data	69 interviews 63 informants	45 interviews 39 informants	24 interviews 24 informants
Dependent variable(s)	Integration mechanisms <i>Figure 4</i>	Integration mechanisms <i>Figure 4</i>	Integration mechanisms <i>Figure 4</i> Network evolution
Independent variable(s)	Type of network <i>Table 4</i> General sources of uncertainty <i>Table 5</i>	Context-specific conditions in supply chains <i>Table 6</i>	Initial and changed levels of uncertainty <i>Table 5</i>

Study I investigates the management of integration and uncertainties characterizing stable, established, and emerging component service networks. Using data from 15 embedded cases representing the three types of strategic networks, the study theorized about the sources of uncertainty and the management of integration that characterize and distinguish different types of strategic networks. *Study II* refines the previous analysis for the stable and established networks by using the similarities and differences in integration management, rather than the formal network typology, as the starting point for distinguishing among the different networks. Using data from 12 embedded cases in the three organizational buyers' component service networks, the study theorizes about the association between the management of integration and contextual conditions in component service networks composed of stable and established sub-networks. *Study III* further refines the two static views of integration management by adopting a longitudinal perspective for investigating the management of integration and its contribution to network evolution under changing levels of uncertainty in emerging component service networks. Using data from the three senior housing concept development collaborations, the study theorizes about the effectiveness of integration management under changing levels of uncertainty in emerging component service networks.

In all three of the studies, ***a pattern matching technique*** (Eisenhardt, 1989; Lee et al., 1999; Yin, 2009) was used as the primary analytical technique. In pattern matching, the researcher compares an empirically based pattern with one or multiple predicted patterns (Yin, 2009: 136). In the analysis, formal hypotheses, an explicit theory, or a less formal conceptual model anticipate a particular pattern of variables, phenomena, or outcomes occurring within one case or across multiple cases (Lee et al., 1999: 174). In this study, no formal hypotheses were formulated in advance; however, less formal conceptual frameworks of ideal types of strategic networks (Table 4) and integration mechanisms (Figure 4) are elaborated using evidence from multiple case studies. In addition, the two tables of general and context-specific contingencies presented in Chapter 3 (Table 5 and Table 6) form the basis for empirically investigating and elaborating the contingencies that characterize different types of component service networks. Their primary purpose is to guide and structure the analysis of empirical data and to theoretically ground the empirical findings in the previous literature on organizational integration. Table 5 structures the analysis for (i) general patterns of uncertainty across the three ideal types of networks and (ii) changes in levels of uncertainty in emerging networks. Table 6 structures the analysis for integration in the specific context of component service networks consisting of stable and established sub-networks.

Because the goal of this research is to investigate how and why integration is managed in different types of strategic service networks, the patterns of interest relate to the independent variables in relation to the dependent variables (Yin, 2009: 139). In *Study I*, the patterns related to the sources of uncertainty and integration management were assessed in relation to the three ideal types of the strategic networks. In the within-case analysis, the interviews were cod-

ed using an open-coding procedure (Corbin and Strauss, 1998) and Atlas.ti software, identifying all of the contextual characteristics and management structures and practices for each studied network. In each case, the contextual characteristics were categorized in a manner that best matched the original definitions and descriptions of the uncertainty constructs. Similarly, the identified management structures were categorized under impersonal and personal integration, further dividing them into operational and strategic integration. Finally, empirical evidence regarding the uncertainties characterizing the case and the integration mechanisms used for managing integration in the network were reduced and compiled into tables to enable further analysis.

In the cross-case analysis the tables were used to identify similar patterns across multiple cases (Eisenhardt, 1989). First, similarities were identified in the uncertainty constructs across the embedded cases within each type of strategic network. Second, patterns were identified for integration management practices across the embedded cases within each type of strategic network. The analysis was continued, often revisiting the original data for each case, until clearly identifiable patterns were discovered for both the uncertainty constructs and the management of integration for the three types of strategic network across all of the cases. These patterns were finally compared with the patterns predicted by the information-processing theory and related literature on information and knowledge integration. The cross-case analysis resulted in theoretical propositions about the uncertainties characterizing each type of strategic component service network and the management of integration that reflects the integration requirements caused by those uncertainties.

In *Study II*, the patterns of contextual characteristics in each service network were assessed in relation to the four types of integration. In the within-case analysis, the interviews were coded based on the initial theoretical framework, creating a database for the management of integration and contextual conditions for all of the embedded cases. First, the studied networks were grouped under each of the four types of integration based on the previous coding of integration management in the stable and established networks. Second, for all of the selected service networks, all quotations from the multiple informants were coded to provide information about the contextual characteristics of the service, the network in question for supplying that service, and the characteristics of the broader environment outside of the specific network that featured the business environment of each service.

In the cross-case analysis, two types of comparison were conducted. First, a comparative case analysis was conducted for *integration mechanisms* to identify patterned differences and similarities in the use of integration mechanisms within the integration types across the embedded cases. The embedded cases that represented similar integration mechanisms within an integration type were grouped together. Second, the *contextual conditions* of the grouped embedded cases were compared to identify similarities in contextual conditions within the group and differences in contextual conditions in other embedded cases outside of the group. The aim was to identify patterned differences in contextual conditions between those embedded cases that had similar integra-

tion mechanisms and those with different integration mechanisms. The procedure was repeated for all four integration types separately until all patterned similarities and differences in integration mechanisms and contextual conditions were identified from the data. Finally, the patterned findings were compared with predicted patterns found in the previous literature on information processing and supply chain integration. The cross-case analysis resulted in theoretical propositions about the association between the management of integration and the contextual conditions of the service networks creating integration requirements and costs.

In *Study III*, the patterns of initial and changed contextual characteristics and practices for managing integration were assessed in relation to the perceived effectiveness of the emerging networks. In the within-case analysis, the essential facts of a longitudinal case history were first described. The information-processing framework and the general sources of uncertainty were then used as the basis for categorizing the empirical data into tables. First, the initial contextual conditions in the network and concept development were categorized under the five general sources of uncertainty. Second, possible changed contextual conditions and resulting changes in the level of uncertainty in the network and concept development were identified and categorized. Third, the perceptions about the network's evolution were identified and categorized.

The cross-case analysis followed four steps. First, patterned similarities in the initial contextual conditions were identified across the cases. Respective patterned similarities in the use of integration mechanisms were identified and linked with the initial contextual conditions. Second, patterned differences in the initial contextual conditions and respective differences in integration mechanisms across the cases were identified. Third, patterned differences in network evolution and respective differences in integration mechanisms were identified and linked with the changed contextual conditions in each network. Fourth, the identified links between the initial and changed contextual conditions, the integration mechanisms used, and network evolution were compared with predicted relations according to the information-processing perspective and previous literature on organizational knowledge transfer and inter-organizational learning. The cross-case analysis resulted in theoretical propositions about the associations between initial and changed contextual conditions in relation to the management of integration and to network evolution.

4.6.4 Case study reports

Case study data, as one form of qualitative data, are often large and time consuming to evaluate, requiring some type of reduction to select, focus, simplify, abstract, and transform the data that appear in written-up field notes or transcriptions (Miles and Huberman, 1994). In all three case studies, data were reduced using case-ordered displays or case-ordered matrices, in which the cases are ordered across the variables of interest, offering a method to easily view and understand patterned similarities and differences across the studied

cases. In practice, the original narratives of multiple informants in each case were synthesized into condensed descriptions of the integration mechanisms used and the contextual conditions for each analyzed embedded case.

Finally, the case study reports follow a *theory-building structure*, in which each section reveals a new component of the theoretical argument being made (Yin, 2009). All three case study reports follow a similar overall structure, in which the overview of the data received from within-case analysis is followed by the results of the cross-case analysis and related theoretical propositions. These results will be reported next in Chapter 5 after briefly discussing the validity and reliability of the selected research design.

4.7 Evaluation of validity and reliability of the research design

The quality of any research design and approach can be evaluated using certain logical tests. In qualitative research, instrumentation, observation methods, and the modes of analyses are not standard, which may also run counter to the prevailing notions of validity and reliability (Lee et al., 1999). To evaluate the quality of a case study design, as in the majority of social research, the following four common tests are suggested: construct validity, internal validity, external validity, and reliability (Table 13; Yin, 2009).

Table 13. The means of addressing the quality criterion in the study, following Yin (2009)

Quality Criterion	Tactics for addressing the quality criterion	Means by addressing the quality criterion in the present study
Construct Validity Identifying and choosing correct operational measures for the concepts being studied	Multiple sources of evidence	- Triangulation of multiple informants and organizations within the networks - Collecting secondary document data (whenever available for the researcher) for verifying and complementing the interview data
	Chain of evidence	- Detailed description and justification of research objectives, questions, and methodological choices, and providing sufficient empirical insights when reporting findings and interpretations of the data
	Review of findings	- Jointly crafting a network figure with the informants during the interviews - Reviewing and discussing the network figures and findings with key informants during supplementary data collection stage
Internal validity Establishing causal relationships whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships	Analytical technique: Pattern matching	- Following and documenting a pattern matching technique within-case and cross-cases in data analysis
	Rival explanations	- Ruling out rival explanations by comparing the patterned empirical findings with previous theories and literature in relevant fields - Presenting and discussing the findings in scientific conferences, research seminars, research project meetings, and in a professional workshop
External Validity Establishing a domain in which the study's findings can be generalized	Replication logic	- Theoretical replication of cases at the level of embedded-units (service exchanges/concept developments) - Literal replication of cases at the level of focal organizations and their networks
Reliability Demonstrating that the operations of a study can be repeated with the same results	Case study protocol	- Developing interview protocols for each stage of data collection
	Case study database	- Recording and transcribing all the interviews - Storing all the data (interviews, network figures, interview notes, case descriptions, archival data) electronically for proof-check

4.7.1 Construct validity

Construct validity involves identifying and choosing the correct operational measures for the concepts being studied (Yin, 2009). Three tactics are suggested to improve construct validity in case research (Yin, 2009: 42): using multiple sources of evidence; establishing a chain of evidence; and allowing key informants to review a draft of the case study report.

In this study, the primary method of improving construct validity is the use of multiple sources of evidence in terms of multiple informants from multiple organizations within the studied networks. Using multiple respondents enables researchers to capture a variety of perceptions and meanings, which is vital to understanding complex business relationships (Dubois and Araujo, 2007). The study sought to maintain the chain of evidence by providing the reader with a detailed description of the entire research process, beginning by formulating the research objectives and questions, describing and justifying the methodological choices made during the course of the research, providing sufficient empirical insights when reporting the findings and interpretations of the data, and synthesizing the results and conclusions. Finally, the case study data and interpretations were reviewed in two ways with the informants. First, each informant was actively engaged during the interviews in helping to craft the network figure and related management and contextual issues in relation to their organizations' network. Second, the crafted network figures, related management structures and contextual conditions were reviewed and discussed with key informants in each studied organization during the final, supplementary data collection stage.

4.7.2 Internal validity

Internal validity seeks to establish a causal relationship whereby certain conditions are believed to lead to other conditions, as distinguished from spurious relationships, and is used only for explanatory or causal studies. The tactics suggested to improve the internal validity of case research include using several of the analytical techniques for case study analysis – pattern matching, explanation building, or logic models – and addressing rival explanations. (Yin, 2009)

The pattern matching technique, as applied in this research, was described in depth in the previous section (Section 4.5). In the three empirical analyses, the theoretical propositions were grounded both in empirical evidence and related previous research findings to provide support for the established associations between the context and the management of integration. Regarding rival explanations, the final results and arguments were discussed in light of possible alternative theoretical assumptions and explanations than those selected. In this study, the contingency theoretical arguments are discussed in light of two alternative perspectives, an institutional and a strategic one, to understand organizational structures. Finally, during the course of the research, the findings and interpretations of the individual studies were presented and discussed at four different scientific conferences and two research seminars.

Through this approach, the results were discussed and peer-evaluated within the scientific community, leading to refinements of the analyses and theoretical arguments during the research process.

4.7.3 External validity

External validity defines the domain in which a study's findings can be generalized (Yin, 2009). This type of validity refers to "*the extent to which it is possible to generalize from the data and context of the research study to broader populations and settings*" (Hendrick et al., 1993: 40). A distinction must be made between statistical and analytical generalizability (Meredith, 1998; Mitchell, 1983). In statistical generalization, the study generalizes the findings received from a sample to a population or universe. This analogy of samples and universes used in quantitative survey research is, however, incorrect for case studies, which aim to produce analytical rather than statistical generalizations. Instead, in analytical generalization, the study generalizes the findings to a broader theory using the replication logic tactic (Yin, 2009).

In this study, the replication of findings was achieved by using multiple focal networks, and within these networks, through multiple embedded units possessing similar (literal replication) and differing (theoretical replication) management practices and contextual characteristics. In addition to replication through sampling, the proposed empirically grounded arguments were analytically generalized to a broader theoretical discourse by establishing a link between the empirical context-specific findings and more universal organization and management theories.

4.7.4 Reliability

Reliability demonstrates that the research operations, such as data collection and analysis, can be repeated, arriving at the same results (Yin, 2009). Thus, the description of methods used in qualitative research must be sufficiently detailed to allow others to replicate the study either in a detailed hypothetical manner or in an actual manner (Lee et al., 1999). The goal of reliability is to minimize the errors and biases in a study (Yin, 2009).

A general approach to the problem of reliability is to ensure that the research process and steps are as operational as possible, to conduct the research as if someone were constantly looking over one's shoulder, and to document the procedures followed with details for other researchers to follow (Yin, 2009). In case study research, the suggested strategies for achieving this objective include a case study protocol and a case study database (Yin, 2009). A case study protocol guides the researcher in collecting data from a single case, whereas a case study database is a means of organizing and documenting the data collected for each case, including notes, documents, tabular material, and narratives.

In this study, an interview protocol (Rubin and Rubin, 2005) was developed in each stage of data collection and analysis to guide data collection. In addition to the specific questions to be asked of the informants, the protocols in-

cluded sub-themes for each main question to remind the researcher about the essential topics of interest. In this manner, the protocol not only assisted the researcher in memorizing the specific questions to be asked of each informant but also helped the researcher to make evaluations during the interview, whether all the topics and sub-questions of interest were discussed at some point during the interview. The case study database included all of the interview records and transcripts, notes taken and network figures drawn during the interviews, and supplementary documentation stored for each case, available for other researchers to elaborate.

The results of the empirical analysis are presented next in Chapter 5.

5. Results

This chapter presents the results of the empirical analysis. First, the case descriptions and the within-case analysis for the management of integration in the embedded-case networks are overviewed. Second, the results of the three studies are presented each involving a number of empirically grounded theoretical propositions. The chapter concludes by summarizing the results and inducing general theoretical propositions based on the findings of the three studies.

5.1 Case descriptions

5.1.1 Case networks

In total, six case networks were selected, from which 15 embedded-case networks were analyzed. This section describes the constitution of the six case networks. The embedded-case networks, which function as the units of analysis, will be presented and classified according to the value network framework in the next section.

The service supply network of real estate investor 1 consists of the following (Figure 7). The investor has outsourced the operational management of maintenance service supplies to two external housing management companies. The majority of the technical maintenance, caretaking and cleaning activities are outsourced locally from 50 to 60 suppliers. In some locations both maintenance and cleaning are purchased from the same supplier, whereas in other locations these are separated into different suppliers. In both situations, the two service functions are separately contracted. Only specialized equipment, such as elevator maintenance and building automation, are outsourced to specialized suppliers; this element is not discussed in further detail in this study. In addition, apartment renovations are contracted from several suppliers, regularly using approximately 20 suppliers. Customer contact service is maintained in-house.

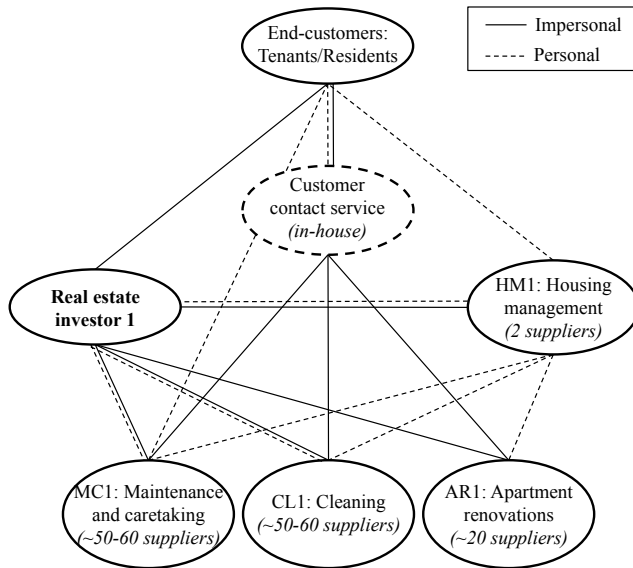


Figure 7. Service network structure of Real estate investor 1 (Case network 1, Embedded-cases 1-4)

The service supply network of real estate investor 2 consists of the following (Figure 8). Investor 2 has outsourced the operational management of maintenance supply for approximately half of its housing stock in the capital region to two external suppliers and retained half of the stock within the firm. In addition, the management of all properties outside the capital region is outsourced to the two external housing management companies. The investor has also separated technical maintenance from other maintenance and caretaking activities. The former are outsourced to two national suppliers (three from the beginning of year 2013), whereas the latter consists of more than 130 locally contracted maintenance and caretaking suppliers. As in the previous case, Investor 2 has contracted a number of suppliers for apartment renovations, of which it regularly uses approximately 15 contractors. In addition, customer contact service is outsourced to two national suppliers, both dedicated within their own geographical regions.

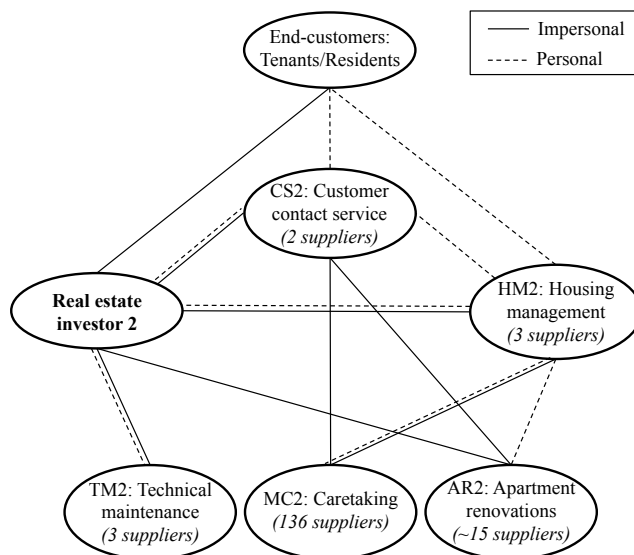


Figure 8. Service network structure of Real estate investor 2 (Case network 2, Embedded-cases 5-9)

The service supply network of the municipal housing company is configured as follows (Figure 9). The municipal housing company has one-hundred-percent ownership of its subsidiary housing management company that manages the maintenance service supply. The company has four main suppliers in maintenance and caretaking activities, each dedicated with their own service locations within the municipality, and three cleaning companies complementing those locations in which the maintenance and caretaking suppliers do not deliver cleaning. The four maintenance suppliers deliver a variety of maintenance activities, with the contracts also including activities of a more technical nature. Only the most technical maintenance service activities, such as building automation, are delivered by the housing management company using its own employees. Apartment renovations employ approximately 12 regularly used contractors. The customer contact service is maintained in-house.

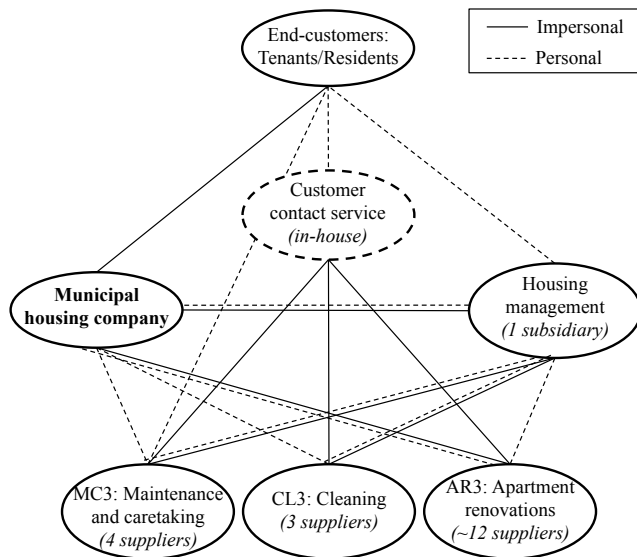


Figure 9. Service network structure of Municipal housing company (Case network 3, Embedded-cases 10-12)

Case network 4 (SH1) aims to develop a unique seniors' housing concept in Finland that can be duplicated in several locations after receiving experiences from a pilot project and location. The concept includes different types of housing (owner-occupied, rental, nursing home), home care services, nursing services, and a variety of additional resident services, such as a luncheonette, hairdresser and massage, a service manager, etc. The network is configured as follows (Figure 10). The network consists of three focal collaborating actors that have formed a joint venture for the concept. These include an insurance company through its financial service and real estate investing units, a residential real estate investor, and a nursing service supplier. The potential future residents or similar focus groups have been surveyed before launching the concept development for receiving knowledge about housing and service needs, from which the concept idea and planning has originated. In addition, an external marketing agency has been used in the beginning of concept development for idea refinement and in creating the visual appearance of the concept. When launching the pilot development project, key stakeholders from the municipal urban and economic planning agency and the social and welfare agency have been engaged in the development to search for a suitable location for the concept and to commit the actors to deliver municipal services within the concept.

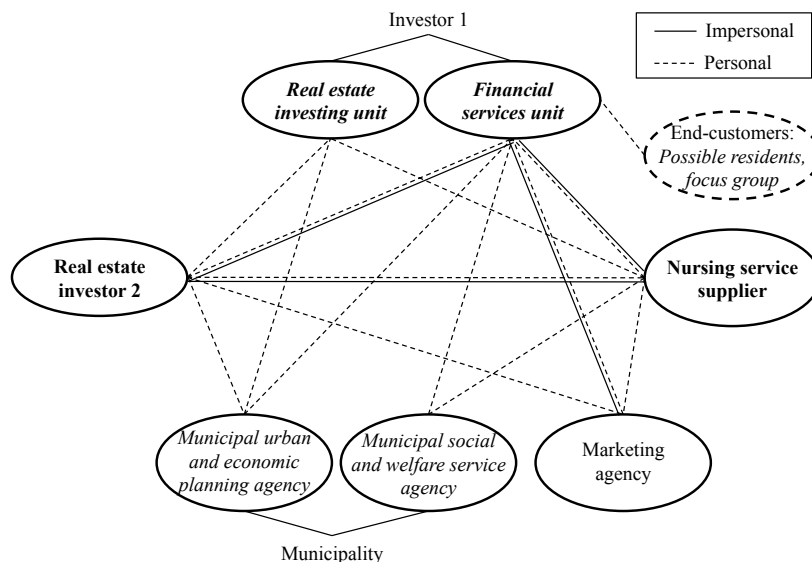


Figure 10. Service network structure in seniors' housing concept development 1 (Case network 4, Embedded-case 13)

Case network 5 (SH2) aims to develop a novel nursing home concept in Finland that unifies individual living and home care with nursing services in a nursing home within the same building. The concept includes rental individual and assisted living, home care and nursing home services, and additional resident services, such as a luncheonette, spa, hairdresser and massage, a service manager for organizing recreational services, etc. The network is configured as follows (Figure 11). The core network consists of two or three focal collaborating actors, including a residential real estate investor and a nursing service supplier. The third focal organization is the municipal urban and economic planning agency that has initially launched the whole concept development through land use planning and organized an architect design competition, based on which the architectural agency has engaged in the development project. In addition, key stakeholders from the municipal social and welfare service agency and government agencies, including the Housing Funding and Development Agency and the Ministry of Environment, have been closely involved in the concept development and implementation stages. For implementation, the real estate investor has contracted two primary contractors and a number of specialized component contractors. In preparing the service supply within the housing location, the nursing service supplier has communicated about the service contents with some of the local service suppliers in addition to those that are regularly used. In addition, a key component in the housing concept, assisted living, has sought bids by the municipal social and welfare agency and has been tendered by the nursing service supplier. The end-customers, i.e., future and potential residents, have been engaged in the concept planning through a model room in the real estate investors' headquarters that is also used to market the apartments.

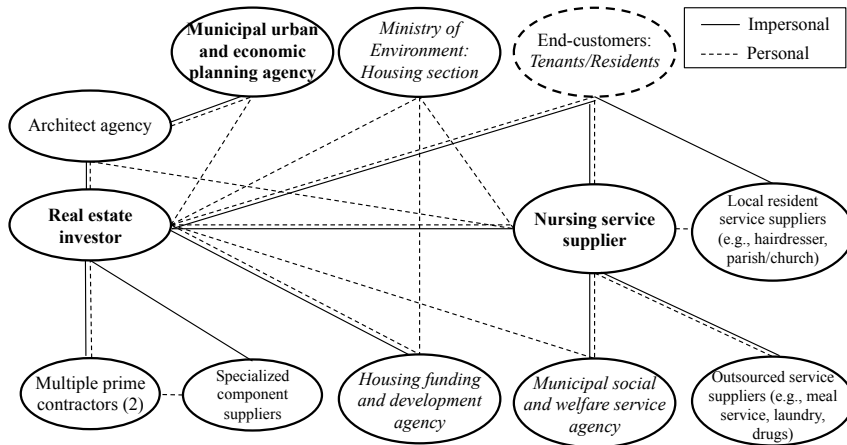


Figure 11. Service network structure in seniors' housing concept development 2 (Case network 5, Embedded-case 14)

Case network 6 (SH3) aims to develop a novel nursing home concept in Finland that unifies individual living and home care with nursing services in a nursing home within the same property. The concept includes rental assisted living, home care and nursing home services, and additional resident services organized by the nursing service supplier based on customer requests. The network is configured as follows (Figure 12). The network consists of the following three focal collaborating actors: a municipal housing company that owns the properties and organizes real estate management and maintenance services through its subsidiary; a municipal geriatric care agency that rents the property and partially outsources and partially supplies the geriatric services; and a nursing service supplier that provides home care and nursing home service in the housing location and coordinates additional resident services from local service suppliers. In addition, the municipal urban planning agency has been closely involved in the original idea phase and in preparing the land use planning. During concept implementation, the Housing Funding and Development Agency has been regularly contacted and has collaborated on the building design and the public housing funding instrument. In addition, a separate development project involving the funding agency for technology and innovation has granted funding and participated in designing the energy efficiency elements in the third stage of property development. During the construction stages, the municipal housing company has contracted building planners, a general contractor, and specialized component contractors, whereas the nursing service supplier and the municipal social and welfare agency have communicated with the national supervisory authority for welfare and health for the novel properties and services to fulfill all of the regulations related to geriatric care.

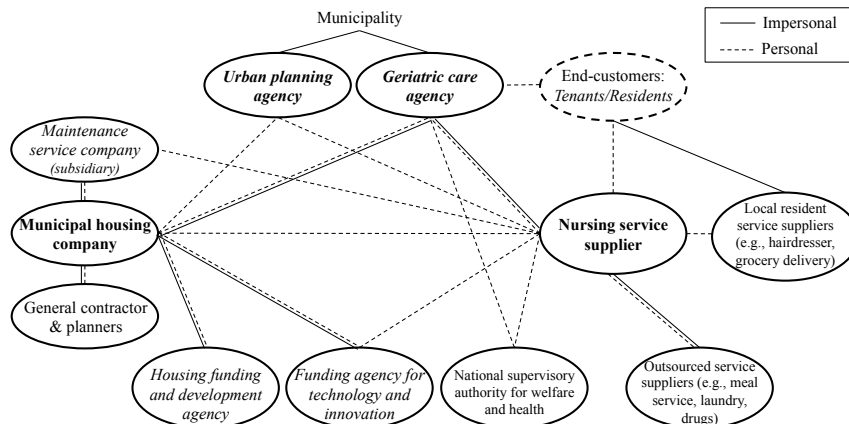


Figure 12. Service network structure in seniors' housing concept development 3 (Case network 6, Embedded-case 15)

5.1.2 Classification of the studied component service networks

This section briefly overviews the embedded-case networks that were selected to represent the stable, established, and emerging service networks. Following Möller and Svahn (2003), the cases represent different (1) determinations of value activities, (2) aims, and (3) structures of the network (Table 14). Empirical evidence used to distinguish among the three types of networks across the embedded-cases is presented in Appendix 3.

Table 14. Summary of value activities, aims, and network structures of the embedded-cases

N	S-E	Value activities	Aims	Network structure
Stable	MC1 & CL1	Standardized service for the firm and in the industry	To achieve stable service quality throughout the supply network	~ 50-60 suppliers (of which about 20 in the capital region)
	MC2	Simple service activities	To achieve locally end-customer satisfaction towards the service, but also cost efficiency	136 suppliers
	MC3 & CL3	Standardized, simple service activities	To achieve cost efficiency and stable quality throughout the supply network	4 maintenance suppliers & 5 cleaning suppliers
	AR1	Clearly specified service activities	To achieve operational efficiency and predictability of costs	~20 contractors with annual fixed-term contracts
	AR2	Clearly specified service activities	To achieve operational efficiency	~15 frequently utilized local/national contractors with annual fixed-term contracts
Established	HM1	Continuous joint development, particularly mutual process interfaces	To develop core business processes	2 suppliers (long-term, but varying proportions of the investor's properties)
	HM2	Developing field	To improve purchasing efficiency	2 large suppliers (long-term, but varying proportions of the investor's properties), 1 small supplier (only few locations)
	CS2	New outsourcing solution for the firm and the residential real estate sector	To improve information handling and monitoring, and operations efficiency	2 new suppliers (separate geographical regions)
	TM2	New outsourcing solution for the firm and the residential real estate sector	To improve service quality and effectiveness of proactive maintenance	2-3 suppliers (old/known, but different tasks and contracts than usual)
	AR3	New contracting solution for the firm	To improve predictability of costs	~12 contractors with three-year fixed-term contracts
Emerging	SH1	No existing concepts in Finland; Novel for the actors	To innovate a novel duplicable seniors' housing concept; Launch a pilot project; Learning and multiplying the concept to other locations	3 focal actors; 3 other actors closely involved in the concept development stage
	SH2	No similar concepts in Finland; Novel for the actors	To develop a novel, state-of-the-art seniors' housing concept that combines multiple levels of housing and services	2+1 focal actors; 6 other actors closely involved in different development stages
	SH3	Novel concept in the municipality and for the actors	To develop a novel and cost-efficient seniors' housing concept that combines multiple levels of housing and services	3 focal actors; 4 other actors involved in different development stages

Stable component service networks

Five **stable service networks** were studied. These networks include the supply networks of real estate maintenance, caretaking and cleaning services purchased by real estate investor 1 (MC1, CL1), real estate investor 2 (MC2) and municipal housing company (MC3, CL3) as well as apartment renovation services purchased by real estate investors 1 and 2 (AR1, AR2).

The service exchange category “**maintenance and caretaking**” refers to services for maintaining the technical properties and equipment of the housing properties and caretaking services such as outdoor maintenance and snow removal. The services represent typical, standardized real estate services purchased by the residential real estate investors. The organizational buyers have adopted slightly different purchasing strategies for maintenance and caretak-

ing services. Investor 1 includes the majority of maintenance and caretaking activities under the same maintenance contracts, contracting its suppliers on a local basis. Investor 2 contracts the caretaking function on a local basis from multiple suppliers but has separated more technical maintenance activities and their inspections as a separate service function. Finally, the municipal housing company has adopted a mid-range solution by including a large extent of technical maintenance and caretaking activities into its four maintenance suppliers' contracts but complementing the technical inspections and repairs with the housing management's own technical maintenance staff.

The service exchange category "**cleaning**" can be considered as a service activity that is separate from maintenance and caretaking, although in many cases, the cleaning service is purchased from the same suppliers providing the maintenance and caretaking activities. Even when purchased from the same supplier, the two services are separately contracted. In some service locations, completely separate suppliers have been contracted to provide the indoor cleaning service apart from the maintenance and caretaking activities. Moreover, the two different service exchanges often involve different operational managers or foremen from the supplier's side and always involve different operational employees.

As described by a director of real estate investor 1, the maintenance and cleaning services represent a "*kind of activity that can be purchased off the shelf*", and which "*you don't really need to develop (--) that much*" (Case 1: *real estate investor 1, director of investment business*). Moreover, characteristics for both service activities follow the common industry practice of price-based bidding with a lowest price, aiming for cost efficiency, and varying service quality across and within service supplier firms in different service locations.

The third service exchange category "**apartment renovations**" includes construction work conducted in the residents' apartments, such as painting, floor replacement, kitchen equipment installation, or bathroom renovation. The emphasis is on renovations conducted when one resident moves out from the apartment and before another moves in. Another important type of apartment renovation includes improvements in the apartments' quality levels provided by the three building owners for their tenants according to their long-term tenant programs. Because of the large housing stocks of all three investors and somewhat high annual turnover in residents, varying from 17 to 30 percent among the investors, apartment renovations represent a significant annual cost category for property management. Similar to maintenance, caretaking and cleaning, the field is also perceived to include a high variety of supplying firms and a commonly known feature of underground economy in the construction industry, yielding challenges for both quality and cost control.

Established component service networks

Five **established service networks** were studied. These networks include a housing management service outsourced by real estate investors 1 and 2 (HM1, HM2), a customer contact service (CS2) and a technical maintenance service

(TM2) outsourced by real estate investor 2, and an apartment renovation service purchased by municipal housing company (AR3). The first two networks feature a developing field within the residential real estate sector, whereas the latter two represent a different type of sourcing solution than what has traditionally been used in the field of residential real estate maintenance in Finland among the large property owners.

The service category “**housing management**” has been traditionally implemented within the firm in the case of large residential rental investors. Housing management includes activities for managing both end-customers and supplier relations within the buyers’ real estate management and maintenance supply networks. The most significant and time-consuming service activities in housing management include meetings with resident committees, inspecting apartments and ordering renovations when a resident moves out of an apartment, inspecting and handling service reports and invoices from the suppliers, conducting field visits and regularly meeting the suppliers, in addition to evaluating service needs and planning the service activities within the buyer-defined maintenance budget.

“If you think at the housing management level, contacting with the residents, solving daily issues what ever they come across with in living. Managing move-ins and outs is an immense task today. (--) we manage 14.000 apartment and in those, 33 percent of tenants change annually. And always leaving the office to inspect the apartment, recording it into the system and making necessary orders for refurbishing the apartment makes it a very time consuming activity at the moment. (Case 1 & 2: housing management firm 1, customer relationship manager)

The service category features a developing field within the residential real estate sector. Despite the experience of outsourcing the service for nearly ten years in the studied companies, the field in general is perceived as rather immature and the cooperation and mutual processes are continuously under development, particularly in relation to purchasing practices. Some exemplary views include “*that kind of professional housing management in Finland, it has not existed for long*” (housing management firm 1, customer relationship manager), and “*the industry, especially this kind of professional housing management, it is a little undeveloped field, or under development*” (Case 1: housing management firm 2, director of sales).

For instance, whereas in the commercial real estate industry the real estate investors exploit the purchasing competence and volumes of the large management companies, only defining the purchasing budget, in the residential real estate industry such a practice does not usually occur. Instead, the residential rental investors purchase and build their service supply networks themselves, leaving only the operational management to the external housing managers. Recently, however, the purchasing practices and cooperation in general between the residential real estate investors and the large housing management companies has begun to evolve, aiming to exploit the potential

economies of scale enabled by the large housing management companies' purchasing volumes.

The second service exchange category "**customer contact service**" by Investor 2 represents a centralized solution for managing information flows in the end-customer interface. The customer contact service receives calls from the residents regarding service needs, evaluates these needs, and further communicates the needs directly to the local service supplier. The outsourced customer contact service of real estate investor 2 (CS2), although a mature service in numerous other contexts, is a somewhat non-traditional solution in the residential real estate industry for handling the end-customer interface. In the traditional method of organizing end-customer interfaces in the field, the residents have direct contact information for the local housing managers and maintenance suppliers responsible for their housing location. In some cases, as for Investor 1 and the municipal housing company, this approach is supported by an in-house customer call center. Conversely, Investor 2 has centralized all end-customer contacts to two external service suppliers that provide customer contact service, each dedicated within their own geographical regions.

The purpose of initiating such a service is three-fold: to improve the operational efficiency of (1) handling end-customer interfaces; (2) transferring information about service needs throughout the network; and (3) monitoring the overall service conduct. Using a centralized customer contact center, housing managers' and service suppliers' workload is decreased by removing them from the direct customer interface; the customer's needs are analyzed according to predefined guidelines and process frameworks and further directed through the investor's ICT system directly to the actors that the service request concerns the most.

Finally, the service exchange "**technical maintenance**" (TM2) has traditionally been included in the basic maintenance and caretaking contracts, as in MC1, or even delivered with the investors' own assemblers, as in MC3. However, Investor 2 has separated technical maintenance service from other maintenance activities, outsourcing the service to three national suppliers. These three national suppliers deliver annual inspections of the technical properties and equipment in the buildings, such as heating, ventilation, air conditioning and cooling systems (HVAC), deliver on-the-spot repairs, and suggest renovation plans for the investor. The underlying reason has been the perception and past experience that the suppliers of basic maintenance and caretaking do not possess enough competence to deliver a sufficient service in more complex technical issues; therefore, specialized suppliers are needed to ensure proactive maintenance of the properties' technical conditions and thus prevent costly renovations.

"In the property interface, we have a separate technical maintenance since 2005, and there we have (two suppliers). This is because we perceived that the service concept with the traditional maintenance companies had become like... we conducted a highly detailed study about the backgrounds of employees in maintenance companies. There were about 600 persons [...] we found out how

often they change their jobs and which kinds of education they have, and from those we were able to conclude that the companies within maintenance business have a very varying level of task conduct, which is a risk from the investors' perspective, because those technical maintenance activities go often in a reactive direction, meaning fault-repair type of renovation. Meaning that they (technical components) are repaired when they break, which is the most expensive way on this technical side. So, proactive maintenance is important, and we began to emphasize that proactivity, and we separated the whole technical side (from other maintenance activities)" (Case 2: real estate investor 2, director of property management).

The "**apartment renovation**" service of the municipal housing company (AR3) is considered to represent an established service network within the municipal housing company's real estate management and maintenance service supply network because of its novelty and aim. The service exchange does not significantly differ from the ones purchased by Investors 1 and 2, but the solution is completely new to the firm and only recently adopted. The municipal housing company is the latest of the three buyers to adopt the model of pre-contracted renovation suppliers with fixed specifications and prices, having launched the model in 2012. The main purpose of the newly established service model has been to improve the predictability and control of costs for the renovations, thus aiming to improve service efficiency in the existing value system.

"This (apartment renovation) system has only recently been adopted, so it's new, and we are learning it on both sides (buyer and supplier) [...] Previously it was implemented so that we basically had fixed hourly prices for these contractors, ordered from them and then they supplied, and we were wondering how many hours were spent. Now, we changed this the other way round, and we standardized the unit-prices" (Case 3: municipal housing company, CEO).

As illustrated, because the model has been recently adopted and a significant amount of the renovations differ from each other in different locations and apartments, the new model continues to require learning and adaptations from both the buyer and the suppliers to become a standardized and stable way of service production.

Emerging component service networks

Three collaborations representing the **emerging service networks** were studied (SH1-3). These include three collaborative ventures for developing new senior housing concepts between residential real estate investors and nursing service providers, including differing levels of participation from the municipal social and welfare section, land use planning, and private and public funding instances. SH1 is a joint venture between two residential real estate investors and a nursing service provider, one of the investors being an insurance company and including a financial instrument as a key element in the joint concept. In addition to these three partnering organizations, municipal agencies

related to urban planning and social and welfare agencies have been closely involved as essential stakeholders when developing the pilot project for the concept. SH2 is a joint venture between a residential real estate investor and a nursing service provider, which developed the senior housing concept based on and partially in collaboration with a municipally driven development project. Other important key stakeholders in the collaboration were the Housing Funding and Development Agency and the Ministry of Environment in relation to building concept planning. SH3 is a joint venture between a municipal housing company, municipal social and welfare agencies and land use planning agencies, and a private nursing service provider. Similar to SH2, public housing funding and the Finnish Funding Agency for Technology and Innovation were closely involved in planning, negotiating and agreeing upon the building concept.

The three concepts and network collaborations seek to develop novel product-service concepts in the field that lacks existing, standardized concepts and cooperation models within the Finnish context.

“It is a kind of new concept, which has not been modeled from anywhere, and we don’t have such a type [...] that kind of models do not exist in Finland” (Case 4: real estate investor, initiating project manager).

In the networks, some of the actors have prior collaboration related to other businesses whereas some have no previous collaboration. In essence, the networks as such have not existed before the studied developments, thus consisting of both old and new actors established to accomplish mutual aims and to achieve joint and individual benefits.

5.2 Within-case analysis for the management of integration in the selected component service networks

5.2.1 Management of integration in the stable component service networks

The following integration mechanisms are used to manage integration in the stable component service networks (Table 15). The management of integration in the service category “*maintenance and caretaking*” involves the following impersonal and personal integration mechanisms. The maintenance service exchanges are built on detailed service specifications for programmed service activities according to the buyers’ maintenance manuals and the decision-making boundaries for implementing ad-hoc repairs and end-customers’ service requests.

“We have maintenance programs and cleaning programs in which the service frequencies are defined for each location; which things are implemented daily, which weekly, what is done twice a month, monthly, or whatever the interval is” (Case 1: real estate investor 1, director of property management)

For the most part, the conduct of services is monitored by the housing managers through invoices and the suppliers' reports to the buyers' ICT system, complemented with random field inspections and direct customer reclamations.

"Housing managers follow through the ICT system what happens in their properties. They follow daily those issues that consider them, where they have been appointed to conduct service tasks. They follow weekly the tasks they have ordered and have those progressed, and then in two week to monthly intervals they follow which other things happens in their properties" (Case 1 & 2: housing manager 1, customer relationship manager).

In addition to this type of regular monitoring, annual end-customer satisfaction surveys conducted by the buyers include questions about the service exchanges, except the technical maintenance of Investor 2. At the most advanced level, the municipal housing company has developed and attached an incentive system for the monitoring of maintenance and caretaking service quality that benefits the suppliers if exceeding the target quality levels and sanctions the suppliers for below-target quality annually.

"All tasks are listed and you give points whether the task is conducted or not. It's a dichotomy. And you collect points, where 8,000 is the target and 10,000 the maximum points. If one ends up under, the target pays us back. If one goes over, gets a bonus from us" (Case 3: municipal housing company, CEO).

The following personal mechanisms are used in supplier interfaces. Investor 1 communicates with the maintenance and caretaking suppliers at three levels as follows. The local housing managers meet their suppliers' foremen and conduct field visits in their locations one to four times per year. The investor's operational or middle management meets the suppliers' contract or customer relationship managers once annually to renegotiate their continuous service contracts. The investor invites all suppliers in the capital region, including customer relationship managers, local foremen, and even their employees to an annual partnership event of a more recreational nature.

"We organized a cooperation afternoon for those maintenance suppliers. We invited housing managers and everybody. [...] You need these kinds of interactions, and all the meetings and telephone communication and all. It brings more depth to it and you learn to know each other better, particularly if we search for partnering" (Case 1: real estate investor 1, director of property services).

Conversely, Investor 2 does not directly communicate with its caretaking suppliers, but each local housing manager meets the service suppliers' local foremen at least two times annually in the housing locations during spring and fall field visits.

Finally, the municipal housing company's housing management subsidiary conducts annual field inspections with the suppliers' local foremen to discuss and solve problems in relation to location-specific issues. This inspection is

complemented by monthly meetings between the housing management and the service suppliers' operational management several times per year, accompanied by the suppliers' contract managers, for reporting and reviewing monthly performance and issues in overall service supply.

“Ten times a year the service suppliers...actually this week is a meeting week. Now we discuss about what has happened in the properties, look at the results of technical field inspections, if there are unfinished work orders, i.e., go through the basic operations. Maybe go into some details but then talk about cooperation and what should be done, what has been agreed upon. It is a kind of general discussion, but then we have those basic issues that are gone through” (Case 3: municipal housing company's housing management, customer relationship manager).

Similar to Investor 1, the municipal housing company organizes an annual supplier event for all of its suppliers. During the events, the buyers review the supply performance of the past year, present their strategies for the next year, and award the best-performing suppliers and individual employees.

The management of integration in the service category “**cleaning**” is based on programming the service activities into the service contract and maintenance manual, including specifications about the frequency of cleaning activities in different spaces. The monitoring of service conduct and quality relies on invoices and ICT reporting, field visits conducted by the local housing managers and cleaning foremen, the results of the buyers' annual customer satisfaction surveys and direct customer reclamations. In addition, in line with the maintenance suppliers, the municipal housing company has also included the three separate cleaning companies in their quality incentive system. Personal integration with separate cleaning suppliers follows the same mechanisms as those in which cleaning is contracted from the same supplier that provides maintenance, as previously described.

The management of integration in service category “**apartment renovations**” for Investors 1 and 2 is characterized by only operational integration. Supplier integration relies heavily on standardizing the service contents, unit prices and predefined materials and designs that the contractors use for each type of renovation activity in the apartments.

“We have very specific models for how...the whole thing (apartment renovation) is modeled [...] pre-defined prices for renovations according to our quality classifications, so that when the housing managers place an order the contractors know exactly what kind of renovation and in which apartment they will do. [...] we have practically fixed all prices, so that we know what it will cost, or, at least we have unit prices. [...] and then we have materials negotiated, so that we use only (floor material from a specific supplier) and certain models from them, and they come with a certain price” (Case 2: real estate investor 2, director of property management).

Information concerning the conduct of services is primarily received by the housing management through invoices, suppliers' self-reports into the buyer's

ICT system, and direct customer reclamations. These are complemented with random field inspections during some of the renovations and systematic field inspections for evaluating and planning future renovations. Operational-personal integration does not occur systematically for each service exchange but primarily occurs between housing management and apartment renovation suppliers in case customer reclamations or other problems occur in the service delivery.

Table 15. Summary of practices for managing integration in the stable component service networks

Embedded case	Operational-impersonal integration		Strategic-impersonal integration		Operational-personal integration		Strategic-personal integration	
	Specifications, coordination	Monitoring	Strategic-impersonal integration		Formal	Informal	Formal	Informal
MC1 & CL1	Service descriptions Maintenance manual, tasks, quality-measures and frequencies MN1: Decision-making boundaries for service delivery	Random field inspections Results of customer satisfaction surveys (all customers) HM1: Monitoring service conduct through invoices	N.A.		Contract meeting once annually (re-negotiation; continuous contracts) HM1: Field visit and meeting 2 times annually (investor defined frequency and agenda) HM2: Programmed field visits between operational management at least once, usually 2-3 times annually	HM1: Needs-based telephone/email communication or joint field visit if problems in service delivery (e.g. customer reclamations)	Annual supplier afternoon (all suppliers from the capital region)	Occasionally, asking opinions (exploiting competence) from significant suppliers when developing own guidelines and processes Negotiating bids from suitable suppliers
MC2	Service descriptions Maintenance manual, tasks and frequencies Decision-making boundaries for service delivery	Customer satisfaction surveys (customer representatives) HM2: Monitoring service conduct through ICT	N.A.			HM2: Needs-based telephone/email communication or joint field visit if problems in service delivery (e.g. customer reclamations)		N.A.
MC3 & CL3	Service descriptions Maintenance manual, tasks, quality-measures and frequencies MN3: Decision-making boundaries for service delivery	Monitoring service conduct through ICT Results of customer satisfaction surveys (all customers) HM3: Monitoring service conduct through ICT	Incentive system for extra fees / sanctions from above / below target quality, based on annual quality evaluation (points)		Regular, monthly meetings together with housing management HM3: Field visits at least 2 times annually Field inspections with the supplier (technical quality)	HM3: Needs-based telephone/email communication or joint field visit if problems in service delivery (e.g. customer reclamations)	Annual partnership event	No systematic joint development, some project-based based on local needs with respective suppliers

Table 15. continues

Embed- ded- case	Operational-impersonal integration		Strategic-impersonal integration	Operational-Personal integration		Strategic-Personal integration	
	Specifications, coordina- tion	Monitoring		Formal	Informal	Formal	Informal
AR1	Detailed service descrip- tions	Random field inspections	N.A.		HM1: Needs-based contacting if problems in service delivery or customer reclamations Inspecting work conduct and employee records randomly in some reno- vations		N.A.
	Predefined prices for each renovation item	Customer reclamations HM1: Monitoring conduct from invoices; random field inspections					
AR2	Predefined materials and material suppliers	HM1: Ordering directly from suppliers	N.A.		HM2: Needs-based contacting if problems in service delivery or customer reclamations		N.A.
	Predefined prices for each renovation item	Customer reclamations HM2: Monitoring conduct through ICT					
	Predefined materials and material suppliers	HM2: Ordering through ICT					

5.2.2 Management of integration in the established component service networks

The following integration mechanisms are used to manage integration in the established component service networks (Table 16). The management of integration in service category “**housing management**” is characterized by an extensive use of all four types of integration mechanisms between the buyer and the suppliers. The buyers use detailed service specifications and maintenance manuals, predefined performance indicators for property management, annual maintenance and renovation budgets, and decision-making boundaries for the housing management to operate and purchase services within their annual budget. In addition, some key operating areas from the buyer’s perspective are attached to an incentive system that may benefit the supplier in case the targets are exceeded.

“We have certain price mechanisms attached to performance measures in these (housing management) partnerships [...] we have four measures, including customer satisfaction, occupancy levels, energy, and maintenance costs, which are compared to the (national property maintenance index)” (Case 1: real estate investor 1, director of property services).

The progress of maintenance activities and related performance indicators are monitored through the buyer’s information systems, based on the cumulative information received from a variety of sources, such as invoices, rental incomes, supplier reports, and customer satisfaction surveys.

Four forms of personal integration occur at different organizational levels. First, a vast amount of daily issues are solved through telephone and email communication between the buyer and the supplier at the operational level. Second, the performance and identified problems in maintenance are discussed in programmed, monthly meetings between the buyer’s functional manager and the supplier’s customer relationship manager. In addition to a preset agenda for systematically discussing monthly issues, the meeting includes the mutual planning of future service operations based on the suppliers’ suggestions. Third, the two investors’ regional real estate managers visit the housing managers’ local foremen at their local offices several times annually to discuss and solve local issues in service delivery. Fourth, strategy level meetings aimed at developing cooperation and overall processes related to real estate management and maintenance occur two to three times annually, involving contract owners and sometimes the companies’ CEOs.

The management of integration in the service category “**customer contact service**” involves the following integration mechanisms. The buyer has defined in detail the process blueprint and list of questions through which customer contacts are received, the customers’ problems are identified, and the service requests directed to the correct supplier in the supply network through the ICT system.

“We have created service paths, meaning that those requests (from residents)...it is not just a call center, but we have a very specific concept through which the faults are solved, and that we could inform already during the phone call what the residents should do” (Case 2: real estate investor 2, director of property management).

The service conduct is primarily monitored by the buyer through the information system based on the supplier’s monthly reporting and predefined performance indicators, such as response times and the number of customer contacts in a same issue before the issue has been solved.

The buyer and the customer contact service’s representatives communicate only on an ad-hoc basis, primarily in case the buyer’s operating system does not function sufficiently to facilitate the service. With the purpose of electronically transferring information about the customers’ service requests, the customer contact service does not have direct contact information for the housing management or other service suppliers. Operational-personal communication has only occurred between the customer contact service and the local housing management when launching the service in new regions. These are also the occasions when more frequent joint development has occurred between the buyer’s and the customer contact service’s contract owners, up to six times annually. In other cases, during ongoing service exchanges, the buyer and the customer contact service’s representatives meet two to three times annually to report service performance based on predefined key performance indicators (KPIs) and to discuss possible systematic challenges in the service and in future developments, primarily in terms of extending the cooperation to housing locations in new geographical regions.

The management of integration in service exchange “**technical maintenance**”, similar to other maintenance and caretaking services, is first and foremost impersonalized into the maintenance manual. This category includes service descriptions, including tasks and frequencies, for inspections and repairs, process framework for conducting and reporting the inspections, and decision-making boundaries for conducting on-the spot repairs. The conduct of inspections and proactive maintenance is monitored through the suppliers’ self-reporting in the ICT-based maintenance manual, supplemented with approximately 20 random field inspections nationally. In addition, the three technical maintenance suppliers are affiliated with the same financial incentive system for energy cost savings as housing management.

“One is energy savings, meaning that they get a certain bonus in a region, that’s for housing management and technical maintenance suppliers, so energy savings partly considers more than one service contract. Why we have that as one is because energy prices are rising in the long run. And it is quite a nice incentive, for a one percent saving, if we think about heating costs that are approximately ten to twelve million, then one percent saving is quite a lot, let alone if talking about five percent savings. The financial impacts in a firm of this size are quite extensive” (Case 2: real estate investor 2, director of property management).

Personal integration occurs both at the operation and the strategic levels. First, Investor 2's manager of technical maintenance and the technical maintenance suppliers' customer relationship managers meet each month to report and discuss the results of inspections and future renovation needs. Second, a more strategic level meeting occurs once or twice per year between the contract owners to discuss joint developments in the technical maintenance operations within the cooperative relations. In addition, occasional recreational events are organized to develop relationships between the buyer and the suppliers' middle or operational managers.

Finally, the management of integration in the service exchange AR3 is otherwise similar to AR1 and AR2, with the exception of additional personal integration. The municipal housing company is the only buyer that has direct communication with the "**apartment renovations**" suppliers when meeting them in a joint meeting once or twice per year.

"We organize a larger meeting a few times a year, in which all the contractors are present at the same time, and where we discuss issues that have come up [...] it is really this kind of flexibility of task implementation, finding suitable solutions if there are flaws, and in general this kind of chemistry between people [...] each and every conducted task is not inspected, but its more through spot checks" (Case 3: municipal housing company, property manager).

Table 16. Summary of practices for managing integration in the established component service networks

Embedded case	Operational-impersonal integration		Strategic-impersonal integration		Operational-personal integration		Strategic-personal integration	
	Specifications, coordination	Monitoring	Integration		Formal	Informal	Formal	Informal
AR3	Detailed service descriptions	Customer reclamations						
	Predefined prices for each renovation item	HM3: Monitoring conduct through ICT Random field inspections	N.A.		HM3: Inspecting work conduct and employee records randomly in some renovations		Joint meeting 1-2 times annually with all suppliers to discuss about past and current issues and development needs in the service	
HM1	Detailed service specifications	Monthly reporting using KPIs	Incentive system for gaining extra fees from energy-related cost savings		Programmed operational meetings 7-8 times annually (functional); includes development-oriented discussion		Strategy level meetings 3-4 times annually (contract owners)	
	Annual budget for maintenance	Monitoring progress in KPIs through ICT					Annual supplier event	
HM2	Decision-making boundaries for purchasing services	Results of customer satisfaction surveys (all customers)					Occasional recreational events	
	Detailed service specifications	Monthly reporting using KPIs	Incentive system for gaining extra fees from energy-related cost savings		Monthly meetings 9-10 times annually (functional)		Strategy level meetings 1-2 times annually (contract owners)	
HM2	Annual budget for maintenance	Analyzing costs and service conduct through ICT			Local meetings 1-4 times annually (operational)		development-oriented Annual meeting between HM2 and market- ing for discussing about mutual interfaces	
	Decision-making boundaries for purchasing services	Results of customer satisfaction surveys (customer representatives)			Annual budgeting meeting involving all suppliers			
	Monthly reporting using KPIs							

Table 16. continues

Embed- ded- case	Operational-impersonal integration		Strategic-impersonal integration		Operational-Personal integration		Strategic-Personal integration	
	Specifications, coordination	Monitoring	Integration		Formal	Informal	Formal	Informal
CS2	Service description Predefined list of questions to be asked from the customers; linked to ICT (directing service requests)	Monthly reporting based on defined KPIs Monitoring through ICT (e.g. response times etc.) Results of customer satisfaction surveys	N.A.			Irregular, needs-based contacting at operational issues or if perceived urgent problems in service delivery	2-3 meetings annually between contract owners for discussing about possible developments in cooperation	When launching or extending cooperation: Frequent, irregular contacting and collaboration between contract managers (and HM2)
TM2	Service descriptions for inspections and repairs Process framework for inspections Maintenance manual, tasks and frequencies Decision-making boundaries for repairs	Monitoring service conduct through ICT Random field inspections (20 properties annually) Customer reclamations Information about service conduct from HM2	Incentive system for gaining extra fees from energy-related cost savings		Regular, programmed monthly meetings at contract level HM2: Programmed meetings between operational management 2-3 times annually	HM2: Needs-based communication in operational issues weekly/monthly (e.g. suggestions and acceptance for repairs)	Programmed, strategy level meetings 1-2 times annually, development-oriented Discussed about service contents in advance with all potential suppliers before bidding	Occasional recreational meetings, 1-2 times annually Discussing about service contents in advance with all potential suppliers before bidding

5.2.3 Management of integration in the emerging component service networks

The following integration mechanisms are used to manage integration in the emerging component service networks (Table 17). Three primary mechanisms were used to manage integration within the first senior housing concept development network (SH1). First, the cooperation between the three focal actors was based on a collaboration contract of a framing type. The collaboration contract included only general objectives, the overall content of the concept, the basic roles of each actor (however, the more specific responsibilities of each actor were left undefined), and rules for terminating the cooperation, including the ownership of immaterial rights. Apart from these, the majority of concept specifications were not known or not included in the contract.

“The collaboration contract is a kind of framing one, meaning that it is not highly detailed, but it sort of cites to, there are citations to business strategy, which is still a sort of strategy that is adjustable, so that there are elements that can change” (Case 4: investor, director, financial services unit).

Second, the idea of the concept was developed in a two-day workshop, in which top management representatives of the focal actors gathered and jointly set the direction for the concept’s contents and for continuing the cooperation. The same group of representatives was later appointed as the steering group of the cooperation, gathering bi-annually to review past developments and plan and agree upon future development steps. Third, three development teams were established for developing different issues within the concept. The development issues included property development, service design, and marketing, each directed by some of the focal actors based on their core competencies.

“We had these task forces under the steering group. There was a product group and then we had a technical building group. Then, at one point we had a marketing group. We had these kinds of sub-groups which then implemented their own areas of responsibilities and reported to the steering group” (Case 4: investor, CEO).

Thus, whereas the teams represented a mechanism for integrating the knowledge of the specialized actors within each development function, the steering group represented an effort towards cross-functional integration by synthesizing the developments of the functional teams.

The following mechanisms were used to manage integration in the second senior housing concept development network (SH2). An essential element in the concept development and cooperation has been the evolving contracts of increasing detail between the real estate investor and the nursing service supplier. Although the actors ended up in the project through top management initiatives, cooperation itself did not have explicitly documented specifications or guidelines. Instead, the contracts between the partners and with future end-customers were developed as the cooperation evolved, resulting in detailed

descriptions about the contents of the concept and the responsibilities of each actor.

Collaboration occurred within each development function, managed by responsible managers that formed working pairs. The collaboration included the managers who initiated and developed the first ideas about the concept, the construction project manager and respective service manager of the nursing service supplier, a manager and a staff member from the real estate investor's rental service and the nursing service supplier's service coordinator, as well as contract managers from both actors. The main principle for the working pairs' communication was needs-based and often frequent, including jointly agreed upon meeting arrangements. In addition, information transfers from one development stage to another have been facilitated via a start-up meeting that included the participation of managers from both the ending and the beginning stage.

Whereas the working pairs in each development stage and function have responded regarding the development stage in question, the working pair of two contract managers has been the main integrative structure for codifying the emerging information in different functions and development stages into the collaboration contracts. Moreover, the real estate investors' project manager has acted as one of the main coordinators in the collaboration from the perspective of building design and construction.

“A project manager has, of course, led the development, and he has his own group, including the designers and contacts to (the public housing funding agency). And then there is me and our lawyer, and then (name of the manager of residential services) has come along during the last year, when we have needed to agree upon responsibilities and what happens in the location during occupation. And from the (nursing supplier's) side there have been (name of the contract manager) and (name of the CEO)” (Case 5: real estate investor, contract manager).

Thus, the concept and project development has not established a formal steering group that would have possessed decision-making authority over the entire concept and project development. Instead, the responsible managers have made decisions through collaboration within each development function and stage. Furthermore, cross-functional information sharing has mainly been needs-based and conducted via the project manager and/or contract managers functioning in liaison roles in the network.

One exception to this approach has been the formation of a temporary steering group for a development project related to designing multi-use and flexible-space concepts, which met 15 times during the concept and property development. Both the focal actors and the representatives from key stakeholders, such as the municipal social and welfare agency, the public housing funding agency and the housing section of the Ministry of Environment, participated in the meetings. Based on the steering group meetings, a public case report was compiled regarding the project, particularly focusing on the early stages of the concept and project development and describing the technical novelties in

the property design for future similar projects to exploit. Another exceptional feature of the concept development was the construction of a model room in the real estate investor's headquarters. The model room was used for the following two purposes: to use focus groups to test and possibly modify the design solutions before the actual apartments were built and to arrange pre-showings of the apartment for possible future tenants.

Three main mechanisms were used to manage integration in the third senior housing concept development network (SH3). First, a highly detailed collaboration contract was developed during the collaboration by the municipal geriatric care agency within the described separate development project. The contracts included, among other issues, detailed descriptions of the services and responsibilities of each actor; methods for evaluating service needs, conducting service plans, and refining the plans; and methods for controlling service quality. These were also frequently exploited and reviewed when problems in the collaboration have arisen that needed to be solved and settled.

“When we have a long-term contract, and if conflict situations arise, we go through the contract very carefully. [...] There should not be issues that are only informally discussed, but that they are documented. We have official memos of these joint meetings with (the service supplier). And if there are reclamations or something to develop, we will return to what has previously happened and name persons in charge to drive the development” (Case 6: municipal geriatric care, director, long-term care).

Not included in the contracts and documents, however, were more operational issues and interfaces, such as invoicing arrangements or communication channels and principles, which were jointly developed along the way when facing unsolved issues.

Second, the different stages of concept and project development were organized using development teams, responsible project managers, or named operational working pairs. For instance, a number of individuals, including the municipal housing company representatives, functional management and some operational management representatives from the municipal geriatric care and the architect gathered multiple times to review, discuss, and negotiate the building plans from the service supply perspective.

“We took with us to planning meetings representatives of the geriatric care, so that we would not miss anything. That I don't know how good the results that we achieved were, but there were always manager-level representatives [...] they know better where the toilet seat must be or some hook. They have the perspective and understanding for the spaces” (Case 6: municipal housing company, project manager).

The CEO or project manager of the housing company discussed and negotiated the building plans further with the public housing funding agency. Similarly, the municipal housing company consulted different types of service equipment providers suggested by the municipality to understand the service requirements for the building design. When service operations began during

the project development, working pairs were formed between the municipal geriatric care agency and the nursing service supplier for frequent meetings and negotiations about the conduct of services.

Third, a steering group was formed from the key individuals of each focal organization. The CEO of the municipal housing company and the directors of the municipal geriatric agency, the nursing service supplier, and the real estate management and maintenance service supplier gathered regularly, approximately three times per year, to review and negotiate issues that had occurred in the concept development. After the service supply had begun, the steering group gathered approximately three times per year to review service implementation and to solve problems regarding cooperation or disputes about the responsibilities of each actor.

Table 17. Summary of practices for managing integration in the emerging component service networks

Embed- ded- case	Operational-impersonal integration		Strategic-impersonal integration		Operational-personal integration		Strategic-personal integration	
			Formal	Informal	Formal	Informal	Formal	Informal
SH1	Framing contracts (loosely defined general goals); long-term; low detail in concept specifications; no detailed operational interfaces Steering group memos Initial concept design documents	Special investment: Joint investments for designing the concept's visual outlook and marketing material	During concept planning: Functional development teams (real estate, service design, marketing)	During concept planning: Marketing the concept and pilot project in the target municipality's key stakeholder agencies (urban planning, long-term care)	In the beginning: A two-day workshop for crafting initial concept design During concept planning and implementation: Cross-functional steering group (contract managers), meetings 2/y.	In the beginning: Preliminary meetings / discussion with potential partners about concept ideology and willingness to engage in joint development		
SH2	Evolving collaboration contracts; 10 years; increasing detail during cooperation Marketing material (detailed concept design documents, service pricing)	Special investment: Model room in the real estate investor's headquarters (testing room design with focus groups; pre-marketing to potential residents) Publicly funded development project and public project report (for property design, modularity of spaces)	During concept planning and implementation: Assigned functional working-pairs and responsible managers (concept planning, marketing) Cross-functional liaison roles (contract managers) During construction stage: Monthly site meetings (operational management);	During concept planning and implementation: Needs-based communication and informal agreements about developments and cooperation within functions (working paired)	During concept planning and implementation: Functional meetings (every 1-2 months; needs-based) Formal, temporary cross-functional steering group for technical property planning (15 meetings)			
SH3	Detailed service and rental contracts; 4-8 years; high detail in service specifications developed during building concept design; Lacking some operational interface details (processes interfaces) Detailed bidding documents for service contracting	Special investment: A separate, publicly funded development project for developing a zero-energy building within the concept; Documented and publicly-shared information about the concept	During concept planning and implementation: Functional development team and planning meetings Assigned project manager and responsible managers from focal organizations	During concept planning and implementation: Needs-based, cross-functional communication and meetings between responsible managers (contract-owners) After beginning operations in the first stages of concept development: Operational level needs-based communication daily / multiple times a week (between responsible individuals)	After beginning operations in the first stages of concept development: Formal steering group (contract-owners), 1-2 meetings annually Director of long-term about initiating and developing the concept			

5.3 Study I: The management of integration characterizing stable, established, and emerging component service networks

5.3.1 Overview of the study

This section presents a case study analysis of the management of integration in strategic component service networks. Specifically, the study examines integration mechanisms and uncertainties characterizing different types of component service networks for explaining similar patterns of integration management within network types. The studied component service networks are divided into three groups of ideal types of strategic networks – stable, established, and emerging – as originally proposed by Möller and Svahn (2004). The management of integration is viewed from the information-processing perspective (Galbraith, 1973) and analyzed in the networks based on the four types of integration mechanisms (see Section 3.2, Figure 4). The uncertainties characterizing the networks are analyzed based on the general sources of organizational uncertainty (see Section 3.3, Table 5). In total, fifteen component service networks presented in the previous section (Section 5.1, Table 14) are analyzed.

The study formulates 11 empirically grounded theoretical propositions, resulting in middle-range theorizing (Burgeois, 1979; Corley and Gioia, 2011) on the management of integration and uncertainty that characterize and distinguish between stable, established, and emerging component service networks. The general argument is that different sources and levels of uncertainty characterize the three ideal types of strategic component service networks, creating differing integration requirements within the network. Furthermore, these requirements reflect the different integration mechanisms used for managing integration in the networks. The results of the cross-case analyses for each ideal network type are presented next.

5.3.2 Results of cross-case analysis for the stable component service networks

The management of integration in stable component service networks builds on integration types one and two. In particular, the following patterns of integration mechanisms are utilized across the studied networks. The first feature is the reliance on operational-impersonal integration using detailed contracts and service specifications for defining tasks to be performed. The maintenance service exchanges are built on detailed service specifications for programmed service activities according to the buyers' maintenance manuals and decision-making boundaries for implementing ad-hoc repairs and end-customers' service requests. The conduct of services is coordinated and monitored first and foremost using information and communication technology based on end-customers' service requests and the suppliers' service reports. Finally, the focal organizations or their outsourced suppliers conduct technical inspections of

the properties to evaluate the service quality and to identify possible needs for more extensive maintenance or renovation activities in the future.

Second, two operational-personal integration mechanisms appear in all of the studied cases. First, local supervision is maintained through systematic or random field visits. Second, possible deviations from standard procedures and quality are discussed and solved at the operational level where the information of service performance locate and where service delivery can be directly influenced upon. As an illustration, in the two maintenance and caretaking cases, personal integration occurs at operational level between the operational management several times per year, sometimes also including the service staff when conducting field visits in the housing locations. A more informal, needs-based personal integration primarily occurs between local housing managers and the service suppliers' local foremen in case customer reclamations or other problems occur in the service delivery. Problem solving is elevated to a functional management level only when problems cannot be solved and negotiated at the operational level. Based on the empirical evidence, two propositions for the management of integration in stable component service networks follow:

Proposition 1.1a: Stable component service networks are associated with high levels of impersonal integration for managing integration, as reflected in detailed contracts, service specifications, and responsibilities of each actor, and the impersonalized monitoring of service performance within the network.

Proposition 1.1b: Stable component service networks are associated with personal integration between organizations at the operational level for managing integration, as reflected in programmed and ad-hoc local level operational management meetings between the exchanging actors within the network.

The following similarities in uncertainties characterize the studied stable component service networks (Table 18). First, the fields of maintenance and caretaking, cleaning, and apartment renovations are highly mature. The offerings for the maintenance and caretaking as well as cleaning functions represent "off-the-shelf" type of services, with standardized service models. Similarly, the construction work itself in apartment renovations is considered to be relatively simple and traditional work conducted by the building contractors. The supply markets in all the three consist of a vast number of both small and large suppliers, where suppliers are often selected through price-based bidding competitions with detailed quotations. Finally, both the focal organization, i.e., the real estate investors or their housing managers, and the service suppliers operate primarily within the same industrial domains of the real estate and construction sectors.

The only common source of uncertainty in the studied networks is related to the complexity of the supply network, involving a varying number of service suppliers. From an information-processing perspective, the network involves a significant amount of performance units, i.e., local service organizations or renovation contractors, whose activities must be coordinated and controlled. The large number of operating units and their geographical fragmentation has

at least two consequences. First, because the service supply networks include a number of actors and their service staff operating in the different locations and regions, the networks may also have varying goals, operating cultures, perceptions about the service quality, and motivations to conduct the services. Second, information about service performance and possible deviations from targeted performance is *dispersed* into the housing locations, operating individuals and end-customers at the service locations. These require standardized value production across the performance units, in addition to information needs about possible deviations from the set value production standards among those geographically dispersed performance units. A proposition follows:

Proposition 1.2: In stable component service networks, the main contingency factor causing uncertainty is the complexity of the supply network and the resulting heterogeneity of service supply and the dispersion of information regarding service performance.

Table 18. Uncertainties in the studied stable component service networks

Case	Uniqueness	Ambiguity	Complexity	Dependence	Difference
MC1 & CL1	Low uniqueness: Mature field; Continuous contracts (relationship durations vary)	Low ambiguity: Standardized service models; Detailed quotations	Low task complexity: Technologically simple service tasks High network complexity: Multiple (>80) suppliers, spatially dispersed;	Pooled: Independent tasks from other tasks/ suppliers	Low distance: Same industry (Real estate investing – Real estate services)
MC2	Low uniqueness: Mature field; Continuous contracts (relationship durations vary)	Low ambiguity: Standardized service models; Detailed quotations	Low task complexity: Technologically simple service tasks High network complexity: Multiple (136) suppliers, spatially dispersed	Pooled: Independent tasks from other tasks/ suppliers	Low distance: Same industry (Real estate investing – Real estate services)
MC3 & CL3	Low uniqueness: Mature field; Fixed-term contracts (3y.) Cooperation with current suppliers: 3 – 9 years	Low ambiguity: Standardized service models; Detailed quotations	Low task complexity: Technologically simple service tasks Moderate network complexity: A few (7) suppliers, spatially dispersed	Pooled: Independent tasks from other tasks/ suppliers	Low distance: Same industry (Real estate investing – Real estate services)
AR1	Low uniqueness: Basic/traditional construction work; Fixed-term contracts (1-2y.)	Low ambiguity: Standardized renovations; Detailed quotations	Low task complexity: Technologically relatively simple construction tasks High/Moderate network complexity: Multiple (15-20) regularly utilized suppliers, spatially dispersed	Sequential: Requires need identification and order from housing manager; Matching scheduling with marketing	Low distance: Closely related industries (Real estate investing – Construction)
AR2	Low uniqueness: Basic/traditional construction work; Fixed-term contracts (1y.)	Low ambiguity: Standardized renovations; Detailed quotations	Low task complexity: Technologically relatively simple construction tasks High/Moderate network complexity: Multiple (12-15) regularly utilized suppliers, spatially dispersed	Sequential: Requires need identification and order from housing manager; Matching scheduling with marketing	Low distance: Closely related industries (Real estate investing – Construction)

Where the networks differ with regards to uncertainty, is in the interdependence of task implementation; service activities are either pooled or sequentially dependent on other activities in the supply network. The service supply in

maintenance and caretaking and cleaning service is independent or pooled from other tasks and suppliers within the supply network, undertaken mostly on a continuous basis without receiving input from or producing output for other supply activities. The construction work in apartment renovations involves a more sequential pacing with housing management and the real estate investor's marketing and sales; housing managers provide input to the service through apartment inspections and work ordering, and the construction work produces an output for marketing and sales to show and lease the apartments for the next residents. However, in the studied networks, these interdependencies seem to be handled primarily by impersonalized or programmed information transfer about the pooled service conduct and the sequential service processes.

“Technical apartment inspector goes through the apartments always when a tenant moves out. He/she has seven days time to do that after the notice is given. He/she goes through the apartment and defines what needs to be done. The inspection formula is filled in, and the order for the contractors is placed in the (information system). And the contractors get it (the order) from (the information system). They previously got it through email, but now they are attached to (the information system), so they get it from there.” (Case 1, real estate investor 1, regional manager)

The findings align with previous studies proposing that stable networks are characterized by relatively well-known value activities, actors, technologies and business processes, aiming for production efficiency (Möller and Rajala, 2007). Hence, task uniqueness, ambiguity, and complexity are relatively low, as are differences or distances between the actors that are often familiar with each other, or at least with the common operating principles in the field. However, although maintenance and caretaking, cleaning, and renovating services are rather standardized services (Axelsson and Wynstra, 2002), the human centricity of service supply (Grönroos, 2007) yields a heterogeneity of service conduct and performance locally. Moreover, information about service performance and deviations from output standards is dispersed into the production system locally to those individuals who are conducting and perceiving the service, i.e., the service staff and the end-customers. The larger and relationally complex the supply network becomes (Choi and Krause, 2006), the higher the uncertainty in relation to achieving stable value production is.

From an information-processing perspective, it appears that stable component service networks handle syntactic boundaries between organizations, in which sufficient common knowledge exists to specify the differences and dependencies of consequences at the boundary, and the primary concern is to transfer explicit information between organizations (Carlile, 2004). One key issue in managing stable networks is then to standardize and economize information transfer about the value production standards and to build mechanisms for identifying and solving local deviations and possible problem causes in value production. In general, a systematized mode for structuring work is used when the task is relatively stable and requires at most minor alterations

in work methods or procedures for task performance (Van de Ven and Delbecq, 1974). Given the main objective of stable networks to maximize efficiency and effectiveness in value production (Möller et al., 2005), one key requirement for management is to reach a high level of information codifiability and transparency to economize the coordination of the standardized value activities (Möller and Svahn, 2006). The extensive use of impersonal integration mechanisms is then explained by its sufficient information-processing capacity to transfer information between organizations in standardized, simple, and discrete tasks (Simonin, 1999). At the same time, this standardization of output, standardization of work, or planning will reduce the effort required to implement operational organizational integration (Barki and Pinsonneault, 2005: 172).

Despite of high levels of standardization, deviations may occur in service conduct and quality for numerous reasons. First, the individual service staff may lack skills to conduct the service activities defined in the maintenance manual for maintenance, caretaking and cleaning or guidelines for a method of construction in apartment renovations. Given the dispersion of information about service conduct and performance, identifying deviations occurring at the local level and solving them as efficiently as possible becomes a key requirement for sustaining efficient and effective value production, particularly in terms of stable quality. In such a decentralized production structure as component service supply, where the individual members of the service staff are responsible for service performance, infrequent exceptions should be handled by those in closest contact with the production process (Perrow, 1967). The use of personal integration mechanisms at the operational level is explained by its greater impact on organizational effectiveness than on the implementation of functional organizational integration (Barki and Pinsonneault, 2005).

A second and more frequently occurring explanation in the empirical data for deviations relates to the motivation and commitment of the service staff to conduct the standardized, often simple services contracted with the lowest price by the real estate investors. In such as case, a complementing explanation for operational-personal integration is that building relationships and enhancing the motivation and commitment of the service supplier, its local foremen, and service staff towards the value activities of the focal organization may prevent unnecessary deviations from production standards. Thus, in stable component service networks, one can expect to find practices that serve the purpose of building trusting relations between the operational management and service suppliers as well as their individual service staff towards the focal actor's value processes. The notion is also supported by findings for the evolution of inter-organizational governance structures, where familiarity and trust between the exchanging actors may substitute for the use of more formal integration mechanisms, increasing production effectiveness and firm performance (Gulati, 1995; Gulati and Nickerson, 2008; Ring and Van de Ven, 1994).

5.3.3 Results of cross-case analysis for the established component service networks

Common for the studied established component service networks is their reliance on types one and three integration. The five established component service networks are characterized by similar impersonal integration mechanisms as those previously described for the stable component service networks. These mechanisms include detailed service specifications and quotations, ICT-based monitoring of service conduct, including various key performance indicators, maintenance manuals for housing management and technical maintenance for itemizing service tasks, their frequency, or technical outcomes, and a process blueprint for the customer contact service to receive, process, and direct end-customers' service requests.

Personal integration in the established networks appears commonly at functional management and/or contract-owner levels. As an illustration, the investors' functional management, often the property managers and directors, meet with their counterparts, usually customer relationship managers or contract owners, on a regular basis to review past service conduct and performance, identify local problems in the service, find solutions to those problems, and discuss possible future developments. In the case of housing management and technical maintenance, the meetings occur monthly, excluding general holiday seasons, and for the customer contact service approximately three to six times per year, depending on whether new extensions are taking place. In addition, the service networks are attached to the investors' ICT-based maintenance manual, including the monthly reporting of similar issues discussed in the regular meetings. Finally, apartment renovation networks in the municipal housing company hold a joint meeting several times per year, in which the buyer and the contracted suppliers jointly review issues that have developed in service conduct and cooperation. Based on the empirical evidence, two propositions follow:

Proposition 1.3a: Established component service networks are associated with high levels of impersonal integration for managing integration, as reflected in detailed contracts, task specifications and/or process blueprints, and the responsibilities of each actor within the value network.

Proposition 1.3b: Established component service networks are associated with using functional information integrators for managing integration, as reflected in programmed functional management and/or contract-owner meetings among the collaborating actors and using ICT-applications to gather and analyze local information system-wide.

A unifying feature in the sources of uncertainty cannot be found across all the studied established component service networks. Instead, the studied networks are characterized by a moderate level of uncertainty in at least one or two task-related sources of uncertainty – uniqueness, ambiguity, complexity, and dependence (Table 19). First, although the basic housing management service generally has established traditions and standardized service models, the sourcing practices in customer service and separated technical maintenance are newer solutions in the residential real estate sector. Apartment ren-

ovations purchased by municipal housing companies fall somewhere in between, the service in itself being a traditional construction service but the model of purchasing being new to the firm.

Table 19. Uncertainties in the studied established component service networks

Case	Uniqueness	Ambiguity	Complexity	Dependence	Difference
HM1	Low uniqueness: In between mature (local suppliers) and immature field (national suppliers); Cooperation since: 2005 – (2 long-term partners)	Low task ambiguity: Standardized service model; Detailed quotations;	Moderate task complexity: Technologically simple service tasks; Reporting and planning maintenance of the whole building stock Multiple mutual interfaces with the focal organization's business processes Low network complexity: 2 suppliers, national	Pooled/ Sequential: Independent supervision of service activities; Coordination required with rental service or investing when renovating apartments/ properties	Low distance: Same industry (Real estate investing – Property management)
HM2	Low uniqueness: In between mature (local suppliers) and immature field (national suppliers); Cooperation since: 2003 – (2-3 long-term partners)	Low task ambiguity: Standardized service model; Detailed quotations;	Moderate task complexity: Technologically simple service tasks; Reporting and planning maintenance of the whole building stock Multiple mutual interfaces with the focal organization's business processes Low network complexity: 3 suppliers, national/local	Pooled/ Sequential: Independent supervision of service activities; Coordination required with rental service when renovating apartments/ properties	Low distance: Same industry (Real estate investing – Property management)
CC2	Moderate uniqueness: New sourcing model in the field of residential real estate sector; Cooperation since: 2008 – (2 suppliers)	Moderate ambiguity: Functionality of the service not immediately perceivable, only with delay when direct customer reclamations or analyzing service conduct data	Low task complexity: Technologically simple service task; Multiple end-customer contacts daily with varying information that needs to be processed for deciding upon correct services and suppliers Low network complexity: 2 suppliers, national	Sequential: Transforming information from end-customers to service requests for the suppliers (input) to perform service activities (output)	Moderate distance: Different, but related industries (Real estate – Security services)
TM2	Moderate uniqueness: New sourcing model in the field of residential real estate maintenance; Cooperation since: 2005 – (2-3 suppliers)	Moderate ambiguity: Outcomes and benefits of the service not immediately perceivable, only in delay when comparable with long-term development of maintenance and renovation costs	Moderate task complexity: Involves technically specialized competence; A variety of building parts to be inspected, analyzed, and repaired; Analyzing and planning maintenance and renovation of the whole building stock Low network complexity: 3 suppliers, national	Pooled: Independent tasks from other tasks/suppliers	Low distance: Same industry (Real estate investing – Real estate services)
AR3	Moderate uniqueness: New operating/contracting model for the firm; Cooperation since 2012; Fixed-term contracts (1-2y.)	Low ambiguity: Standardized renovations; Detailed quotations	Low task complexity: Technologically relatively simple construction tasks Moderate network complexity: Multiple (10-12) regularly utilized suppliers, spatially dispersed	Sequential: Requires need identification and order from housing manager; Matching scheduling with marketing	Low distance: Closely related industries (Real estate investing – Construction)

Second, in customer contact service and technical maintenance, the outcomes and benefits of the service are more ambiguous because the overall performance is perceived only in delay. Whether the customer contact service effectively analyzes the service needs and directs them further correctly is revealed only if the end-customers at some point notice and make a reclamation regarding delays in service delivery or the investor analyzes data on the re-

sponse times and service delivery speed from the ICT. The effectiveness of the technical maintenance has an even longer interval; the benefits of such proactive service are visible only when future renovation needs and costs occur or do not occur in the housing properties in comparison to renovations needed and conducted in previous years.

Third, the type and level of complexity also varies among the cases. Whereas housing management and customer contact services are technically rather simple services, technical maintenance involves more specialized competence in comparison to basic maintenance, caretaking and cleaning activities. Task complexity for housing management relates to the multiple interfaces between the management services with the buyer's business processes, such as real estate investing and renting. In customer contact service, task complexity derives from the high amount of service occasions and the types of problems that must be solved. In the apartment renovation service network, the primary source of complexity is mainly relational because the supply network involves 10 to 12 regularly used suppliers.

Finally, whereas technical maintenance, like basic maintenance and caretaking, is an independent or service activity pooled from other tasks and activities, housing management, customer contact service, and apartment renovations involve sequential elements of service supply. For instance, the primary role of the customer contact service is to function as an information mediator or broker between the residents and service suppliers. The residents' inquiries and service requests function as inputs for the service, and the customer contact suppliers' information delivery provides input for the service suppliers to take over the service activity.

Proposition 1.4: In established service networks, the main contingency factors causing moderate levels of uncertainty include novelty and ambiguity about service effectiveness and/or mutual interfaces and dependencies between the actors' processes.

Established networks are merely an extension of stable networks. Accordingly, the stable portions of the value activities and their coordination attempt to economize using impersonal integration mechanisms. As an extension to stable networks, established networks incrementally develop the value production system through local improvements (Möller et al., 2005). Rather than emphasizing the identification and solving of occasional local deviations from the value production standards, the focus is on identifying and analyzing systematic local inefficiency or ineffectiveness and developing solutions for system-wide local improvements.

One key issue in established networks is to create an effective knowledge-sharing network (Dyer and Nobeoka, 2000) to exploit and expand the specialized knowledge of the network members through collaborative learning (Möller and Svahn, 2006). This type of learning from failures (Ariño and de la Torre, 1998) is also referred to as coordination by feedback (March and Simon, 1958), using personal integration mechanisms for managing uncertainty (Thompson, 1967; Van de Ven et al., 1976). Whether novelty and ambiguity or

complexity and dependency occur in the network, the resulting higher uncertainty, in comparison to stable networks, creates additional integration requirements within the network. This scenario is further reflected in the use of additional integration mechanisms to increase the network's information-processing capacity. In the established component service networks, the processing of local information at the system level is developed using personal integration mechanisms at functional management and/or contract-owner levels.

One explanation for personal integration at functional or contract-owner levels relates to the previously described feature of work and information dispersion in stable component service networks, where information about the service conduct and performance is dispersed to the operational units delivering the service and the customers receiving the service. To develop the service activities and processes more efficiently and effectively, an integration of this locally dispersed information is required for conducting system-wide analyses, identifying local problem areas in the system, and directing development efforts to these local problems that are causing inefficiencies or ineffectiveness in the value production system. Although operational staff and their direct management are aware of local problems and opportunities, these problems become system-wide information only at higher organizational levels, which possess a wide-enough view of system performance and the relations between different system-parts.

Because centralizing such dispersed information and decision-making on individual local developments at higher levels in the organizational hierarchy could overload top management (Galbraith, 1973), it is instead aggregated using liaison roles at the functional management or contract-owner level, the individuals sometimes referred as category managers in the buying organization (Trauttmann et al., 2009). This level also possesses the capability to process more and richer information, hence, acting as an information integrator (Daft and Lengel, 1986; Galbraith, 1973). In addition to possessing system-wide decision-making authority for systemic changes that improve the system's local efficiency or effectiveness, functional management possesses a natural line of communication to diffuse the planned and agreed changes back to operations. This area is also where the locus of personal integration between organizations in established component service networks is found.

5.3.4 Results of cross-case analysis for the emerging component service networks

The management of integration in emerging component service networks is, by definition, innovation- and development-oriented, and hence, built on type three integration. First, low levels of impersonalization characterize the networks in the beginning of collaboration. Whereas the management of integration in the two previous network types relies highly on detailed contracting and task specification, the emerging component service networks involved only framing type of collaboration agreements to inform about the general objectives and legal rights in the collaboration, or were guided by a common

informal vision and agreement to carry out the development activities, formal contracts being formed as the collaboration evolved.

Second, the development of new value activities and processes occurs in functional teams, involving participation from both operational and functional management or through operational pairs and functional pairs. Although in SH1 much of the development activity was conducted in functional teams—one for marketing, one for real estate developing, and one for service design—working pairs were used within each function and respective stage of the development process in SH2 and SH3. Thus, both the functional, system-wide knowledge and the more operational knowledge were simultaneously included when designing the concept and its technical, financial, and contract solutions.

Third, in addition to this type of functional cooperation and interaction, the combined knowledge of each function was gathered and combined to connect the different types of information of the concept. This process was conducted in two different ways. In SH1, a steering group convened regularly to understand the concept as a whole and to make decisions about further proceedings. In SH2, information that emerged and was agreed upon during the cooperation was continuously codified into the contract by the actors' contract managers, who functioned as information brokers. In SH3, both methods were used, crafting increasingly detailed contracts about cooperation, responsibilities, and agreed-upon issues, as well as forming a steering group that discussed, negotiated, and agreed upon mutual issues. In particular, a significant amount of effort was targeted towards understanding the other actors' needs for the joint concept and their general operating logic. In addition, as shown in the following example, clarification was required on a number of issues related to terminology and concepts that were unique to the specific industry and of which the partners from different industries were unaware:

"In the beginning we used quite extensively time for studying each other's businesses[...]we tried to open (the partners) where this kind of a company as (us) receive their value[...]and we tried to understand what are the conditions that need to be fulfilled that is reasonable business for [the partners]" (Case 4, investor, CEO).

Finally, participating in a collaborative act in emerging networks may often include considerable investments of economic and human resources and risks if the network fails to accomplish its aims. The need for integration prompted by multiple uncertainties requires the extensive use of resources and time for knowledge codification and information transfer within the network. For example, the focal actors in SH1 invested a significant amount of resources to acquire a housing property lot used as a pilot concept and to craft marketing material and teach the sales staff to market the unique and unfamiliar housing concept and its services. SH2 and SH3 required extensive efforts from multiple participants involved in conducting the cooperation and service contracts. In addition, in SH2, a model apartment was built in the focal actor's headquarters to test the design solutions and market the apartments for possible future residents. Launching collaboration of an emerging type with multiple uncertain-

ties consequently necessitates top management participation and support. In the three cases, the CEOs or the chairmen of the focal companies initiated the cooperation, held initial discussions and negotiations with possible partners, and were involved in the initial idea development phase in the concept development. The four following propositions are based on the presented findings:

Proposition 1.5a: Emerging component service networks are associated with low levels of impersonal integration for managing integration in the beginning of collaboration, as reflected in framing contracts and informal agreements for directing collaborative activities.

Proposition 1.5b: Emerging component service networks are associated with personal integration within functions for managing integration, as reflected in functional-team or functional-pair structures between collaborating actors within the network.

Proposition 1.5c: Emerging component service networks are associated with cross-functional integration between organizations for managing integration, as reflected in continuous information integration through codifying functional information with evolving contracts or in steering group or contract manager meetings between the collaborating actors within the network.

Proposition 1.5d: Emerging component service networks are associated with top management involvement in the beginning of collaboration for managing integration.

Featuring for all the studied emerging component service networks is their moderate to high level of uncertainty in each uncertainty category, resulting in high overall level of uncertainty in the network (Table 20). One characteristic in all of the cases is their *uniqueness*. First, in Finland, the housing of elderly people, including geriatric services, is primarily a publicly funded and provided service, the private senior housing market being only emerging. Consequently, there are no standardized models and only few examples of concepts combining senior housing with component services. Second, in all cases the informants clearly stated that the organizations did not have experience in similar developments or cooperation. A related characteristic is the *ambiguity* of the concepts and cooperation; with no experience and existing models for the final product and service concept, the business logics of the concepts, cooperation contracts, the building and service design solutions, and the impacts on the final outcome were not known in advance. Instead, the majority of these concepts were developed during the cooperation, partially through trial and error.

Table 20. Uncertainties in the studied emerging component service networks

Case	Uniqueness	Ambiguity	Complexity	Dependence	Difference
SH1	High uniqueness: Emerging field: Novel concept in Finland and Europe; No prior experience about similar concepts or collaboration; Cooperation since: 2006 –	High ambiguity: Loosely defined objectives for cooperation; No existing models for the concept, cooperation, or contracting when beginning cooperation	High task complexity: A number of decisions about the content and business model of the concept, building and service design, responsibilities of each actor, and committing various interest groups to the development Low network complexity: 3 main collaborators; municipal actors	Reciprocal: Joint planning of multiple operational and contractual interfaces; Combining knowledge of all actors	High distance: Different, traditionally not related industries (Insurance – Real estate investing – Health care/Nursing)
SH2	High uniqueness: Emerging field: Few/No similar concepts in Finland; No prior experience about similar concepts or collaboration; Cooperation since: 2006 –	High ambiguity: No clearly defined objectives for cooperation; No existing models for the concept, cooperation, or contracting when beginning cooperation	High/Moderate task complexity: A number of decisions about building and service design, responsibilities of each actor, and negotiation of the public housing funding instrument Low network complexity: 2-3 main collaborators; a number of peripheral actors	Reciprocal: Joint planning of multiple operational and contractual interfaces; Combining knowledge of all actors	High distance: Different, traditionally not related industries (Real estate investing – Health care/Nursing)
SH3	High uniqueness: Developing field: Few/No similar concepts in Finland; No prior experience about similar concepts or collaboration; Cooperation since: 2005 –	High ambiguity: Lack of clarity in objectives, changed multiple times during cooperation; No existing models for the concept, cooperation, or contracting when beginning cooperation	High/Moderate task complexity: A number of decisions about building and service design, responsibilities of each actor, and commitment of the municipal interest groups to the development Low network complexity: 3 main collaborators; a number of peripheral actors	Reciprocal: Joint planning of multiple operational and contractual interfaces; Combining knowledge of all actors	High distance: Different, traditionally not related industries (Housing development and construction – Health care/Nursing)

The third and fourth characteristics of the emerging strategic networks are the *complexity* and *dependency* of value activities; designing and producing the final concepts with multiple decision variables requires knowledge and information from multiple sources, on numerous occasions in a reciprocal manner. For example, the design of the buildings required an understanding of the operating logic and operations of the nursing service function within the buildings. In addition, the nursing operations include a variety of special requirements from the buildings that the investors were unaware of. At the same time, for the concepts to be profitable for the investors and able to fulfill the requirements of public housing funding whenever such funding was used, the properties needed to be efficient in terms of building plan solutions and estimated maintenance costs. Thus, the requirements of both nursing operations and efficient building planning were closely incorporated in a reciprocal manner to produce feasible design solutions.

Finally, the fifth characteristic of the cases is that the collaborating actors come from separate industries with different operating logics, languages, and educational backgrounds. Thus, a high *difference*, particularly in terms of *cognitive distance*, prevailed among the actors when launching the collaboration. Whereas the real estate investors deal with technical issues and employ people with engineering or other technical education, the nursing service providers

deal with human issues and treatment, employing people with social and health care education and competence. In the extreme, the insurance company in SH1 has, to some extent, the most specialized operating environment compared to the other two focal organizations, and respective competence from advanced financial instruments and regulations not possessed in real estate or health care sectors. As a result, little overlap of knowledge bases and competence, i.e., common knowledge, prevailed among the actors in jointly developing and designing the concepts before learning each other's languages and basic operating principles. Moreover, the difference in knowledge made it difficult for the actors to evaluate the necessity of needs indicated and the solutions proposed by their partners.

In summary, although in established component service networks only some of the uncertainties were present in the network, in the studied emerging networks, the majority of the five types of uncertainties are highly present. This high level of overall uncertainty is further reflected in the use of integration mechanisms that exhibit higher information-processing capacities compared to those in stable or established networks.

Proposition 1.6: In emerging component service networks, the main contingency factors causing uncertainty include high to moderate levels of uniqueness, ambiguity, task complexity and difference among the collaborating actors, and reciprocal knowledge interdependence.

Aligned with prior literature, in emerging networks, key issues relate to recognizing the dispersed and vague ideas of the actors, making sense of them, and processing them into a systemic vision or agenda (Möller and Svahn, 2006, 2010). As shown in the studied networks, the management of integration in emerging component service networks reflects the need to combine information and knowledge of the specialized actors under condition of high uncertainty deriving from task uniqueness, ambiguity, and complexity and the difference between the actors.

The concepts of uniqueness, ambiguity, and complexity are interrelated (Simonin, 1999). The lower the level of prior experiences with the underlying knowledge domain, the more ambiguous the knowledge to be transferred. Moreover, the higher the number of interdependent technologies, routines, individuals, or resources linked to a particular knowledge or asset, the less clear are the logical linkages between actions and outcomes, inputs and outputs, and causes and effects that are related to this technological or process knowledge (Simonin 1999). In emerging networks, the value activities are usually not known in advance, but cooperation is driven by general motivations, challenges in current value activities, and possible ideas about solutions for the challenges. Thus, without clear understanding and knowledge about the value activities and processes, clearly defined standards through impersonal mechanisms are not often possible to make. If anything, the general rules and aims of cooperation may be described in framing contracts that provide sufficient support against opportunistic behavior.

Instead, the development of new value-creating systems requires the integration of information about both system-wide and local needs, challenges, and opportunities. However, under the condition of task novelty, an actor is unfamiliar with the common knowledge being used to represent the differences and dependencies between domain-specific knowledge. As novelty increases, the amount of effort required to adequately share and assess this specialized knowledge also increases (Carlile, 2004). The higher the degree of novelty, personal integration mechanisms should be emphasized for building sufficient information-processing capacity (Adler, 1995). Furthermore, increasing task complexity and dependencies creates more uncertainty, which is further reflected in higher integration requirements (Tushman and Nadler, 1978). For transferring complex knowledge between partners, mechanisms with high information-processing capacity are needed, including frequent communication and joint problem solving (McEvily and Marcus, 2005). When the tasks are so variable that each is novel and unique, group modes will be used (Van de Ven and Delbecq, 1974).

Finally, with regards to difference, the findings are aligned with prior literature on inter-organizational knowledge transfer and innovation management. The type of inter-industry alliances and networks provide organizations access to more diverse knowledge than collaboration within industries, which further improves their innovation performance (Kotabe and Swan, 1995). However, creating a complex product or service often requires differences in the amount and type of knowledge. This in turn creates differences in levels of experience, terminologies, tools, and incentives that are unique to each specialized domain (Carlile, 2004). Actors from different industries may possess low levels of knowledge overlap, and thus find it difficult to communicate with and learn from each other (Mowery et al., 1996). Because of an organization's ability to learn from a partner increases as the knowledge bases of the partners become more similar and complementary (Hamel, 1991; Lane and Lubatkin, 1998; Simonin, 1999), extensive information integration is needed to enable the actors to build enough common knowledge (Grant, 1996), and thus reduce cognitive dissimilarity for effective inter-organizational information transfer. As the difference in the amount and/or type of domain-specific knowledge increases between actors, also the amount of effort required to adequately share and assess each other's knowledge also increases (Carlile, 2004).

5.3.5 Summary of findings

The study examined integration mechanisms and uncertainties characterizing different types of component service networks for explaining similar patterns of integration management within network types. For this purpose, the typology of strategic networks was empirically elaborated and applied to understanding the management of integration in the context of 15 component service networks within the residential real estate sector in Finland. The findings reveal the integration mechanisms common for the network types and the uncertainties characterizing the networks for explaining the differing patterns of

integration management that are common within the stable, established, and emerging component service network (Table 21).

Table 21. The management of integration as well as the sources and level of uncertainty characterizing stable, established, and emerging component service networks

Type of network	Stable component service networks	Established component service networks	Emerging component service networks
<i>How: Management of integration</i>	<i>Type I & II:</i> <ul style="list-style-type: none"> - Detailed contracts, service specifications, and responsibilities of actors; - Formal and informal interaction at operational level 	<i>Type I & III:</i> <ul style="list-style-type: none"> - Detailed contracts, service specifications, and responsibilities of actors; - Formal interaction at functional and/or contract-owner levels 	<i>Type III:</i> <ul style="list-style-type: none"> - Framing contracts and informal agreements in the beginning of collaboration; - Functional teams or working-pairs; - Cross-functional teams or liaison roles; - Top management involvement/commitment in the beginning of collaboration
<i>Why: Characterized uncertainty</i>	<i>Moderate to high level:</i> <ul style="list-style-type: none"> - Network complexity (spatial, relational) 	<i>Overall moderate level:</i> <ul style="list-style-type: none"> - Novelty and ambiguity about service effectiveness; - Mutual interfaces and dependencies between the actors' processes 	<i>Overall high level:</i> <ul style="list-style-type: none"> - Task uniqueness, complexity, and ambiguity; - Reciprocal knowledge interdependence; - Difference in knowledge domains between the collaborating actors

The results partially support the notion of network management as contingent on the characteristics of the network, in particular the strategic intent of the network (Järvensivu and Möller, 2009). The main conclusion is that the common patterns of integration management in the three ideal types of strategic component service networks are *to some extent* contingent on the network type characterized by certain sources and/or overall level of uncertainty. However, not all similarities and differences in the management of integration are uncovered with the focus on network type. First, apart from the general patterns of integration management, some identifiable differences appear in stable component service networks both for the content of impersonal integration and level of personal integration. Second, in established networks, the sources of uncertainty as well as the use of personal integration mechanisms vary between groups of studied networks. Third, in emerging component service networks, both the levels of uncertainties and the management of integration evolve in the cases as the collaboration evolves.

The next study attempts to refine the value network framework by providing a more contextualized view of the management of integration in stable and established component service networks. A longitudinal perspective to the evolution of integration management and uncertainty in emerging component service networks will be taken in the third study.

5.4 Study II: Contextualizing the management of integration in stable and established component service networks

5.4.1 Overview of the study

This section presents a contextualized view of the management of integration in component service networks involving stable and established sub-networks. More specifically, the study examines patterned similarities in the management of integration in 12 stable and established component service networks within three organizational buyers' overall service supply networks based on the within-case analysis presented in Section 5.2. Furthermore, the study identifies context-specific conditions that help understanding the differing integration patterns between the networks. For this purpose, a framework of contextual factors associated with purchasing and supply chain management is incorporated in the analysis (Section 3.2.5, Table 6). The empirical analysis centers on examining service networks for housing management, customer contact service, maintenance and caretaking, technical maintenance, cleaning, and apartment renovations.

As a result of empirical elaboration, the study formulates 10 empirically grounded theoretical propositions about the association between the use of integration mechanisms and the contextualized conditions in component service networks consisting of stable and established sub-networks. The main argument is that the management of integration in stable and established component service networks is contingent on task-, network-, and environment-related characteristics, four of them being general across networks and additional four conditioning spatially complex networks. The within-case analyses for the management of integration and contextual conditions are summarized next, after which the results of the cross-case analysis are presented.

5.4.2 Summary of within-case analyses for the management of integration and contextual conditions in the studied networks

Based on the analysis of the practices for managing integration in the studied networks presented in Section 5.2, the 12 stable and established component service networks are positioned in the framework of integration types as follows (Figure 13). First, the case networks are characterized by the extensive use of operational-impersonal mechanisms for managing integration, including detailed service specifications and the use of ICT-based tools to coordinate service activities and monitor service performance. Second, the management of integration in all housing management service networks, maintenance and caretaking service networks, and cleaning service networks involves the use of operational-personal integration mechanisms. These mechanisms include, for instance, meetings between operational foremen at the local level in service locations and meetings between operational or functional and customer relationship managers at the buyer's headquarters. Third, the management of integration in both housing management service networks, the customer contact service network, portions of real estate investor 1's maintenance and cleaning

service networks, and the municipal housing company's maintenance, cleaning and apartment renovation service networks involve strategic-personal integration. These include interaction and communication aimed at either or both service development and relationship development between the buyer and the network of suppliers. Fourth, strategic-impersonal integration in the form of the sharing of performance information and the use of related incentive systems occurs only in the networks for housing management service, technical maintenance service, and the municipal housing company's maintenance and cleaning services.

Integration type		Integration media	
		<i>Impersonal</i>	<i>Personal</i>
Integration orientation	<i>Operational</i>	<p>Type I All embedded-case networks</p>	<p>Type II HM1, MC1, CL1 HM2, MC2 MC3, CL3</p>
	<i>Strategic</i>	<p>Type IV HM1 HM2, TM2 MC3, CL3</p>	<p>Type III HM1, MC1, CL1 HM2, CS2 MC3, CL3, AR3</p>

Figure 13. Types of integration management identified in the studied case networks

Apart from what is presented in case descriptions in Section 5.1, the essential contextual characteristics of the 12 studied real estate management and maintenance service networks of the three buyers include the following (Table 22). First, for both real estate investors 1 and 2, to a certain degree, “**housing management**” represents the most significant and strategic supplier relations because it is perceived to closely relate to their overall business performance. In addition, because the service includes partial component-type customer service and partial instrumental-type management service, the service involves multiple interfaces with the buyer's processes, such as rental service and overall housing stock development.

“In that (housing management), you always go really extensively to each other's sphere of operation, and to the other's operating systems and resource allocation, and other systems” (Case 1: real estate investor 1, director of investments).

Second, the service networks for “**customer contact service**” by Investor 2, represents a centralized solution for managing information flows in the end-customer interface. The customer contact service receives calls from the residents about service needs, evaluates the needs, and further communicates the needs directly to the appropriate local service supplier. Outsourcing such a service in the context of housing is somewhat new in the field, improving the operational efficiency of handling end-customer interfaces, transferring information about service needs throughout the network, and monitoring the

overall service conduct. The traditional method of organizing end-customer interfaces in the field occurs when residents have direct contact information for the local housing managers and maintenance suppliers responsible for their housing location. In some cases, such as real estate investor 1 and the municipal housing company, this approach is supported by an in-house customer call center.

Third, maintenance and caretaking activities are considered rather simple services. The supply markets are perceived mature with fairly standardized service tasks and a price-based bidding culture with detailed quotations. In addition, the supply markets comprise multiple large and small suppliers representing a highly heterogeneous service quality among companies in different regions.

“The quality of some service suppliers, even within the capital region, it can be said that region-wise, or even between properties is completely diverse [...] it is extremely hard to achieve stable quality” (Case 1: real estate investor 1, executive vice president of real estate business).

Table 22. Summary of contextual conditions in the studied 12 component service networks

Overall service network	Embedded case	Network type	Task characteristics			Supply network characteristics			Supply environment char.		
			Perceived importance	Novelty	Complexity	End-customer contact	Relational complexity	Spatial complexity	Perceived importance of suppliers	Demand fluctuation/volatility ²	Perceived operating culture
Service supply network of Real estate investor 1	HM1	E	High overall business	Developing field	Mutual interfaces	Functional	2	Local offices	High	Regular (d/w/m/a)	Locally differing ways of operating
	MC1	S	Moderate: Finance/Cust	Standardized service	Simple	Technical Functional	~ 50-60 ³	Property/ Apartment	Low/ High ⁴	Regular (d/w/m/a)	Locally differing service quality
	CL1	S	Low: Customer	Standardized service	Simple	Technical	~ 50-60 ³	Properties	Low/ High ⁴	Regular (w/m/a)	Locally differing service quality
	AR1	S	Moderate: Financial	Standardized for the firm	Simple	Technical	~ 20	Apartment	Low	Irregular (m)	Underground economy
Service supply network of Real estate investor 2	HM2	E	High overall business	Developing field	Mutual interfaces	Functional	2	Local offices	High	Regular (d/w/m/a)	Locally differing ways of operating
	CS2	E	Moderate: Oper. effc.	New model in the field	Simple	Functional	2	National call center	High	Irregular (d)	N.A. ⁵
	TM2	E	High: Financial	New model in the field	Specialized competence	Technical	2	Properties	High	Regular (annual)	Locally differing service quality
	MC2	S	Low: Customer	Standardized service	Simple	Technical	136	Property/ Apartment	Low	Regular (d/w/m/a)	Locally differing service quality
Service supply network of Municipal housing company	AR2	S	Moderate- Financial	Standardized for the firm	Simple	Technical	~ 15	Apartment	Low	Irregular (m)	Underground economy
	MC3	S	High: Finance/Cust	Standardized service	Simple	Technical	4	Property/ Apartment	High	Regular (d/w/m/a)	Generally low service quality
	CL3	S	Moderate: Customer	Standardized service	Simple	Technical	5	Properties	High	Regular (w/m/a)	Generally low service quality
	AR3	E	Moderate: Financial	New model for the firm	Simple	Technical	~ 12	Apartment	Low	Irregular (m)	Underground economy

1 S = stable network; E = established network 2 d = daily; w = weekly; m = monthly; a = annual

3 Most cleaning and maintenance services are purchased from the same suppliers, but separately contracted; includes some separate cleaning suppliers

4 Large suppliers (in general) and some suppliers with high proportion of total turnover from the buyer considered significant

5 Not mentioned special characteristics by any informant

The technical maintenance service makes an exception, involving greater competence requirements than those for the basic maintenance and caretaking of the residential properties. Another characteristic of the service exchanges is that the service does not occur in direct contact with the residents. Whereas the residents can directly perceive the technical quality of some of the basic caretaking services, such as snow removal, the conduct and quality of the more technical services, such as changing the sealing in heating equipment is not conducted in the direct end-customer interface, and can be seen only in delay if the equipment stops working properly.

Fourth, service networks for **“cleaning”** are separated in this study from maintenance and caretaking service networks, although in numerous cases, the cleaning service is purchased from the same suppliers providing the maintenance and caretaking activities. The two are treated separately, because even when purchased from the same supplier, the services are separately contracted. In addition, in some service locations, completely separate suppliers have been contracted to provide the indoor cleaning service apart from the maintenance and caretaking activities. Moreover, the two different service exchanges often involve different operational managers or foremen from the supplier’s side and are always conducted by different staff. Cleaning is perceived as a simple, standardized service with low competence requirements for conducting the work. Similar to the basic caretaking activities, the field is perceived as a low-cost-oriented industry with a high turnover of employees, particularly in large service companies, and characterized by heterogeneous service conduct and quality among companies and geographical regions.

Finally, service networks for **“apartment renovations”** include construction work conducted in the residents’ apartments, such as painting, floor replacement, kitchen equipment installation, or bathroom renovation. The emphasis is on renovations conducted when one resident moves out of the apartment and before another moves in. Another important form of apartment renovations are improvements in the apartments’ quality levels provided by the three building owners for their tenants according to their long-term tenant programs. The service exchange is characterized by a fluctuation in demand in irregular locations; the majority of renovations occur at the turn of the month when residents move into or out of apartments, and thus the service does not occur regularly in the same location compared to the regularly occurring maintenance and caretaking or cleaning activities. In addition, the service is perceived financially as somewhat important for the large buyers for two reasons. First, the number of renovations each month and year is high, generating high renovation operating costs for the buyer. Second, the rapid conduct of renovations is important for minimizing the periods when the apartments cannot be occupied and thus do not generate rental incomes.

5.4.3 Results of cross-case analysis for the use of integration mechanisms

This section presents the results of the cross-case analysis. Each of the four types of integration is discussed. The findings are reported regarding the iden-

tified patterns of integration mechanisms and contextual conditions in the component service networks, resulting in the formulation of empirically grounded theoretical propositions. Each proposition consists of the following two components: the integration mechanism used for managing integration and the contextual condition or conditions with which it is associated.

Type I: Operational-impersonal integration

One common feature of integration management across all of the studied service networks is an extensive use of impersonal operational integration mechanisms (Type I). At least two key common contextual factors can be used to explain the emphasis on economizing integration. First, a large organization is an established condition in organizational design literature for explaining the use of impersonal integration mechanisms, referring to the standardization or formalization of organization structures (Child 1972; Pugh, 1969). In the context of the study, the number and dispersion of service occasions is essential: the higher in volume and more geographically dispersed the service occasions are, the more performance units are needed to supply the services. Consequently, a high number of employees, traditionally used as a proxy for organization size (Child, 1972; Pugh, 1969), yields formalized organization structures.

Another common factor explaining the use of operational-impersonal integration in the case networks is the labor intensity (Baltacioglu et al., 2007) or human centricity (Grönroos, 2007) of service supply, extensively reported in prior studies on service management. Because the supply of services is human centric by nature, the conduct and performance of services are heterogeneous across the service staff and their operating units. Consequently, the quality and productivity of services are often highly dependent on the people involved in the service production, delivery and consumption (Gummesson, 1998; Grönroos, 2007). The processes of implementing housing management are highly dependent on the habits of individual housing managers at the local level, technical maintenance on the knowledge of individual assemblers about their locations, and the outcome of caretaking, cleaning and apartment renovations on the individual characteristics and motivations of the service workers. This finding is further associated with standardizing the service levels to a great extent through extensive service specifications. For instance, a maintenance service contract may exceed 70 pages in length, including detailed specifications about the conduct of a variety of maintenance and caretaking tasks.

Differences in impersonalization can be perceived in the content of service specifications (Table 23). The operational-impersonal mechanisms, particularly *the content of service specifications*, vary depending on *the type of customer contact* in the exchanged service. First, for services, in which the customer is not directly involved in the service process but perceives the technical outcome of the service, the buyers specify the technical quality and outcome of the service to ensure consistent quality across the service locations. In the data, maintenance, caretaking, cleaning and apartment renovation services represent service activities in which the end-customer is not directly involved in the

service process but perceives the technical quality of the service. Apartment renovations include clearly defined outcomes for each individual renovation to be conducted. Similarly, some caretaking services such as grass cutting include measurable qualifications for the outcome quality, in this case the average length of the grass. However, not all services visible to the end-customer have such clearly defined outcomes. Instead, the service specifications include the frequency of service conduct, which is considered to yield sufficient technical quality. Examples include the frequency of corridor cleaning, weekly or bi-weekly, or changing filters annually in air conditioning systems.

The findings support the finding that measurable outcomes are associated with outcome-based contracts in business service networks (Van der Valk and Van Iwaarden, 2011). However, previous arguments suggesting that a lack of measurable outcomes leads to the use of social agreements do not occur in the data. Rather, the lack of quantifiable outcome-measures is compensated by using input-based specifications in terms of service delivery frequencies. Two propositions follow:

Proposition 2.1a: In component service networks, integration is managed with operational-impersonal integration by specifying the technical quality of the service when the outcome of the service is visible to the end-customer and the technical quality is quantifiable.

Proposition 2.1b: In component service networks, integration is managed with operational-impersonal integration by specifying the frequency of service supply when the outcome of the service is visible to the end-customer and the technical quality of the service cannot be easily defined.

Finally, for services in which the customer is involved in the service process, the buyers specify the way in which the suppliers interact with the end-customers. In the case of real estate management and maintenance, the end-customers (i.e., residents) are primarily involved in the service activities on three occasions. First, the end-customers directly contacts customer contact service for reporting faults, repair needs, or disturbances perceived in the properties, the apartments, or the behavior of other residents. Second, the residents or committees formed by the residents, meet with the investors, housing management, and in some cases the service suppliers, to discuss current issues and future events and activities. Third, in a number of locations, one of the investors has included apartment showings to the caretaking companies instead of external real estate agencies. These activities are all standardized by the buyers in terms of the process for customer interaction as follows: the customer contact service has a predefined list of questions with which they aim to identify and understand the resident's problem and direct the service request to the actor responsible for delivering the service; housing management has predefined guidelines for the frequency and content of meetings with the residents or resident committees; maintenance suppliers conducting apartment showings are given guidelines regarding how and what to present.

Table 23. Patterns of integration mechanisms and contextual conditions for operational-impersonal integration

Management of integration	Embedded-case	Network type	Task characteristics			Supply network characteristics			Supply environment char.			
			Perceived importance	Novelty	Complexity	End-customer contact	Relational complexity (Number of suppliers)	Spatial complexity (Dispersion of supply)	Perceived importance of individual suppliers	Demand fluctuation/volatility ¹	Perceived industry operating culture	
Only output-based	AR1	S	Moderate: Financial	Standardized for the firm	Simple	Technical	Technical	~ 20	Apartment	Low	Irregular (m)	Underground economy
	AR2	S	Moderate: Financial	Standardized for the firm	Simple	Technical	Technical	~ 15	Apartment	Low	Irregular (m)	Underground economy
	AR3	E	Moderate: Financial	New model for the firm	Simple	Technical	Technical	~ 12	Apartment	Low	Irregular (m)	Underground economy
Mainly input-based (may include some output-based)	TM2	E	High: Financial	New model in the field	Specialized competence	Technical	Technical	2	Properties	High	Regular (annual)	Locally differing service quality
	MC1	S	Moderate: Finance/Cust	Standardized service	Simple	Technical	Technical	~ 50-60	Property/ Apartment	Low/ High	Regular (d/w/m/a)	Locally differing service quality
	MC2	S	Low: Customer	Standardized service	Simple	Technical	Functional		High	Property/ Apartment	High	Regular (d/w/m/a)
	MC3	S	High: Finance/Cust	Standardized service	Simple	Technical	Technical	136	Property/ Apartment	Low	Regular (d/w/m/a)	Locally differing service quality
	CL1	S	Low: Customer	Standardized service	Simple	Technical	Technical	4	Property/ Apartment	High	Regular (d/w/m/a)	Generally low service quality
	CL3	S	Moderate: Customer	Standardized service	Simple	Technical	Technical	~ 50-60	Properties	Low/ High	Regular (w/m/a)	Locally differing service quality
	HM1	E	High overall business	Developing field	Mutual interfaces	Functional	Functional		High	Properties	High	Regular (w/m/a)
Process based	HM2	E	High overall business	Developing field	Mutual interfaces	Functional	Functional	2	Local offices	High	Regular (d/w/m/a)	Locally differing ways of operating
	CS2	E	Moderate: Oper. effic.	New model in the field	Simple	Functional	Functional	2	Local offices	High	Regular (d/w/m/a)	Locally differing ways of operating
	MC1	S	Moderate: Finance/Cust	Standardized service	Simple	Technical	Functional	~ 50-60	National call center	High	Irregular (d)	N.A.5
						Technical	Functional		Property/ Apartment	Low/ High	Regular (d/w/m/a)	Locally differing service quality

The findings are aligned with the view of service supply chains as bidirectional, where the customer is the supplier of raw material for the supplier, providing bodies, minds, belongings, or information as inputs to the service processes (Sampson, 2000). From the information processing perspective, the involvement of the end-customer in the supplier delivered component service process creates uncertainty from the buyer's perspective, which, ultimately, is responsible for fulfilling the service promise it has given to the end-customer (Niranjan and Metri, 2008). Given the inherent heterogeneity of service supply in bidirectional service exchanges (Sampson, 2000; Sampson and Froehle, 2006), and the aim for stable service quality in both stable networks and the stable portions of the established networks, it seems reasonable to argue that the buyers attempt to formalize the suppliers' decision making and information processing when the customer is involved in the service process (Chase and Tansik, 1983). Based on these findings, the study proposes the following:

Proposition 2.1c: In component service networks, integration is managed with service specifications by specifying the service process when the end-customer is involved in the service supply.

Type II: Operational-personal integration

In general, a variety of personal integration mechanisms are used in managing supplier integration, including daily telephone and email communication, monthly meetings at the buyer's headquarters, and semi-annual meetings at the local level in service locations. This finding aligns with the previous literature suggesting that an inherent characteristic of service supply chains is a bidirectional interaction between the buyers and suppliers (Field and Meile, 2008; Sampson, 2000; Sampson and Froehle, 2006). The differences in operational-personal integration in the studied service exchanges relate mainly to which parties are interacting, how frequently they interact, and whether the interaction is formal or informal (Table 24).

First, frequent informal interaction can be observed between the buyers and their housing management suppliers, who engage weekly or even daily through telephone or email conversations, negotiations, and problem solving. The service is distinguished from other service exchanges by the complexity in terms of a number of mutual interfaces and interdependencies between the buyers' processes and its suppliers' processes. Whereas the other service exchanges function rather independently of the buyer's operations, housing management is closely linked to a buyer's core operations. An example of a frequently occurring linkage is cooperation with the buyer's apartment rental service when inspecting, coordinating renovations, and informing the rental service about the conditions and availability of the apartments. Aligned with the information-processing theory, organizational complexity increases the dependencies between tasks (Perrow, 1967), which further increases the need for mutual adjustment (Thompson, 1967).

Table 24. Patterns of integration mechanisms and contextual conditions for operational-personal integration

Management of integration	Embedded case	Network type	Task characteristics			Supply network characteristics			Supply environment char.		
			Perceived importance	Novelty	Complexity	End-customer contact	Relational complexity (Number of suppliers)	Spatial complexity (Dispersion of supply)	Perceived importance of individual suppliers	Demand fluctuation/volatility	Perceived industry operating culture
None	AR1	S	Moderate: Financial	Standardized for the firm	Simple	Technical	20	Apartment	Low	Irregular (w)	Underground economy
	AR2	S	Moderate: Financial	Standardized for the firm	Simple	Technical	15	Apartment	Low	Irregular (w)	Underground economy
	AR3	E	Moderate: Financial	New model for the firm	Simple	Technical	12	Apartment	Low	Irregular (w)	Underground economy
Only operational	MC1	S	Moderate: Finance/Cust	Standardized service	Simple	Technical/Functional	50-60	Property/ Apartment	Low/High	Regular (d/w/m/a)	Locally differing service quality
	MC2	S	Low: Customer	Standardized service	Simple	Technical	156	Property/ Apartment	Low	Regular (d/w/m/a)	Locally differing service quality
	CL1	S	Low: Customer	Standardized service	Simple	Technical	50-60	Properties	Low/High	Regular (w/m/a)	Locally differing service quality
Only functional	CS2	E	Moderate: Oper. effic.	New model in the field	Simple	Functional	2	National call center	High	Irregular (d)	N.A.
	TM2	E	High: Financial	New model in the field	Specialized competence	Technical	2	Properties	High	Regular (w/m/a)	Locally differing service quality
Operational and functional	HM1	E	High overall business	Developing field	Mutual interfaces	Functional	2	Local offices	High	Regular (d/w/m/a)	Locally differing ways of operating
	HM2	E	High overall business	Developing field	Mutual interfaces	Functional	2	Local offices	High	Regular (d/w/m/a)	Locally differing ways of operating
	MC3	S	High: Finance/Cust	Standardized service	Simple	Technical	4	Property/ Apartment	High	Regular (d/w/m/a)	Generally low service quality
	CL3	S	Moderate: Customer	Standardized service	Simple	Technical	5	Properties	High	Regular (w/m/a)	Generally low service quality

Proposition 2.2a: In component service networks, integration is managed with operational-personal integration by frequent, informal interaction at the operational level between the buyer and the suppliers when the service is complex, involving mutual organizational interfaces.

Second, formal personal integration at the operational level is perceived in all locally produced, regularly occurring services. The buyer's operational management visits the housing management's local offices several times per year to meet the local foremen and discuss, negotiate and solve their local issues, usually including field visits at the housing locations. In a similar manner, the housing managers meet their local suppliers' foremen at least twice per year and inspect the properties for technical quality. The only services in which local level operational integration is not visible in the data are the customer contact service—which has no local offices but in which the production is centralized at national headquarters—and apartment renovations that occur seasonally, and not regularly in specific residential locations.

Considering the human centrality and the resulting heterogeneity of service supply (e.g., Grönroos, 1998; Parasuraman et al., 1985), standardization itself may not be a sufficient procedure for ensuring stable service quality across the service locations. When each individual supplier and its employees interpret the service specifications and guidelines based on their own goals, mental frames, cognitive limits, and boundaries for rationality (March and Simon, 1958; Weick, 1995), mutual adjustment is required for building shared understanding about the service specifications, possibly including even the education of the supplier's foremen to the buyer's specifications and guidelines.

However, integration also has its costs (Galbraith, 1973). Although the heterogeneous supply may require personal integration to ensure stable service levels, the capacity to deliver such personal integration cannot exceed its benefits. In the studied organizations, this phenomenon can be seen in the tendency to build information-processing capacity for stable parts of the service supply while conducting only random inspections for irregularly occurring services in which the demand fluctuates to cause temporary peaks, the control of which temporarily exceeds the built controlling capacity.

Proposition 2.2b: In spatially complex component service networks, integration is managed with operational-personal integration by formal interaction at the operational management level when the service is regularly occurring.

Third, in addition to formal personal integration at the operational level, the spatially complex service networks involve functional level interaction when the importance of the service exceeds the cost of integrating. The buyer's middle or functional management meets the service suppliers' customer relationship managers at the buyer's headquarters whenever the number of service suppliers in the specific service function enables this meeting to occur. The three buyers engage in monthly meetings with the housing management suppliers, real estate investor 2 meets with its technical maintenance suppliers and the municipal housing company meets with its maintenance and cleaning suppliers.

One feature of services is the perceived importance of the buyer's business performance in terms of risks in maintenance costs or satisfaction among the end-customers if the service delivery fails. However, direct communication is enabled only when the relational complexity of the supply network, i.e., the number of suppliers, for the service exchange is low, resulting in lower integration costs. The two investors do not communicate in principle with their maintenance and cleaning suppliers, which exceed tens or even more than one hundred suppliers. Instead, the housing managers meet the service suppliers' location managers several times annually based on the investors' demands.

"They (apartment renovation suppliers) are already so many that we simply cannot lift them up to this level [...] it is the same with the maintenance and caretaking suppliers that the housing managers communicate with them [...] if we were able to halve them to even 50 suppliers it would mean a great relief to management"(Case 2: real estate investor 2, property manager).

Conversely, in a similar type of service, the municipal housing company is tightly involved in monthly meetings with its maintenance suppliers, enabled by the low number of total suppliers and further motivated by the importance of each individual supplier for the service performance.

This finding is supported by research on purchasing processes suggesting that services important to the core business of the buyer, involving a substantial exposure to risk if failure occurs, will attract higher level management involvement in the purchase for ensuring fit with corporate goals (Fitzsimmons et al., 1998). It is generally suggested that the procurement of highly strategic items indicates the need for tighter integration (Parker et al. 2008); the importance of the purchase relates positively to the amount of communication between the client and vendor (McQuiston, 1989). However, when the number of cooperating firms rises, that is, the relational complexity of the supply base increases (Choi and Hong, 2002), the importance of operational formalization for cooperation performance increases and mutual influence diminishes (Schmoltzi and Wallenburg, 2012). Consequently, the buyers seek either to reduce the supplier base (Choi and Krause, 2006) or to develop more efficient methods of governing and communicating with the suppliers, thereby economizing information transfer (Galbraith, 1973).

Proposition 2.2c: In spatially complex component service networks, integration is managed with operational-personal integration by formal interaction at the functional management level when the service is perceived important for the buyer's business performance and the relational complexity of the supply network is low.

Type III: Strategic-personal integration

Two forms of strategic personal integration can be perceived in the studied networks, one relating to developing the organizational exchange relationship and the other to developing personal relationships among individuals in the exchanging organizations (Table 25). First, services and related cooperation

models that are rather new to the buyers or immature to the field in general require the mutual development of operations models between the buyer and the service suppliers. For instance, Investor 2 has outsourced its customer contact service (CS2) to two external suppliers. This meant the introduction of a new approach to operating in the field of housing management and maintenance. Although the traditional method of operating was that the end-customers, residents, had direct contact information for the housing manager and maintenance company in their housing location, the reason for outsourcing customer service was to make both the customers' and the housing managers' activities easier by offering a centralized call center that operates on a 24/7 basis. Because of the novelty of the service to the firm, extensive joint development efforts were needed in the beginning between the investor, the customer contact service supplier, and the local housing management office in which the service was first piloted. After the initiation phase, formal meetings are used between the contract-owners for monitoring and further improving the service and related process models. A similar type of development also can be perceived in the other service exchanges, including novelties in the service processes, i.e., housing management (HM1-2) and technical maintenance (TM2), in which the contract-owners meet once or several times per year to review the relationships and discuss possible cooperative developments.

This finding is supported by prior research, which has generally found a positive relationship between the novelty of the purchase and the amount of communication offered to others for consideration (McQuiston, 1989), newer products also signifying the need for earlier supplier integration (Parker et al. 2008). As novelty increases, the amount of effort required to adequately share and assess knowledge also increases (Carlile, 2004), and consequently, personal integration mechanisms should be emphasized for building sufficient information- processing capacity (Adler, 1995).

The reason for communication in novel service networks to occur at higher management level was already noted in Study I, proposing that these managers function as liaison roles (Galbraith, 1973) for synthesizing system-wide information, communicating it between the collaborating organizations, and deciding upon future actions. A refinement to the first study's proposition is that, as shown in the empirical data, novelty of the service networks is associated with personal integration at contract-owner level, whereas functional management involvement, as proposed previously (Proposition 2.2c), depends on the importance of the service to the buyer's business performance.

Proposition 2.3a: In component service networks, integration is managed with strategic-personal integration by formal interaction at contract-owner level aimed at developing the overall exchange relation when the service process involves novelties.

Table 25. Patterns of integration mechanisms and contextual conditions for strategic-personal integration

Management of integration	Embedded case	Network type	Task characteristics			Supply network characteristics			Supply environment char.		
			Perceived importance	Novelty	Complexity	End-customer contact	Relational complexity (Number of suppliers)	Spatial complexity (Dispersion of supply)	Perceived importance of individual suppliers	Demand fluctuation/volatility	Perceived industry operating culture
None	MC1	S	Moderate: Finance/Cust	Standardized service	Simple	Technical	~ 50-60	Property/ Apartment	Low/ High	Regular (d/w/m/a)	Locally differing service quality
	MC2	S	Low: Customer	Standardized service	Simple	Technical	136	Property/ Apartment	Low	Regular (d/w/m/a)	Locally differing service quality
	CL1	S	Low: Customer	Standardized service	Simple	Technical	~ 50-60	Properties	Low/ High	Regular (w/m/a)	Locally differing service quality
	AR1	S	Moderate: Financial	Standardized for the firm	Simple	Technical	~ 20	Apartment	Low	Irregular (m)	Underground economy
	AR2	S	Moderate: Financial	Standardized for the firm	Simple	Technical	~ 15	Apartment	Low	Irregular (m)	Underground economy
Only service development	CS2	E	Moderate: Oper. effc.	New model in the field	Simple	Functional	2	National call center	High	Irregular (d)	N.A.
	AR3	E	Moderate: Financial	New model for the firm	Simple	Technical	~ 12	Apartment	Low	Irregular (m)	Underground economy
	MC1	S	Moderate: Finance/Cust	Standardized service	Simple	Technical/ Functional	~ 50-60	Property/ Apartment	Low/ High	Regular (d/w/m/a)	Locally differing service quality
Only relationship development	MC3	S	High: Finance/Cust	Standardized service	Simple	Technical	4	Property/ Apartment	High	Regular (d/w/m/a)	Generally low service quality
	CL1	S	Low: Customer	Standardized service	Simple	Technical	~ 50-60	Properties	Low/ High	Regular (w/m/a)	Locally differing service quality
	CL3	S	Moderate: Customer	Standardized service	Simple	Technical	5	Properties	High	Regular (w/m/a)	Generally low service quality
Service and relationship development	HM1	E	High overall business	Developing field	Mutual interfaces	Functional	2	Local offices	High	Regular (d/w/m/a)	Locally differing ways of operating
	HM2	E	High overall business	Developing field	Mutual interfaces	Functional	2	Local offices	High	Regular (d/w/m/a)	Locally differing ways of operating
	TM2	E	High: Financial	New model in the field	Specialized competence	Technical	2	Properties	High	Regular (annual)	Locally differing service quality

Second, the buyers engage in activities aimed at building individual relationships in locally produced, and thus spatially complex service exchanges where the individual suppliers are considered significant within the service function. Real estate investor 1 organizes an annual supplier event for the relationship and operational management of its housing management and maintenance suppliers functioning in the capital region, where it has over 80 percent of its housing stock, and thus the suppliers having significant proportion of all service provision. Similarly, the municipal housing company has an annual supplier event for its maintenance and cleaning suppliers' operational management as well as those service workers that are awarded for their superior performance. Real estate investor 2 does not organize events for all the suppliers, but its contract-owners and operational management occasionally meet housing management and technical maintenance suppliers' contact persons informally.

As revealed in the previous illustrative quotation, these different types of mutual recreational activities are perceived by the buyers as important ways of developing relationships between the buyer and suppliers, as well as among the suppliers. This appears to be particularly the case with services that are locally produced, resulting in spatially complex supply networks in which service conduct becomes heterogeneous because of locally varying operating cultures and variation in service conduct between individuals. Although coordinating and controlling such spatially decentralized tasks easily becomes costly for the buying organization, more efficient ways of ensuring stable service conduct and quality are needed.

Prior studies suggest that interaction oriented towards relationship development, also referred to as supplier socialization mechanisms (Cousins et al., 2008; Stouthuysena et al., 2012), is required for building and maintaining motivation, commitment, responsiveness and trust towards the buyer firm and between the operating individuals (Baltacioglu et al. 2007: 116). Furthermore, trust between cooperating actors that emerges from personal encounters may reduce the need for formal governance mechanisms (Ring and Van de Ven, 1994), facilitate the emergence of inter-organizational routines (Zollo et al., 2002), and further improve cooperation efficiency and firm performance (Gulati and Nickerson, 2008). In addition, service firms tend to use more competitive pressure and less supplier involvement activity than manufacturing firms to compel suppliers to improve their performance, simply because it might be more feasible, practical, and effective compared to engaging in the more resource-intensive alternatives of supplier development (Krause and Scannel, 2002). Relying on the notion of integration costs, the choice is then between the cost of investing in supplier socialization mechanisms and the cost of not doing so. As revealed in the cases, relationship-building practices are only present in such spatially complex services when the performance of the individual suppliers is considered significant for the buyer's business performance in a specific service function, and thus, worthy of investment.

Proposition 2.3b: In spatially complex component service networks, integration is managed with strategic-personal integration aimed at relationship

development when the individual suppliers are considered important within the service network.

Type IV: Strategic-impersonal integration

Strategic supplier integration through impersonal mechanisms appears in the data in two primary ways (Table 26). The first includes the sharing of cost information and further sharing the costs and benefits between the buyer and the service supplier. This exchange occurs between the two real estate investors and their housing management suppliers and between real estate investor 2 and its technical maintenance suppliers.

In principle, the buyers aim to improve cost performance by using an incentive system for the suppliers to benefit from energy-saving activities, thus motivating the suppliers to proactively plan maintenance activities and practices to reduce costs, particularly energy costs. The underlying reason is that energy costs are a major component of investors' operating costs in maintenance; in addition, the investors face pressure to develop new energy-efficient solutions when energy prices increasingly rise and public energy policies and building regulations become tighter.

Second, strategic impersonal integration also occurs in some cleaning and maintenance service exchanges in which the municipal housing company has developed an incentive system that awards the suppliers for exceeding targeted service quality. Conversely, lower-than-desired quality leads to annual pay-backs from the supplier to the buyer. The quality is assessed both through the programmed field inspections and programmed customer satisfaction surveys. Rather than bidding the suppliers regularly based on price, as is traditional in the industry, the housing company prefers to increase the payments for its suppliers in response to quality improvements and to impose sanctions in response to quality failures.

Table 26. Patterns of integration mechanisms and contextual conditions for strategic-impersonal integration

Management of integration	Embedded-case	Network type	Task characteristics			Supply network characteristics			Supply environment char.		
			Perceived importance	Novelty	Complexity	End-customer contact	Relational complexity (Number of suppliers)	Spatial complexity (Dispersion of suppliers)	Perceived importance of individual suppliers	Demand fluctuation/volatility	Perceived industry operating culture
Cost-related incentives	HM1	E	High overall business	Developing field	Mutual interfaces	Functional	2	Local offices	High	Regular (d/w/m/a)	Locally differing ways of operating
	HM2	E	High overall business	Developing field	Mutual interfaces	Functional	2	Local offices	High	Regular (d/w/m/a)	Locally differing ways of operating
	TM2	E	High: Financial	New model in the field	Specialized competence	Technical	2	Properties	High	Regular (annual)	Locally differing service quality
Quality-related incentives	MC3	S	High: Finance/Cust	Standardized service	Simple	Technical	4	Property/ Apartment	High	Regular (d/w/m/a)	Generally low service quality
	CL3	S	Moderate: Customer	Standardized service	Simple	Technical	5	Properties	High	Regular (w/m/a)	Generally low service quality
	CS2	E	Moderate: Oper. effic.	New model in the field	Simple	Functional	2	National call center	High	Irregular (d)	N.A.
None	MC1	S	Moderate: Finance/Cust	Standardized service	Simple	Technical Functional	~ 50-60	Property/ Apartment	Low/ High	Regular (d/w/m/a)	Locally differing service quality
	MC2	S	Low: Customer	Standardized service	Simple	Technical	136	Property/ Apartment	Low	Regular (d/w/m/a)	Locally differing service quality
	CL1	S	Low: Customer	Standardized service	Simple	Technical	~ 50-60	Properties	Low/ High	Regular (w/m/a)	Locally differing service quality
	AR1	S	Moderate: Financial	Standardized for the firm	Simple	Technical	~ 20	Apartment	Low	Irregular (m)	Underground economy
	AR2	S	Moderate: Financial	Standardized for the firm	Simple	Technical	~ 15	Apartment	Low	Irregular (m)	Underground economy
	AR3	E	Moderate: Financial	New model for the firm	Simple	Technical	~ 12	Apartment	Low	Irregular (m)	Underground economy

In the data, the quality-related strategic-impersonal integration relates to the buyer's perception of an industry-wide operating culture. In general, the buying organizations perceive a high local variation of quality in cleaning and maintenance services involving low-skilled employees that change companies frequently. Even more so, the municipal housing company has experienced a continuous tradition of low service quality and commitment from the suppliers' side over the years within its range of operation in the municipality. It is perceived that because the cost-minimization orientation leads to regularly competing suppliers for bids based on the lowest market price – a traditional method of purchasing in the field – the service suppliers do not invest more than minimal resources in the locations that would ensure sufficient capacity for providing good quality, particularly for delivering the service on time. Thus, the operating culture in the field that is strongly based on price competition between the suppliers and economizing the use of resources, even with consequences to achieving target quality, has led the municipal housing company to integrate the suppliers in a more strategic way to direct them for a long-term oriented cooperation, resourcing, and improvements in both technical and functional service quality.

The reason why the two investors have not developed quality-related incentives is not completely explained by the data; however, the answer may include two alternative explanations. The first explanation may be that although the two investors perceive the same need for quality incentives, they have focused their development resources on more important and less developed service exchanges at a time. For instance, Investor 2 has focused much of its efforts towards developing the rather newly established separated technical maintenance and customer contact service functions. Rather than developing incentive systems, motivating the suppliers in the less critical caretaking function relies more on the fear of ending the service contract if there are major failures in service delivery. Similarly, a key informant from Investor 1 reported that it has considered whether certain quality-related incentive systems should be developed for cleaning, maintenance and caretaking. However, for the time being, the company's focus has primarily been on developing the more important service functions, referring to partnerships with the housing management suppliers and related management and ICT systems for managing service supply. This finding supports a strategic choice argument (Child, 1972) in which organizations, particularly large ones, can sustain inefficient or ineffective structures temporarily because of their slack resources.

Another possible explanation is that the municipal housing company perceives the quality of maintenance and caretaking as high, or the most important aspect of overall business performance, whereas the two investors do not value the basic maintenance activities as highly as, for instance, housing management (HM1) or technical maintenance (TM2).

“In the end, I perceive the overall functioning of maintenance and caretaking as the most important [...] if it doesn't work, it shows to the residents very quickly. If it doesn't work, it shows also in our end because the residents then contact us. Problems might come up in the properties, which have even structural implica-

tions, so I would see, and that's why I think of maintenance and caretaking, that it shows the easiest in both directions (end-customer and the housing company)" (Case 3: municipal housing company, property manager).

In this case, the perceived importance of service quality in maintenance and caretaking for overall business performance would be the driving factor for developing certain quality-related incentives for the suppliers. This is conditional, however, on where such quality incentives are detrimental because of low-quality orientation in the industry.

The findings are supported by previous manufacturing-based research on integration management, in which strategic supplier integration, including the requirement from major suppliers to contribute to cost and/or quality improvement, is found to be positively associated with the firm's market performance (Swink et al., 2007). It appears reasonable to suggest that activities aimed at cost improvements are undertaken with suppliers that are highly important to the buying firm's financial performance. Similarly, it would appear reasonable for quality improvements to be developed with suppliers because quality associated with those suppliers' service performance is considered a significant factor for the buyer's business performance. Supported by the empirical insights, the following two final propositions are offered with regard to strategic-impersonal integration:

Proposition 2.4a: In component service networks, integration is managed with strategic-impersonal integration by cost-related incentive systems when the service is considered highly important for the buyer's financial performance.

Proposition 2.4b: In spatially complex component service networks, integration is managed with strategic-impersonal integration by quality-related incentive systems when the service quality varies locally and is considered important for the buyer's business performance.

5.4.4 Summary of findings

The findings show that the management of integration in component service networks consisting of stable and established sub-networks is contingent on a variety of contextual characteristics. Five main contextualized conditions were identified to be associated with the management of integration in the studied service supply networks of the three buyers: the type of end-customer contact, the complexity of the service process, the novelty of the service (for the firm or the stage of development of the industry), the importance of the service to the buyer's financial performance, and the spatial complexity of the service supply network. Furthermore, four additional contextual conditions interact with the last condition, spatial complexity. These include demand fluctuation, the relational complexity of the supply network, the significance of an individual supplier, and local variation in service quality in relation to the importance of service quality for the buyer. The propositions are summarized in Figure 14.

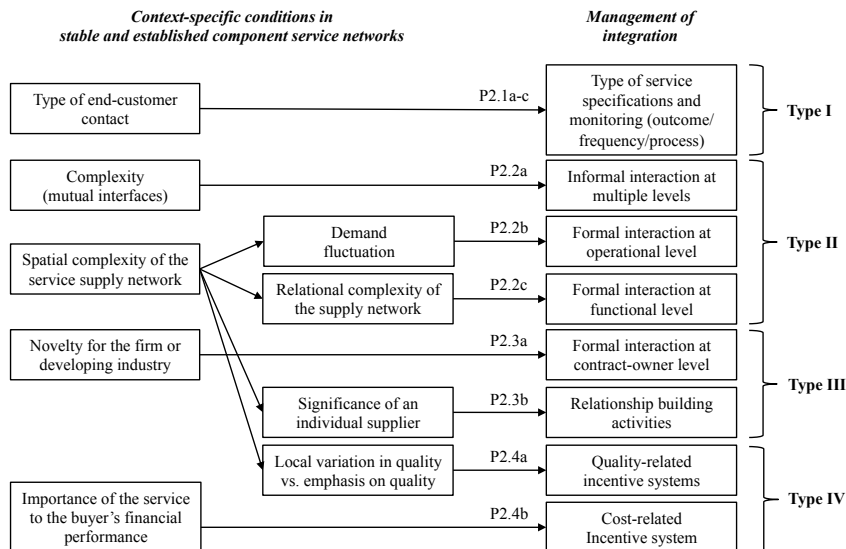


Figure 14. Model of integration management in stable and established component service networks

One important distinguishing factor for the management of integration appears to be whether the service, and thus the service supply network, is spatially complex. Services and service networks that are spatially complex require higher integration efforts than those that are not. The choice of designing sufficient information capacity to respond to these requirements is, however, conditioned by four considerations. First, designing operational level interaction appears to be a choice of building a sufficient level of information-processing capacity for integrating spatially complex networks to achieve stable service quality that can deal with regularly occurring situations, i.e., the stable portions of the supply network. Second, designing functional level interaction appears to be a consideration between the requirement of integrating spatially complex service networks and the cost of integrating relationally complex networks. For the majority of the studied cases, this limit already exceeds at low levels of relational complexity, which reflects either the centralization of purchases to fewer suppliers, if possible, and building relationships with them, or relying on integration management only at the operational level. Even in the latter case, relationship-building activities are used if individual suppliers within the service category are perceived as significant for the buyer. Third, the building of mechanisms for strategic-impersonal integration, particularly related to ensuring stable service quality in spatially complex component service networks, seem to be conditioned by how high the buyer values service quality as a function of business performance under the condition of locally varying service quality.

The conclusions are two-fold. First, in order to understand the management of integration in stable and established component service networks, the distinction between network types does not suffice, but the contingencies creating integration requirements in the networks should be contextualized, including

task-, network-, and environment-related characteristics. Second, and more broadly speaking, the traditional contingency view of examining relations between individual context and integration management variables seems to leave us only with a partial view of the use of integration mechanisms under different contextual conditions in component service networks. Instead, the study suggests that one should also look at interacting pairs or groups of contextual conditions for better understanding the considerations between the requirements and costs of integration. For this purpose, comparative qualitative inquiries and the contextualization of integration seem to offer a suitable strategy.

5.5 Study III: The management of integration and network evolution under changing contingencies in emerging component service networks

5.5.1 Overview of the study

This section presents a longitudinal case analysis of the management of integration under changing contingencies in emerging component service networks. In particular, the study investigates the management of integration and its contribution to network evolution under changing levels of uncertainty. The aim of the study is two-fold: (1) to identify and explain patterns between the management of integration and the initial sources and levels of uncertainty; and (2) to identify and explain patterns between the management of integration and network evolution when changes occur in the levels of uncertainty in the network. The resulting theoretical arguments attempt to increase the understanding of the different integration mechanisms' capacity to facilitate network evolution under changing contingencies in emerging component service networks.

The empirical context of the study is three senior housing concept development networks in Finland (SH1-3), where unique housing-service concepts are developed in collaboration⁷ between focal housing producers and nursing service producers, and a number of peripheral actors. The management of integration in the networks during different concept development stages was reported in the within case analysis in Section 5.2 (Table 17). Besides the initial sources and levels of uncertainty when initiating concept development reported in Section 5.3 (Table 20), the study provides longitudinal case descriptions for revealing the essential changes in the levels of uncertainty during collaboration. In addition, network evolution is elaborated through three common innovation network processes, including network stability, knowledge mobility, and innovation appropriability (Dhanaraj and Parkhe, 2006). Finally, in addition to the information processing perspective, the theoretical argumentation is supported with related literature on knowledge transfer and inter-organizational learning⁸.

Three empirically grounded propositions are formulated regarding the relation between integration mechanisms and initial sources and levels of uncertainty in emerging component service networks. In addition, two propositions offer contingency theoretical explanations for the contribution of integration management to network stability and knowledge mobility under changing lev-

⁷ Collaboration refers here to the purposeful joint activity in general, in which the actors in the network have engaged (cf. Hibbert et al., 2008).

⁸ A separate research stream from the information processing perspective known as the knowledge-based view of the firm (Grant, 1996) has developed over the past two decades. Building on the same foundations of early scholars in organizational design and with similar argumentation to that of the information processing perspective, this literature provides a valid reference point for the present study, however, uses the term 'knowledge' in its essential vocabulary with a similar meaning and content to 'information' as defined in this study (see Chapter 3). This study remains loyal to the original terminologies adopted in both research streams, and uses 'information' and 'knowledge' interchangeably as synonyms when theoretically grounding the arguments, the choice depending on the source literature.

els of uncertainty. The findings particularly stress the roles of team-based cross-functional integration to facilitate knowledge mobilization and evolving impersonal integration to ensure network stability. The longitudinal case descriptions and the results of the cross-case analysis are presented in the following sections.

5.5.2 Results of within-case analysis for the changes in contingencies

Longitudinal description of SH1

Initial contingencies

The contextual characteristics of SH1 at the initial stages of concept development include high uniqueness of the task, high task ambiguity and complexity, a reciprocal interdependence between the actors, and high difference between the real estate investors and the nursing service supplier (Table 27). SH1 represents a network seeking to develop a *unique* product-service concept, in which existing models did not exist for the concept, collaboration, or contracting when beginning joint development. In addition to the general novelty of the concept, the two real estate investors did not have experiences in the business field of senior housing and nursing services. Similarly, the specific focal actors did not have experience with collaboration of a similar type; rather, the only forms of previous collaboration between the investors related to traditional residential real estate investments.

The objectives of the network were loosely defined, focusing primarily on the long-term objectives of developing multiple similar types of senior housing locations across the growth centers in Finland based on a common concept. The objectives and idea occurred at a relatively general level, the main goal being to develop a duplicable concept that combines housing, services, and financing, to implement a pilot project in which the concept could be evaluated, refined, and eventually implemented on a wider scale in various geographical locations. Thus, the network was characterized by *high ambiguity* about the concept, where a number of more detailed design issues and implementation activities were not known in advance but needed to be developed in collaboration between the focal actors.

In addition, and partially related to the ambiguity of the concept, the concept was *highly complex*, involving multiple concept design issues to be planned and to meet the network's objectives. Such issues included the following: designing the concept's service and housing offering, including a variety of housing and service alternatives; offering financial instruments that would differentiate the concept from other possible concepts and would be attractive to consumers; and creating an overall business model that would enable concept duplication. In addition, the pilot project required finding and acquiring land for property development and committing key stakeholders to the project, including municipal land use planning and social and welfare agencies as both service suppliers and buyers.

Table 27. Summary of initial and changed conditions and perceived network evolution

Case	SH3	SH2	SH3
Initial contingencies	Uniqueness: High Ambiguity: High Complexity: High Dependence: Reciprocal Difference: High	Uniqueness: High Ambiguity: Moderate Complexity: Moderate Dependence: Reciprocal Difference: High	Uniqueness: High Ambiguity: Moderate Complexity: Moderate Dependence: Reciprocal Difference: High
Changed contingencies (Internal)	Strategy change (real estate investor) Objectives and business needs changed during the pilot project Key individuals changed during pilot project (CEO's of all focal organizations)	Change of the service supplier during concept development Changing and occurring needs during property development (service supplier) Strategy change (real estate investor) Initiating executives changed	Change of the service supplier between project stages 1 and 2 Commitment of the municipality varied during the development project Change of key individuals (municipal geriatric care) during cooperation
Changed contingencies (External)	Economic conditions in the environment changed, causing (1) increased construction costs, (2) collapse of the housing markets	Unexpected change of building type (and related regulation) by municipal supervision of building during property development causing also change in a public housing funding instrument	Rejection of public housing funding during the third project stage causing redesign of the property development
Network stability	Partner withdrawal from and termination of the pilot project Renegotiation of the collaboration contract Search continued for a new pilot location	The development project completed	All three development projects completed
Knowledge mobility	Initially collaboration perceived enjoyable and forward looking Skeptical and less motivated after changes in one actor's strategy and the key individuals Difficulties in communicating and understanding each other's business logics	Collaboration generally perceived open, development-oriented, and enjoyable (except project manager) The planning stage perceived extremely long and consuming (especially project manager) in comparison to traditional projects (3years)	In general, collaboration perceived open, motivated and trustworthy Lack of proactive planning and communication of needs from partners (housing company's perception)
Innovation appropriability	No realized financial outputs by the time of development Experienced unbalanced investments to idea development and marketing in relation to the partner's investment capabilities	Inefficient property design (in terms of construction costs, maintenance, and rents)	Efficiency of properties improved between the projects Perceived as the most efficient nursing service solution in the municipality Multiple non-functionality issues occurred with the building design

Finally, the development activities within the network needed to be implemented in a *reciprocal* manner both between the focal actors and between the focal network and the essential peripheral stakeholders. Because the concept needed to be feasible from a business standpoint for all of the focal actors, the requirements of each actor's business had to be incorporated into the concept design. What made this task challenging was the fact that the organizations, particularly the real estate investors and the nursing service suppliers, *differed* from each other in multiple ways. In particular, from the perspective of information integration, the cognitive and domain distance of the actors played a key role; the terminologies, business logics, and the surrounding business environments of the actors from different industries were unfamiliar for the others. Given this, designing a concept that would fulfill the three focal actors'

business requirements was perceived as challenging before sufficient common ground was achieved for understanding each other.

“We cooperate this closely with another field of business, and people from a different domain, so there is the issue of how we speak. We have also needed to learn quite a lot all kinds of nursing service terminology in order to understand what we speak of. And now I realized that I still don’t know whether it is a group-home, or dementia-, or assisted-living, or what the correct term is, so there’s all this kind of little issues where we have needed to learn common language” (Case 4: investor, director, service development).

Changes in contingencies during collaboration

Three types of major changes occurred during the concept development, particularly during the pilot project planning. At approximately the same time in summer/fall 2008, the chief executive officers of the nursing service supplier and one of the real estate investors involved in the network changed in the companies and were replaced by new executives. As a result, the collaboration contract and the concept were re-evaluated by the new key individuals, who expressed skepticism towards the original concept.

“Then became the change of the [nursing supplier’s] CEO, and if I exaggerate a little, the new CEO questioned almost everything the previous had done and said. So, we ended up going through the development again for many rounds. That was maybe a little frustrating phase for at least me. And about the same time there became changes in people and strategies also in the [real estate investor’s] organization. And there was also a kind of situation where people emphasizing the softer aspects of business were replaced by people who had calculators in their hands. So overall in that stage, the whole thing begun to slightly fall apart.” (Case 4: investor, CEO)

During the concept re-evaluation led by the new executives, it was perceived that the original concept and the pilot project were not feasible for the businesses of the focal actors. Multiple rounds of re-planning and re-negotiation were undertaken in the steering group between the focal organizations’ executives to redesign the contractual responsibilities of the actors and restore balance in the collaboration. At approximately the same time in fall 2008, the external economic conditions and the corporate strategy of the other real estate investor changed. One consequence of the changed economies was an increase in construction costs, and hence, also the lowered feasibility of the pilot project. Moreover, the new corporate strategy of the real estate investor was no longer aligned with the network’s objectives, having little room for risky and less profitable senior housing than traditional housing production. As a result, the real estate investor with a new strategy withdrew from the pilot project, followed by a withdrawal of the nursing service supplier, and resulting in termination of the pilot project.

Network evolution after change in contingencies

To some extent, SH1 represents an unsuccessful case; the case failed to achieve its objective, at least with the first trial, of completing a pilot project based on the designed concept. The project was ultimately terminated because of changes in the external economic situation during the pilot project and changes in one partner's strategy that led to its withdrawal from the pilot project. Although collaboration with the other organizations and their individuals had functioned well in the initiation, idea, and concept development stages, collaboration began to fall apart after the key individuals changed and the pilot project began to fail.

The general objective and idea of the network had been, and continued to be, relatively stable and clear for the focal network members. However, differing views prevailed regarding the feasibility of the concept's underlying business model, the roles and responsibilities of each actor, and the clarity of the financial component in the concept – an essential and unique component compared to traditional senior housing concepts.

“As I recall, I never received in my hands a written description of what the financial service would look like.” (Case 4: real estate investor, director, project development)

After terminating the pilot project, a new round of negotiations took place and the collaboration contract was refined, resulting in even less detailed, loosely defined objectives. In addition, the responsibilities and commitments of the focal actors in the network were reduced. Furthermore, a new team led by the initiating focal organization was established to find a suitable location for a new pilot project.

Longitudinal description of SH2

Initial contingencies

The contextual characteristics of SH2, when initiating the concept development, include high uniqueness of the task, moderate task ambiguity and complexity, reciprocal interdependence of the focal actors' in concept design, and high difference between the real estate investor and the nursing service supplier's operating domains (Table 5-14). The concept represents a novel senior housing location in the Finnish context, in terms of housing and service combinations and the extensiveness of the concept in terms of financial investments and the number of apartments and residents. More importantly, the focal actors did not have experience developing any similar types of concepts and related housing and service contracting solutions, nor did they have experience collaborating with each other.

The objectives and the overall property solution were clear when the real estate investor and the nursing service supplier became involved in the network. These boundaries had been decided by the municipality when initiating the concept development in 2000 through land use planning and an architect de-

sign competition for the property. However, when the actual implementing actors, the real estate investor and the nursing service supplier, became involved in the project in 2005 and 2006, the actual service design and a more detailed building design did not exist. There was also a lack of information regarding whether the municipality should purchase nursing home beds from the nursing service supplier or whether the nursing service supplier should sell the beds to other municipalities or directly to consumers.

The overall concept was clearly identifiable, including a single property development and related service design, and did not include plans for future collaboration. However, a number of design issues were novel and not clearly related to the service and property design and contractual design, including the financing model and the responsibilities of each actor. In particular, designing the contractual arrangements, responsibilities, and related financial benefits were perceived to be highly time consuming throughout concept development.

“It has been a completely novel project for both of us. It must be confessed that we dealt with new issues. No ready-made model existed, but we have made a kind of trial-and-error search, and it took then two years with these contracts.”
(Case 5: real estate investors, contract manager)

In addition, the construction of the property was based on a public housing funding instrument that needed to be customized for an exceptional project, and which had not been previously funded by the Housing Funding and Development Agency. The service, property and contractual design required the combined information of the real estate investor and the nursing service supplier, in addition to communication and a re-modification of the plans with the architectural agency that had created the initial plans. Furthermore, the plans had to be negotiated and refined with, and approved by the public housing funding agency.

Combining the actors' information was challenging because of the different operating domains of the real estate investor and the nursing service supplier. The key differences included different terminology to be translated for the other actors to understand and the capability of each actor to evaluate the requirements and related design solutions proposed by other actors. For example, the nursing supplier's service director had difficulty understanding and commenting on the building plans proposed by the real estate investor, whereas the real estate investor's project manager did not have the competence to evaluate every situation and design issue requested by the nursing service supplier.

“In the beginning I got the feeling that they (nursing service supplier) almost gave orders which spaces in the building are needed and how much and all that sort. Those kinds of things that increase costs, and you yourself did not necessarily have any understanding whether they were needed” (Case 5: real estate investor, project manager)

Changes in contingencies during collaboration

Four types of changes occurred in the network's contextual conditions during the concept development, generating ambiguity regarding the concept and differences between the actors. First, the nursing service supplier changed in September 2007 because of a business acquisition by another service company. The new nursing service supplier and its new CEO and directors re-evaluated the concept plans and perceived them as infeasible for their business. As a result, some of the solutions in the original concept design were re-evaluated, calculated, and rejected or modified. One major change involved an increase in the number of nursing home units. The nursing home units doubled during the third and final building planning stage, requiring the real estate investor, architect, and public housing funding agency to redesign and negotiate the building plan and financing and to refine and change the area's original building plan.

Second, the initiating CEO and development manager of the real estate investor changed during the concept development. Consequently, some of the information was lost regarding the original motivations and ideas in the concept. For instance, the new managers were not able to describe the original motivation for involvement in the concept development, except for general ideas. In particular, it was perceived that the real estate investor would not commit to a similar construction project in normal circumstances. This view was emphasized when the regulations for public housing funding were refined during concept development, and it was discovered that the new housing funding instrument, essential for the concept to succeed financially, did not enable profit making according to the company's goals.

Third, both the nursing service supplier's needs and the regulatory needs for the properties had varied during the concept and property development as new circumstances or information appeared. The nursing service supplier changed its originally communicated requirements for the building design numerous times, which caused the building planning to return to a lower level of detail. For instance, after a while of negotiating and drafting contracts, the nursing service supplier realized a way to improve the financial efficiency of the concept using a different contractual design solution than the one originally designed. Although some of the changes were renegotiated in the contracts, others were left unnoticed.

“For instance, we came across VAT issues. And we had long negotiated that the contracts will be made with model A, until it was found that it causes them (nursing service supplier) certain VAT implication, which was by the way found by us, in which case they could not commit to contracting with model A, but model B was needed. So, an issue that should have well been in their knowledge was negotiated for months, until it was found that they cannot do it. [...] It (certain tax treatment) relates to this industry (geriatric care), to my understanding. And we would have had a possibility to get a VAT return for the kitchen premises of scale 50 to 60 thousand euros, but that would have required the actor to apply itself as VAT something. So, we put our hands up.” (Case 5: real estate investor, contract manager)

From the regulatory perspective, the municipal land use planning and construction supervision changed their definition for the building type from housing to a health care facility in the very final stages of building planning. This required re-developments and negotiations in the building design, for instance, for fulfilling the fire safety regulations and the eligibility for the public housing funding instrument.

Finally, the real estate investor's corporate strategy changed during the concept development, such that the new strategy no longer included senior housing as a key investment segment. The change in strategy, however, was not perceived to influence the project in question because the major investments were already made to the development, and the construction project needed to be finalized in order to capitalize on those investments. Instead, the change affected the investor's will not to engage in new similar projects.

Network evolution after change in contingencies

The network's evolution and the ultimate achievement of the network's objectives received contradictory reviews. The overall aim generally was achieved, completing the development project and continuing the collaboration with ongoing service supply. On one hand, the building was perceived as exceptional, unique, and esthetically well designed. On the other hand, the property was perceived as extremely inefficient in terms of both production costs and maintenance costs, resulting in high rents for the apartments.

“It is a highly inefficient building. There are huge common spaces, wide aisles. A tenant always thinks of the efficiency of space utilization, in a way that there are as much leasable square meters as possible, and this building is really... The planning has not started by thinking (about) the efficiency.” (Case 5: real estate investor, contract manager)

Similarly, collaboration in general has been perceived as well functioning, open, and development oriented, with some exceptions. In particular, the property planning stage was perceived as extremely long and consuming in comparison to more traditional housing construction projects.

“This (collaboration) has involved quite heavy conflicts from the beginning, and as they (architect agency) are paid by us, they should have listened to the client's voice, instead of acting as omniscient in every single issue. So, there have been these kinds of negative aspects during the whole project. [...] So, these kinds of projects are really heavy, for the organization to begin with. First we had the planning stage, which took about three years, and then getting the project a building permit along with the continuous disagreements that prevailed during the project.” (Case 5: real estate investor, project manager)

From the perspective of the real estate investor's project manager, some of the main reasons for the challenges were the lack of competence of the nursing service supplier in proactive planning and communicating its needs for the

premises and contracts, and the architect's lack of motivation towards joint development and open negotiation.

Longitudinal description of SH3

Initial contingencies

The contextual characteristics of SH3, when initiating the concept development, include the high uniqueness of the task, moderate task ambiguity and complexity, the reciprocal interdependence of the focal actors' efforts, and high difference between the municipal housing company, the municipal geriatric care agency, and the nursing service supplier's operating domains (Table 5-14). The case network sought to develop a novel senior housing concept that combined different types of housing, including independent living, assisted living, home care services, and nursing home types of housing. For each type of housing, a property was developed within the same plot of land. Furthermore, the fourth stage of development included a regular housing location, including premises for different types of service suppliers. The extensiveness of the concept as well as the combination of a variety of housing and services are novel in the Finnish housing context. In particular, the intensive home care in assisted living has neither been used or contracted previously in the municipality nor combined with nursing home care. In addition to service and contractual novelty, the three focal actors did not have experience working with each other; similarly, the municipal housing company did not have experience with nursing homes or the field of nursing.

“We were a housing construction company. We didn't have any experience of nursing homes or seniors' housing” (Case 6: municipal housing company, project manager)

The general objectives for the network were relatively concrete and clear: to implement and complete a combination of three as well as the planned fourth project sequentially. The construction project was also granted approval and commitment from the town board before the project launch. However, longer-term objectives for network after the project completion was not planned in advance; instead, each participating organization had its own objectives for applying the experiences received from the projects in other areas of their operations. Moreover, there was lack of information of the final nursing service supplier, which would be sought through a bidding process and selected by the municipal geriatric care agency to deliver services after designing the concept and the properties.

The concept development included a number of design issues, including property and service design, contractual arrangements, the negotiation of the public housing funding instrument, and applying novel construction methods in the property development. The contractual design received significant attention from the municipality; an independent development project was launched to design service contracts and quotes in collaboration with six sur-

rounding municipalities. The goal was to exploit the contracts designed for the specific concept development through service outsourcing in the participating municipalities. Similarly, a separate development project was launched and funded by the public housing funding agency and the public funding agency for technology and innovation to develop a duplicable novel construction method for low-energy buildings. In this case, the financing for the services was guaranteed because the municipal geriatric care would rent the properties from the housing company and deliver the nursing services partially by outsourcing and partially by itself. Thus, by being limited to an identifiable series of projects, the complexity and the ambiguity of the concept and its implementation related more to the service, property, and contract design than the concept's business model.

One main goal of the development was to combine different types of housing and services and therefore improve the efficiency of service supply. This goal required the focal actors, particularly the municipal geriatric care and the housing company, to collaborate and combine their specialized knowledge in both property design and financial design. After the service supplier was selected for the project, this reciprocal information sharing, planning, and negotiating extended to more detailed operational interfaces between the focal actors.

“Invoicing, for instance. When we were supposed to begin to make the first invoices it was revealed that it wasn't that simple, but we needed to first create the invoicing principles. So, with which kinds of principles the invoices are made, and how they are made etc. It has taken us quite a lot of time and energy to create this type of routines and cooperation models.” (Case 6: nursing service supplier, director)

Similarly, the responsibilities of each actor in property and equipment maintenance and the decisions about emerging needs for repairs in the properties have often been the key agendas in the collaboration.

However, collaboration in the issues has been complicated because of the difference in the actors' operating domains and decision-making capabilities. The informants reported multiple misfits in perceptions and understanding between individuals in the real estate and nursing service domains regarding the necessity of certain communicated needs, requirements, and desires, such as issues in the properties that challenged or prevented service supply in the properties. Moreover, the slower decision-making speed of the municipal agencies in comparison to the housing company and the nursing service supplier, was perceived to slow the development and cause frustration in some of the individuals, particularly the construction project manager, engaged in the project.

Changes in contingencies during collaboration

Three types of partially interrelated changes occurred in the conditional conditions of the network, increasing ambiguity and difference during the concept

development. First, the municipal geriatric care agency's objectives and needs changed multiple times during the concept and property development. For instance, although the original idea for housing and services in the third property of the concept was independent living and related home care services, a need emerged during building planning for "heavier" nursing home type of service, requiring major changes in the building design. In addition, although the original idea was that the nursing service supplier would provide home care service to the third property's residents, the municipality decided in the very final stages of property development to provide the changed nursing home service itself.

Similarly, although an initial commitment had been received from the town board to support and accept the construction project, varying opinions about the entire concept prevailed within the board. Between the second and the third stage of development, as other health care related projects were decided in the municipality, the town board's commitment to continue supporting the senior housing project was questioned. For a period of time, the municipal housing company decided to continue the construction project even without certainty about the municipality's involvement and support. Although in the end, the municipal geriatric care agency perceived a need to use the property, uncertainty initially prevailed about the municipality's objectives and strategic decisions during the time of development.

"The first property, where the 24/7 nursing home unit is, went nicely in collaboration. Then, when building the second property, some uncertainty prevailed whether the municipality was or was not on board. Then, however, in the final stages, when the housing services for the elderly in the municipality were rearranged, the property was in great need. Similarly for the third property development, which is now completed by the summer, the municipal long-term care withdrew from the project at some point completely. And the municipal housing company just decided that the construction work is a kind of activity that once started today it cannot be ended tomorrow, but it's a big train that moves forward, and they decided to build it with an idea that senior housing in the municipality will be needed in the future. So, even though the long-term care does not want to commit to it, it will be needed. And so it happened again that there's a tremendous need for that building." (Case 6: municipal urban planning, director)

Finally, a third type of major change in the network's conditions included the change of the director of the municipal geriatric care agency twice during the concept development. In addition to possibly reflecting the overall evolution of the organization of the geriatric care and related town board's decisions, the new directors needed to be settled in the development to ensure the continuity of the concept development. Even more importantly, the nursing service supplier changed between stages one and two in the concept development. This change was perceived as extremely problematic for numerous reasons. First, the change was not conducted smoothly but several misunderstandings and interruptions occurred during the change of personnel and nursing equipment, although the residents and their care needed to continue without inter-

ruptions. Second, whereas the previous supplier had assisted in the design of the second property from the point of view of service functionality, the new supplier with differing opinions had not been involved in property design.

Network evolution after change in contingencies

The case network had somewhat succeeded in realizing its objectives. First, the development project was concluded and service operations and developments continued in the housing locations. Second, the later stages in the property developments, particularly the third property, turned out to be the most efficient building in the concept and for the municipal housing company in general. Similarly, the municipal geriatric care agency estimated that the concept's service model has decreased the service costs for residents who have moved into the new senior housing location.

“This (second project) has offered us a new concept. We haven't had before this kind of assisted individual living. [...] we received whopping savings because if one (nursing home bed) costs about 40 to 60 thousand euro per year, here the cost is...we haven't calculated the exact cost saving, but it costs us now about one third of it” (Case 6: municipal long-term care agency, director).

Conversely, from the service supplier's perspective, the properties were not perceived to be functional in terms of service supply. Conversely, several issues needed to be corrected and repaired after beginning the service operations for the building to fulfill the regulatory requirements and to enable effective service supply.

At a general level, collaboration was perceived as positive, open, and oriented towards problem solving between the focal actors. At a more operational level, several specific issues in the collaboration were perceived as challenging during the concept development. The key informants for the three focal actors perceived some lack of understanding and information gaps on the other actors' behalf. On one hand, the municipal housing company perceived that the uncertainty and changes in the municipality's objectives and needs for the properties caused additional work and costs for the construction projects. On the other hand, the nursing service supplier perceived that the municipal housing company did not completely understand and fulfill its responsibilities towards maintaining and repairing the properties to ensure uninterrupted service supply, a critical element from their perspective to ensure the safety and health of the residents.

“We discuss time to time with (the municipal housing company), it can be said of little things about the lines of responsibilities. [...] A concrete example is, which I think is quite unbelievable, that every floor here has its own balcony. And they have these doorsteps and our residents could not get into those balconies because there weren't any ramps. And it took time to get those ramps. It was really difficult. They were asked and promised and promised, and it lasted and lasted. And in a way, it felt like it was not really realized (from the housing

company's side) what the issue was about." (Case 6: nursing service supplier, unit manager)

5.5.3 Results of cross-case analysis for the management of integration

The management of integration and the sources and levels of uncertainty

Two findings appear commonly across the three networks. First, the three cases represent networks of *high uniqueness* of the concepts under development as well as the network constellation engaged in the development activities, a *reciprocal dependence* of the network members in concept development, and *high difference* between the actor's operating domains. Second, with regards to managing integration, the networks involve functional structures based on development and planning teams or working pairs engaged in frequent, often needs-based interaction for communicating and combining information of the specialized actors.

Grounding on literature and related terminology on knowledge transfer, the contextual similarities reflect the following three general properties of knowledge – novelty, dependence, and difference (Carlile and Rebentisch, 2003) – which all influence integration across knowledge boundaries. In general, the higher the degree of novelty is, the higher the amount of effort required to adequately share and assess knowledge is (Carlile, 2004). When novelties are present, the problem shifts from merely processing explicit information to learning about the sources that create the differences that exist at a knowledge boundary. This situation creates a requirement to generate “mutual understanding” through communities of interaction in which individuals can work through the differences (Carlile, 2002). Consequently, personal integration mechanisms should be emphasized for building sufficient information-processing capacity to respond to the high integration requirements (Adler, 1995; Carlile, 2004).

In addition to novelty, the reciprocity of knowledge for accomplishing the task creates integration requirements. This situation is also referred to as “reciprocal learning” (Lubatkin et al., 2001), in which the primary intent of cooperation is to co-experiment and leverage each other's unique but complementary knowledge structures, creating new knowledge through a blending of knowledge, co-learning, and joint discovery. As the number of dependencies increase between actors, the amount of effort required to share and assess knowledge increases (Carlile, 2004). Thus, tasks with reciprocal interdependence require greater or richer information-processing capacity than what impersonal devices can carry (Galbraith, 1973; Daft and Lengel, 1986). Mutual adjustment, referring to personal interaction between two or more actors, is then used for transferring the specialized knowledge of different actors when the tasks and knowledge required to accomplish those tasks are interdependent (Grant, 1996; Thompson, 1967).

Finally, the need for integration is emphasized when the difference in the actor' operating domains, particularly the cognitive distance between the actors

(Noteboom, 2000; Noteboom et al., 2007), is high, requiring the creation of sufficient common knowledge for the actors to effectively share and understand their differing knowledge bases (Grant, 1996). This third property of knowledge inherently includes the paradox of inter-organizational learning. On one hand, creating a complex product or service often requires differences in the amount and type of knowledge (Carlile, 2004) because products and services introduced by firms that are cooperating across industries tend to be more innovative than products introduced by firms that are cooperating within the same industry (Kotabe and Swan, 1995). On the other hand, the capacity to co-learn and jointly discover is dependent on the similarity of the partners' general knowledge base (Lubatkin et al., 2001). The difference between organizations creates differences in training, expertise, experience, terminologies, tools, and incentives that are unique to each specialized domain (Carlile, 2004; Pennings, 1975) up to a point, where inter-organizational learning is likely to be hindered by a lack of either ability or motivation to absorb and communicate knowledge between the partner organizations (Larsson et al., 1998). Thus, at very high levels of overlapping knowledge, partners have little to learn from one another, whereas at very low levels of overlap, partners find it difficult to communicate with and learn from each other (Noteboom et al., 2007; Simonin, 1999). Consequently, as the difference in the domain-specific knowledge increases between actors, the amount of effort required to adequately share and assess each other's knowledge also increases (Carlile, 2004).

Proposition 3.1: In emerging component service networks, personal integration within functions is associated with reciprocal interdependence and high difference between actors, as reflected in the use of functional development teams or working pairs between the collaborating organizations.

In addition to functional integration, some form of cross-functional integration is used in all networks to knit the separately developed parts of the concept together and to ensure continuity in the concept development from one development stage to another. In SH1, the management of integration across the development functions was organized into a multi-organization steering group that jointly planned and agreed upon the functional developments and direction of the entire concept. In SH2 and SH3, cross-functional communication, often needs-based, occurred mainly between responsible managers in each development stage or function. In SH2, the working pair of contract managers was the main integrating structure between different functions and development stages, supported by a central role played by the construction project manager as a liaison between development functions. Similarly in SH3, first the CEO and later the project manager of the municipal housing company were the key individuals driving the development and collaboration between various actors in the network. Later, a formal steering group was formed between the CEO of the municipal housing company and the directors of the municipal geriatric care agency, the nursing service supplier, and the real estate management and maintenance service supplier, gathering approximately

three times per year to review and negotiate issues that had occurred in the collaboration, and solving disputes regarding the responsibilities of each actor.

Similarly, the cases vary in the degree of complexity of the concept under development. All of the cases involve multiple components that must be incorporated and decided upon in the concept development. However, to a certain extent, SH1 represents the most complex concept by incorporating not only property-related and service-related design issues but also the design of a business model that builds on a unique financing instrument. Moreover, although the two other concept developments were targeted into a clearly identifiable construction project or a series of projects, the development in SH1 involved the development of a completely separate business segment, particularly in the two investors' offering. Finally, in SH3, the complexity increased in the network as service operations began simultaneously with the later project stages, including the planning of more detailed operational interfaces between the actors.

According to the information-processing perspective, higher task complexity creates additional uncertainty because of the higher number of interface coordination issues to be solved (Adler, 1995; Perrow, 1961). This finding is further reflected in higher requirements for the organization's information-processing capacity (Tushman and Nadler, 1978). In general, integration is found to be highly beneficial in challenging and complex tasks and organizations (Turkulainen and Ketokivi, 2013). Thus, for transferring complex knowledge between partners, mechanisms with high information-processing capacity are needed and are also beneficial for the organization. Such mechanisms include joint problem-solving arrangements that promote the transfer of complex and difficult-to-codify knowledge (McEvily and Marcus, 2005). For this purpose, liaison roles played by functional or project managers offer a certain degree of information-processing capacity for information integration across functions (Galbraith, 1973, 1977). However, higher task complexity may overload the information-processing capacity of a rationally bounded individual liaison (March and Simon, 1958), particularly when knowledge transformation, instead of sole transfer, is required (Carlile, 2004). In this case, group modes (Van de Ven and Delbecq, 1974) or teams (Ancona and Caldwell, 1992) are needed to offer higher capacity to process novel knowledge combinations.

Proposition 3.2: In emerging component service networks, the use of cross-functional teams is associated with higher task complexity, and the use of liaison roles with lower task complexity for managing integration.

Finally, the level of detail in contracts used for impersonal integration reflects the level of task ambiguity inherent in the case networks varying from moderate to high. In summary, SH1 represents less clear objectives and a less-detailed picture of the overall concept and its different parts in the beginning of concept development than SH2 and SH3. Respectively, the initially crafted collaboration contract in SH1 was a framing one with rather loosely defined objectives and described roles and responsibilities of each actor. Similarly, the marketing material and concept design documents were conducted at a gen-

eral level. For instance, it was not clear for the partners whether and which type of financing instrument, a key unique element in the concept, had been developed and proposed. Conversely, in SH3, a highly detailed collaboration contract was developed by the municipal geriatric care agency in the context of an independent development project participated in and funded by five other surrounding municipalities, aiming to exploit the same contract formulas in their own projects and service outsourcing arrangements. SH2 falls in between these two opposites. The joint development between the real estate investor and the nursing service supplier was initiated without existing contracts. However, the contracts and other concept documentation were continuously developed to an increasing detail for the purpose of codifying the evolving information about the concept and the responsibilities of actors as well as managing the relations between the real estate investor, the nursing service supplier, and the future residents.

High ambiguity refers to a situation in which the tasks and problems are poorly defined and vague (Perrow, 1967; Van de Ven et al., 1976). Like difference, ambiguity also reflects the paradox of knowledge; although ambiguity hampers knowledge transfer, it also has a strategic significance because it makes knowledge more difficult for competitors to imitate (Wijk et al., 2008). Moreover, ambiguity and complexity are interrelated constructs; task complexity is one antecedent of, and positively related to, task ambiguity (Reed and DePhilippi, 1994; Simonin, 1999). This may also explain why the case featuring initially high task complexity also featured high ambiguity, and why cases with less complexity had a lower level of task ambiguity.

Because ambiguity is negatively related to inter-organizational knowledge transfer (Simonin, 1999), higher ambiguity requires integration mechanisms that facilitate the transfer of richer information (Daft and Lengel, 1986). Thus, formalization or impersonalization may not offer sufficient information-processing capacity in ambiguous situations, but personal integration mechanisms are required. In the case of high ambiguity, it may not even be possible to codify information, and hence impersonalize information transfer, because many of the objectives and tasks at hand are unclear or multiple interpretations exist for the present situation. Without clear understanding about the value activities and processes, clearly defined standards through impersonal mechanisms might not be possible to make initially. Instead, they incrementally evolve as more information is available and more detailed understanding of the tasks develops.

Proposition 3.3: In emerging component service networks, higher level of impersonal integration is associated with lower level of task ambiguity, as reflected in the use of detailed contracts in moderately ambiguous tasks and framing contracts in highly ambiguous tasks.

The management of integration and network evolution under changes in the levels of uncertainty

The longitudinal analysis shows three essential changes in the networks' contextual conditions during concept development. These include changes in the focal actors' objectives and needs toward the concept, changes of focal actors' or key interest groups' strategies or commitment with the concept, and changes in key individuals. As a result of the changes in all three case networks, ambiguity regarding the concepts and collaboration as well as differences within the networks increased. Furthermore, the changes in contextual conditions were responded differently in the networks, resulting in differing evolutionary paths for the networks.

In SH3, the multiple interpretations of old and new actors about the conditions were first and foremost solved by relying on the existing detailed contracts and joint problem solving and renegotiation in the steering group for those problems that the contracts did not solve. Similarly, in SH2, the new ambiguities, particularly regarding the changing needs in the concept design, were discussed and renegotiated at the specific function in question and codified at the cross-functional contracting level, modifying and continuously developing the contracts. Both projects were also completed, and the cooperation continued into managing and further developing the service operations.

In SH1, where the contracts were loosely framed, new ambiguities and differences between actors, particularly when the key individuals changed, needed to be renegotiated in the cross-functional steering group. The concept development suffered from multiple reinterpretations and renegotiations in multiple issues, including the founding principles of the collaboration, eventually leading to project dissolution when other severe ambiguities arose that could not be easily solved in a reasonable time. After the project termination, the collaboration contract was recomposed, turning into a yet more loosely framed one than the original, in terms of the objectives and the actors' responsibilities. The interpretation for the case is that the use of cross-functional personal integration did not suffice to manage the increasing differences and ambiguities in the network, nor did the loosely defined contracts provide a means for settling the disagreements and conflicting interpretations in a manner that would have provided network stability under the changing internal and external conditions.

Previous studies show that the ambiguity of projects generally decreases during the project lifecycle, decreasing the integration requirements and the related needs for information processing across functional units (Adler, 1995; Morris, 1982). The studied cases show, however, that although some of the ambiguities may have decreased and may have been solved during collaboration, new ambiguities arose because of changes in the internal and external conditions of the network. According to the structural adaptation to regain fit model (Donaldson, 1987), such increases in the level of uncertainty creates additional integration requirements and need to be responded to for sustaining the network's effectiveness.

The findings suggest that in emerging component service networks, increasing task ambiguity and/or increasing difference within the network causes additional requirements for integration, which must be addressed both proactively and reactively to facilitate network evolution towards achieving the network's objectives. This is supported by previous literature on knowledge transfer and inter-organizational learning. Changes in either the internal or external conditions of the collaboration cause the actors to reassess the equity and efficiency of the collaboration. Furthermore, the partners' assessments cause them to either engage in re-negotiation of the terms of the contract or to modify their behavior unilaterally, in an attempt to restore balance to the relationship. (Ariño and de la Torre, 1998) In other words, the actors face a pragmatic boundary in which negotiation and the transformation of past knowledge is required to develop common interests that allow actors to address the consequences, differences, and dependencies of each other's domain-specific knowledge (Carlile, 2004: 560). This renegotiation continues until a new mutual understanding of the network's equity and common interests are restored (Ariño and de la Torre, 1998). This finding explains the long planning and negotiation stages in SH1 and SH2, which experienced both external and internal changes in the cooperation and caused changes in the concept designs.

Conversely, networks and alliances may collapse when the collaboration is subjected to environmental changes or shifts in the overall strategies of the partners (Kumar and Nti, 1998). If mutual understanding and agreement is not reached at the renegotiation stage, the aggrieved party may react unilaterally in an attempt to restore its lost efficiency or equity (Ariño and de la Torre, 1998). In SH1, one of the real estate investors made a unilateral decision to exit the pilot project, causing project termination and the engagement of the actors in renegotiating the entire collaboration contract. In SH3, the municipal housing company decided to continue with the project in the third property development stage although the commitment from the municipal long-term care agency was uncertain during a period of time.

The types of unilateral actions possibly causing network disruption are likely solutions when the relationship quality is low or there are no established procedures for conflict resolution (Ariño and de la Torre, 1998). Standardized forms and methods provide a shared format for solving problems across different functional settings, establishing a shared language for individuals to represent their knowledge (Carlile, 2002). Thus, procedural issues are critical from the start of a collaborative venture in fostering a climate of positive reinforcement and in building mutual trust and confidence in the relationship (Ariño and de la Torre, 1998), facilitating innovation network stability (Dhanaraj and Parkhe, 2006). In SH1, such standardization and procedural issues were not notably present because of loosely framed contracts and operating principles. Instead, the conflicting interpretations that arose contributed to a reduction in the actors' confidence in the network's ability to achieve its objectives.

Proposition 3.4: Emerging component service networks facing increasing ambiguity and/or difference as the collaboration evolves are better able to sustain network stability when the management of integration is based on sufficient level of impersonal integration, as reflected in increasingly detailed formal contracting.

This sufficient level of impersonal integration cannot be clearly determined from the study's data. Furthermore, although sufficient for facilitating network stability, the used integration mechanisms may not suffice to facilitate efficient knowledge mobility throughout the network. In SH1 and SH3, where team structures were used in concept and property planning, the collaboration was perceived on average to be satisfactory throughout the development projects. In SH2, however, the original project manager had resigned from the task because of the challenges in reciprocally collaborating with the architectural agency. The new project manager and the contract manager perceived collaboration to be extremely challenging throughout the project because of constantly changing requirements and needs regarding the concept design, causing a series of multiple renegotiations and returns to previous stages of development. In particular, the property planning stage was perceived as extremely challenging and long in comparison to traditional housing projects. In addition, because the project did not have a joint forum or steering group where individuals from different functions communicated, the informants in different development functions were unaware whether information about plans and decisions had been received and processed in other functions.

In general, when resources and tasks change, managing partner dependencies require the capacity to develop an adequate common knowledge (Carlile, 2004). Under increasing ambiguities, richer media for information integration is needed to facilitate better understanding of causally ambiguous information (Daft and Lengel, 1986). The role of a project manager as the key integrative liaison may become overloaded as further ambiguities arise during the concept and project development. Because of the bounded rationality (Simon, 1949; March and Simon, 1958) and the resulting limitation of an individual to process all necessary information, the project manager may encounter difficulties in understanding, interpreting, evaluating, and combining the different types of specialized knowledge of various actors, causing dissatisfaction and frustration towards cooperation. Conversely, group modes and teams are associated with greater information-processing capacity to deal with the increasing integration requirements caused by increasing ambiguities, facilitating the exchange of existing views among managers to define problems and resolve conflicts through the enactment of a shared interpretation that can direct future activities (Daft and Lengel, 1986).

Proposition 3.5: In emerging component service networks facing increasing ambiguity as the collaboration evolves, team-based structures for cross-functional integration are associated with higher knowledge mobilization and further innovation appropriability than using liaison roles.

5.5.4 Summary of findings

The study reveals two essential components of integration management in emerging component service networks (Figure 15). First, the findings stress the role of evolving impersonal integration for sustaining network stability even if the contextual conditions of the network change. The study also reveals the paradox of ambiguity in emerging networks, in which initially high task ambiguity may prevent the combination and codification of information necessary to prevent possible future network instabilities. In the context of the studied networks, the changes endangering network stability related to changes in strategies and objectives of the focal organizations and changes in key personnel or even some of the focal organizations involved in the innovation network. The evolving impersonal integration related primarily to increasingly detailed formal codification of information throughout the service concept development.

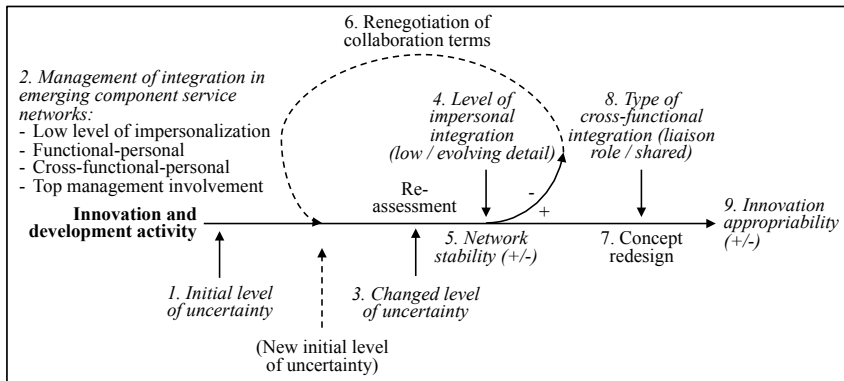


Figure 15. A framework of integration management and network evolution in emerging component service networks

Second, the study highlights the need to develop sufficient information-processing capacity for managing simultaneously novel and complex tasks and for responding to possible increases in uncertainty because of unanticipated changes in the concept or collaboration. In particular, the findings emphasize the building of a sufficient information processing capacity through team-based cross-functional integration mechanisms, whereas liaison roles played by individual managers may become overloaded from the requirement to manage multiple knowledge boundaries and complexities in the course of increasing differences between actors and multiple interpretations about implementation. This is particularly the case when the concept development faces unanticipated changes either in internal objectives or external requirements, requiring the re-design and re-negotiation of solutions that are interdependent of the changed conditions. Although the network may sustain its stability even if cross-functional capacity does not fully reflect the integration requirements, the lack of information-processing capacity might eventually lead to inefficient

mobility of information within the network and further to dissatisfactory outcomes, as shown in SH2.

Finally, the study generally emphasizes the importance of adopting a longitudinal perspective to better understand the integration requirements and respective management practice in emerging component service networks. The study suggests that because emerging networks are inherently continuously evolving, one needs to understand the changes in contingencies as the network evolves in order to understand the integration management practices and their contribution to further network evolution. The results of the three studies are summarized next.

5.6 Summary of results: Inducing general propositions

The results of the three studies can be summarized as follows. Study I examined the management of integration characterizing the three ideal types of component service networks. The study shows that the management of integration has differing common patterns in the three network types reflecting the sources and/or overall level of uncertainty inherent in the networks follows:

- **Stable component service networks** are characterized by the use of high levels of impersonal integration and personal integration between organizations at operational level for managing integration (Proposition 1.1a-b) reflecting the uncertainty deriving from the complexity of the supply network and the resulting heterogeneity of service supply and dispersion of information about service performance (Proposition 1.2).
- **Established component service networks** are characterized by the use of high levels of impersonal integration and functional information integrators for managing integration (Proposition 1.3a-b) reflecting the overall moderate level of uncertainty deriving from moderate levels of novelty and ambiguity about service effectiveness, and/or mutual interfaces and dependencies between the actors' processes (Proposition 1.4).
- **Emerging component service networks** are characterized by low levels of impersonal integration in the beginning of collaboration, personal integration within functions, cross-functional integration between organizations, and top management involvement in the beginning of cooperation for managing integration (Proposition 1.5a-d) reflecting the overall high level of uncertainty deriving from high levels of task uniqueness, reciprocal interdependence and difference between the collaborating actors, and moderate to high levels of ambiguity and task complexity (Proposition 1.6).

A general argument induced from the findings of Study I can be formulated as follows:

Proposition 1: The common patterns of integration management in stable, established, and emerging component service networks are to a certain extent contingent on the network type characterized by different sources and/or overall level of uncertainty.

As the proposition postulates, the uncertainties characterizing the three ideal types of strategic service networks *to a certain extent* explain the **general patterns of integration management** within the networks. However, the study also discovered (1) differences in integration management within each network type, (2) differences in the sources of uncertainty, particularly in established networks, as well as (3) overlap in the use of integration mechanisms among network types, particularly between stable and established component service networks. Two additional studies were established to uncover these differences and overlaps.

Study II refined the value network framework for stable and established component service networks by further contextualizing the management of integration in the component service networks of three organizational buyers. It was found, first, that the management of integration within the sub-networks varies in the *type of integration*, not completely aligned with the distinction between stable and established networks. Second, the *integration mechanisms* used for managing integration were found to associate with the characteristics of the exchanged services, the supply network structure, and characteristics of the supply environment in each network. The following empirically grounded arguments were formulated of the use of integration mechanisms for the four types of integration:

- **Operational-impersonal integration:** The type of service specifications and monitoring (*input, output, process*) are associated with the type of end-customer contact and the ability to quantify technical service quality (Propositions 2.1a-c).
- **Operational-personal integration:** The formality and level of operational interaction are associated with the complexity of the service (Proposition 2.2a), the interaction of the spatial complexity of the supply network and the fluctuation of service supply (Proposition 2.2b), and the interaction of the spatial complexity of the supply network, the importance of the service to the buyer's business performance and the relational complexity of the supply network (Proposition 2.2c).
- **Strategic-personal integration:** The purpose of strategic-personal interaction is associated with the novelty of the service (Proposition 2.3a) and the interaction of the spatial complexity of the service supply network and the significance of individual suppliers in the network (Propositions 2.3b).
- **Strategic-impersonal integration:** The type of supplier incentive systems (*cost, quality*) is associated with the importance of the service to the buyer's financial performance (Proposition 2.4a) and the interaction of the spatial complexity of the supply network and the importance of service quality for the buyer's business performance (Propositions 2.4b).

A general argument induced from the findings of Study II can be formulated as follows:

Proposition 2: The management of integration in stable and established component service networks is contingent on service-, network-, and environment-related characteristics, four of them being general across the networks and additional four conditioning spatially complex networks.

Finally, Study III adopted a longitudinal perspective for investigating the management of integration and its contribution to network evolution under changing contingencies in emerging component service networks. In particular, four contingency-theoretical arguments were proposed of the level of impersonal integration and type of cross-functional-personal integration. First, in emerging component service networks, the level of impersonal integration is contingent on the level of task ambiguity (Proposition 3.3). Furthermore, under condition of increasing ambiguity and/or difference between the actors, network stability is facilitated when the management of integration is based on a sufficient level of impersonal integration, as reflected in increasingly detailed formal contracting (Proposition 3.4). Second, in emerging component service networks, the type cross-functional integration is contingent on the level of task complexity (Proposition 3.2). Furthermore, under condition of increasing ambiguity, team-based structures for cross-functional integration are associated with higher knowledge mobilization and further innovation appropriability than using liaison roles (Proposition 3.5). A general argument induced from the findings of Study III can be formulated as follows:

Proposition 3: The management of integration and its contribution to network evolution in emerging component service networks is contingent on both initial task ambiguity and complexity and changing levels of task ambiguity and/or difference between actors.

The presented findings and arguments are discussed next in relation to the original research question and objectives along with implications for industrial network and service supply chain management research.

6. Discussion and conclusions

This chapter reflects the results back to the original research question and objectives as well as the theoretical discourses from which the motivation to conduct the study originated. The contribution of the study to industrial network and service supply chain management research will be discussed and the managerial implications of the findings will be proposed. These are followed by a discussion of the theoretical and methodological limitations of the research. The chapter concludes by suggesting directions for future research.

6.1 Assessment of research objectives

The purpose of the study was to develop a contingency view of service network management, focusing especially on the management of integration in the context of component services. In particular, the study aimed to understand **how and why integration is managed in strategic component service networks**. The following more specific research objectives were established to answer the research question:

1. To synthesize current knowledge on network management and service supply chain management;
- 2a. To elaborate the management of integration and uncertainties that characterize stable, established, and emerging component service networks;
- 2b. To examine the management of integration and context-specific conditions in component service networks composed of stable and established sub-networks;
- 2c. To examine the management of integration and its contribution to network evolution under changing levels of uncertainty in emerging component service networks.

Objective 1 was assessed by systematically reviewing literature on network management and reviewing relevant identified literature on service supply chain management (*Chapter 2*). The reviews resulted in (1) state-of-the-art frameworks of extant research on network management and service supply chain management, (2) the identification of important gaps relevant to this inquiry, and (3) the positioning of the research within the two streams of literature.

Objective 2a was assessed by examining (1) the integration mechanisms for managing integration and (2) the sources and level of uncertainty in 15 stable,

established, and emerging component service networks in the Finnish residential real estate sector (*Section 5.1*). The study resulted in the identification of common patterns in the use of integration mechanisms and the sources and/or level of uncertainty for each network type. Based on the empirical elaboration of the value network framework, the study argued the following:

Argument 1: The common patterns of integration management in stable, established, and emerging component service networks are to a certain extent contingent on the network type characterized by different sources and/or overall level of uncertainty.

Objective 2b was assessed by empirically investigating (1) the management of integration and (2) the context-specific conditions in residential real estate management and maintenance networks of three organizational buyers, consisting of 12 stable and established sub-networks (*Section 5.2*). The multiple-case analysis resulted in a refined contingency view of integration in stable and established component service networks, by showing the associations between the use of integration mechanisms and service-, network-, and environment-related characteristics. The general argument was formulated as follows:

Argument 2: The management of integration in stable and established component service networks is contingent on service-, network-, and environment-related characteristics, four of them being general across the networks and additional four conditioning spatially complex networks.

Finally, objective 2c was assessed by empirically investigating (1) the management of integration, (2) the initial and changed contextual conditions, and (3) network evolution in the context of three senior housing concept development networks (*Section 5.3*). The longitudinal case analysis resulted in a refined contingency view of integration in emerging component service networks particularly for the level of impersonal integration and the type of cross-functional-personal integration. The study argued the following:

Argument 3: The management of integration and its contribution to network evolution in emerging component service networks is contingent on both initial task ambiguity and complexity and changing levels of task ambiguity and/or difference between actors.

6.2 Theoretical contribution

6.2.1 Implications to industrial network management research

The research contributes to industrial network management research both conceptually and empirically. The contribution relates to developing the emerging contingency-based view of network management (Järvensivu and Möller, 2009) by empirically elaborating and refining the original value network (Möller and Rajala, 2007; Möller et al., 2005; Möller and Svahn, 2003) in the context of component service networks. The contribution can be then

considered to unfold at the level of middle-range theorizing (Burgeois, 1979; Glaser and Strauss, 1967; Merton, 1949).

The conceptual contribution relates to the synthesis of the fragmented field of network management research into a conceptual framework. The framework primarily continues the work of Järvensivu and Möller (2009) by distinguishing among five different perspectives or dimensions for understanding the management of strategic organizational networks as well as the main antecedents and consequences of network management. The study breaks from the tradition of building separate silos of network management theory within different network contexts and disciplines, offering a common language of concepts and a common framework for advancing the development of a unified theory of managing inter-organizational entities. To provide a more comprehensive theory of network management, the framework helps researchers to position their studies on the five main dimensions of network management, providing cumulative knowledge about network management practice with regards to the specific dimension, their performance or evolutionary consequences in addition to the contingent factors determining management practice. Furthermore, multilevel investigations – both conceptual and empirical – can be conducted and reported, whereby two or more dimensions of network management are examined in combination to provide knowledge of configurations of network management practice and their consequences under different contextual conditions.

The empirical contribution of the research to industrial network management research is two-fold. First, to the best of the author's knowledge, the study introduces the first empirical elaboration of the value network framework (Möller and Rajala, 2007). In doing so, the study clarifies the distinction between the different types of strategic networks and their managerial requirements in the context of component services. Previous network management studies have either examined specific types of strategic networks from stable supply chains (e.g., Knight and Harland, 2005; Svahn and Westerlund, 2007) to innovative R&D ventures (e.g., Dhanaral and Parkhe, 2006; Heikkinen et al., 2007). However, few studies have compared and explained managerial differences in the various types of strategic networks (e.g., Möller et al., 2005; Möller and Svahn, 2006; Möller and Rajala, 2007; Ritter et al., 2004). Moreover, focusing mainly on network management tasks (Möller and Rajala, 2007) or capabilities (Möller and Svahn, 2003), current understanding about the managerial requirements in different networks has remained conceptual. Using the information-processing perspective (Galbraith, 1973) as the underlying theoretical idea and empirical evidence from 15 component service networks, the study offers empirically grounded explanations for the common patterns of integration management in stable, established, and emerging networks based on the uncertainties that characterize the networks.

Second, the study refines the original value network framework in two ways attempting to offer a more realistic view of the contingent nature of network management in the context of service networks, and in particular, component service networks. For stable and established component service networks, the

study suggests abandoning the drawing of a fuzzy line between the stable and established in the context of services. Instead, the study emphasizes the view of service network management as contingent on the contextualized characteristics of the services, the supply network structures, and the operating environment specific for each network. For emerging component service networks, the study emphasizes the adoption of a longitudinal perspective to better understand the evolution of the network further reflecting how it is managed.

Taken together, the study responds to the call for more fine-grained, empirically grounded contingency-based explanations for network management in different types of strategic networks (Möller and Rajala, 2007; Möller et al., 2005; Möller and Svahn, 2006). In general, the study supports and further develops the contingency-based view of network management (Järvensivu and Möller, 2009), proposing that service network management is contingent on the characteristics of the service, the supply network structure, and the operating environment as well as changes in these contingencies as the network evolves.

6.2.2 Implications to service operations and supply chain research

Similar to industrial network research, the study contributes primarily to service supply chain management and secondarily to supply chain integration research both conceptually and empirically. At the conceptual level, the study provides an updated synthesis of relevant literature on service supply chain management. Based on the review, current service supply chain management research consists of the following topic areas: (1) service sourcing, (2) service supply chain/network structure, and (3) service supply chain management tasks. In addition, three crosscutting research themes attempt to (4) characterize services and theorize about the nature of service supply and service supply chains in general, (5) classify different types of services and service supply chains, and (6) operationalize and translate supply chain management concepts from goods to services contexts. A significant amount of this research aims to develop a general understanding regarding the special features of managing services as distinct from goods and compare supply chain management practice between goods and service industries. What seems to be needed is a more refined understanding of the management of different types of services, particularly during ongoing exchange relations and from the service buyer's perspective. As suggested by this study, adopting a contingency view and contextualizing common manufacturing-based supply chain management concepts to services seems like a viable research strategy (cf. Chen and Paulraj, 2004).

The study contributes empirically to service supply chain management literature by extending and contextualizing the existing manufacturing-based supply chain integration concept to the services context. The study adopted a holistic view of buyer-supplier coordination and control, interaction, and information management in service supply chains through the established concept of supply chain integration, focusing particularly on external integration (Bariki and Pinsonneault, 2005). Rather than creating separate models for under-

standing manufacturing and service supply chain management, the study identified concepts and variables from the existing manufacturing-based supply chain integration framework that are essential to understanding management in service supply chains, as suggested in the service operations research agenda (Chen and Paulraj, 2004).

Most importantly, aligned with recent research on integration (e.g., Turkulainen and Ketokivi, 2013), the study stresses the importance of contextualizing the key concepts of integration. One feature of current service supply chain management studies is the comparison of management tasks either between goods and service firms or among the various types of service exchanges characterized by a particular key dimension, such as application or technology (e.g., Wynstra et al., 2006). By focusing on specific types of service supply networks that have been created to supply and develop component services (Wynstra et al., 2006; Balakrishnan et al., 2008), the study offers explanations for perceived managerial differences within component service exchanges, which have not yet been explained using the previously identified and predicted “ideal patterns” (van der Valk et al., 2009; van der Valk and Wynstra, 2012). In addition to the traditional importance, complexity, and novelty constructs (e.g., McQuiston, 1989), essential contextual conditions in the services context include (1) *the type of end-customer contact* and (2) the level of geographical dispersion of service supply resulting in *spatially*, and in some cases, *relationally complex supply networks*. Moreover, (3) *demand fluctuation* is emphasized in the context of services, which, by nature, are intangible, and thus impossible to store for later use and thus to respond to demand peaks. Finally, because of the individual- and location-specificity of many service encounters, the (4) *locally varying operating cultures* and resulting heterogeneity of service supply was shown to create additional requirements for integration.

With regards to supply chain integration research more generally, the holistic perspective on integration provides a fine-grained understanding of the concept to better comprehend its multiple dimensions. Traditionally, operational and strategic integration concepts are investigated separately, and studies have been called for to examine the interplay of strategic and operational supply chain integration (e.g., Swink et al., 2007). The holistic perspective assumes, first, that different supply chain management tasks, such as buyer-supplier interaction and supplier development, cannot be fully understood in isolation. Instead, a single integration mechanism may serve multiple purposes. For instance, an integration mechanism based on personal interaction and designed for coordinating and controlling purposes may simultaneously function as a means of developing individual relations between the exchanging actors. Thus, examining only coordination and control mechanisms and their performance impacts might be misleading; the very mechanism might also serve other purposes, further contributing to performance. Second, the traditional contingency view of examining relations between individual context and integration management variables seems to leave us only with a partial view of reality. Instead, the study suggests that one should also look at interacting

pairs or groups of contextual conditions for better understanding the considerations between the requirements and costs of integration.

Such a view is aligned with the configurational perspective of integration (e.g., Das et al., 2006; Flynn et al., 2010), suggesting that maximizing the use of each individual aspect of integration might not lead to high performance, but that “optimal” sets and levels of integration for firm performance can be identified that are contingent on the organizational context. The study identifies several contextual conditions associated with different types of integration, supporting the idea that there is a suitable or sufficient degree of integration under different contextual conditions. For instance, the high importance of a service function for the buyer’s business performance is associated with a partnering type of integration, the novelty of the service with a collaboration type of integration, and the complexity of service with a problem-solving type of integration. Furthermore, the spatial complexity of the supply network cuts across the different levels of integration activity, and interacts with other contextual conditions suggesting an “optimal” integration level for spatially complex networks based on these other conditions.

Identifying the contextual conditions in explaining integration may also help to interpret previous findings on the performance implications of supplier integration. For instance, based on the findings, organizational buyers adopt strategic integration orientation in tasks of high significance to the buyer’s business performance in terms of operating costs. Hence, strategic supplier integration itself does not necessarily lead to direct improvements in the firm’s market performance, but rather, only when applied to exchanges with high impact on cost performance. Similarly, even in the case of important tasks, the cost deriving from a high number of suppliers in the business function may exceed the benefits of strategic integration. In these cases, market performance is then conditioned by effective operational integration to develop production capabilities (e.g., Swink et al., 2007).

At the most general level, the study suggests that the integration mechanisms used by organizational buyers to manage integration in their service supply networks depend on the contextual characteristics of the exchanged services, the supply network structure, and the supply environment. The findings thus support the contingency-based view of operations management research instead of limiting attention to practice-performance relations without understanding why such practices occur (Flynn et al., 2010; Sousa and Voss, 2008; Turkulainen and Ketokivi, 2012).

6.3 Implications to practice

The results of the case studies inform practicing managers in networked organizations in the following ways. The study provides a framework of the different sources and levels of uncertainties characterizing the different types of component service networks in which contemporary firms operate. Furthermore, the study suggests patterns of integration mechanisms that, based on the contingency argument, meet the integration requirements created by those

uncertainties. Whether operating in stable, established, or emerging component service networks, sufficient information-processing capacity must be developed in the network by adjusting the amount and richness of integration within the network and ensuring that the management of integration occurs at “optimal” levels between the organizations in correspondence to the network’s requirements.

The study also suggests for organizations that purchase component services to develop integration mechanisms that are simultaneously able to respond to different contextual conditions creating integration requirements and cost efficient. The findings of the second study provide evidence of the following integration-context combinations. First, outcome- and/or process-based service specifications and related monitoring reflect whether the service interface with end-customer is technical or functional and whether the service outcomes are quantifiable. Second, informal communication channels are allowed in the network across organizational levels for complex service exchanges with multiple organizational interfaces. Third, mechanisms for formal interaction aimed at service or process development are built into the management system for novel services. Fourth, formal operational interaction and relationship-building activities are included for spatially complex service networks whenever the cost of building more management capacity does not exceed the benefits of personal integration in comparison to economizing integration through impersonal mechanisms. Fifth, highly important supply network relations for the buyer’s business performance are equipped with financial- and/or quality-related incentive systems, whichever are emphasized by the buyer as important factors for its overall business performance.

Finally, fitting the management of integration with the contextual conditions does not necessarily suffice over time. Instead, especially for emerging component service networks, in which the task and possibly the network and environment evolve continuously, the management of integration should reflect the changes in the network’s contingencies for facilitating positive network evolution. Based on the findings of the third study, actors engaged in developing novel component services in emerging networks should invest in continuously developing the impersonal integration mechanisms as the collaboration evolves for facilitating network stability even if changes occur in the task, the network’s constellation, or the external environment. Furthermore, investing in team-based cross-functional-personal mechanisms can be used to support the functioning of individuals having liaison roles in the network for facilitating sufficient mobility of information, and further advance concept development that serves equal innovation appropriability.

6.4 Limitations of the research

6.4.1 Theoretical choices

This study has examined organizational structures, focusing in particular on mechanisms created and used to manage integration in intentionally created

stable, established, and emerging networks in the context of component services. Three important and partly interrelated assumptions and theoretical choices have been made during the course of the research. First, organizational networks are seen as intentionally created, purposeful arrangements between organizations, instead of serendipitous, emergent structures. Second, organizational structures are seen from a structural contingency perspective (Lawrence and Lorsch, 1967; Donaldson, 2001), where the design of organizational structures is driven by the rationality criterion of organization-environment fit, hypothesizing that organizational effectiveness results from fitting the organization structure with the contingencies in the operating context. Third, an information-processing perspective (Daft and Lengel, 1986; Galbraith, 1973; Tushman and Nadler, 1978; Van de Ven et al., 1976) was chosen as the underlying theoretical idea, limiting the research focus to organizational structuring as an information-processing problem. Some of the main theoretical limitations deriving from these theoretical choices include the following.

The first theoretical limitation of the study relates to the underlying assumption regarding networks as strategic, intentionally created, and purposeful constellations of organizations viewed from an egocentric perspective. It is perceived that the networks studied are intentionally created by the focal organization or organizations to achieve certain objectives. Similarly, it is perceived that the focal organization or organizations have purposefully designed the structures for managing inter-organizational exchange and information transfer to fulfill certain structural requirements created by the organizational context. Attached to this is the assumption of organizations as rational systems, whereby rationally bounded individuals make choices based on information about the environment (Simon, 1997[1947]; Simon and March, 1993[1958]).

An alternative perspective of networks as serendipitous, emergent entities, views the structures to emerge as a result of interaction, influencing, and bargaining games between social and economic actors (e.g., Andersson et al., 1994; Håkansson and Snehota, 1989). On one hand, management structures can be then viewed as mechanisms to influence the power distribution and perceptions of network members, emphasizing interaction and communication between the actors, instead of deliberate and direct coordination and control of activities within the network. On the other hand, the structures emerge and evolve as a result of this interaction and bargaining. Although the choice of viewing networks as deliberate and strategic organizational arrangements focused the research on formal organizational structures, understanding management structures from an emergent view would have required focusing on the interaction and decision-making processes and resulting power games through which the structures evolve. The difference between the strategic and emergent views of networks is closely related to

The second theoretical choice relates to adopting a contingency perspective to understand organizational structures, and leaving other possible lenses to viewing organizational structures outside the scope of the research. Two such alternatives could have included an institutional perspective (e.g., DiMaggio

and Powell, 1983; Meyer and Rowan, 1977; Scott, 2008) and a strategic choice perspective (e.g., Chandler, 1962; Child, 1972). An institutional perspective for understanding network management structures would suggest that the management mechanisms perceived are based on regulatory, normative, and/or cultural-cognitive properties inherent in the operating context (Scott, 2008). This perspective would also reflect closely on the view of networks as emergent entities. Rather than resulting from intentional design and activity of managers pursuing economic rationality, the structures results from isomorphic processes (DiMaggio and Powell, 1983), in which each organization in the organization field, even against economic rationality, uses similar structures for gaining legitimacy or coordination efficiency in the market (Scott, 2008). In line with the emergent view of networks, assessing network management from an institutional perspective would have turned the focus either to the decision-making processes during interactions or a more macro view for investigating the development of management structures within organizational fields or industry clusters. Although these areas were intentionally left out of the scope of this study, they represent potentially interesting avenues for further inquiries.

A strategic choice perspective (Child, 1972) also partly rejects the deterministic view of the structural contingency theory, according to which contextual characteristics determine organizational structure. Instead, it suggests that organizations, particularly large ones, are able to function effectively with organization structures that do not entirely fit with the contextual requirements. In some cases, organizations may even influence or change the contingent characteristics of the context to gain fit with the current structure (Child, 1972). Revealing such strategic choices would have required an evolutionary approach to assessing whether the identified structures had survived over a period of time, contrary to the requirements created by the organizational environment. Alternatively, the inquiry could have focused on contextual changes that have resulted from longer-term high performance of the organization, generating new levels of contingencies, as suggested in the neo-contingency model (Donaldson, 2001; see also Chandler, 1962). The strategic choice perspective was not adopted in this inquiry, mainly because of the criticism it has received. In general, the structural contingency scholars suggest that the discretion of large or monopolistic organizations to utilize incompatible structures is only a temporal state, and eventually the slack resources of the organization, which enables this temporary misfit, is consumed and the organization needs to change to survive (Donaldson, 2001).

Third, the choice to focus on organizational integration and to adopt the information-processing perspective as the underlying theoretical idea posits three limitations in theoretical focus for the findings. First, the information-processing perspective of organizations limit the attention to structures that specifically address the practices and management mechanisms for transferring information in response the organizational information-processing problem (Galbraith, 1973). What is left outside, for instance, are structures to safeguard the organizations from opportunistic behavior (Williamson, 1985) or

moral hazards (Jensen and Meckling, 1976). Second, only the structural characteristics, particularly relating to the tasks, networks and the environment, were considered as determinants for those structures. Based on an intentional choice, behavioral patterns and power issues within the network are left outside the investigation as possible explanations for the existence of different management structures. Finally, although the study focused on formal structures for coordination at the organizational level of analysis, the informal information transfer within the network of social relations at the socio-psychological level of analysis (Scott and Davis, 2007) were not considered. These types of assessments were not within the focus of this research and would require a complete inquiry of their own.

6.4.2 Methodological choices

A case study research design

A case study design was selected as the study's research strategy. Although case studies bring forth insights into the topic and context under which the phenomenon is studied, the disadvantage is the generalizability of the findings to other contexts and populations, and needs careful consideration. Given the relatively early state of research on management of different types of strategic service networks and service supply chains, as well as the inherent difficulties of quantitatively collecting empirical evidence from multi-party networks of organizations (e.g., Grabher and Powell, 2004), qualitative research approach using case studies seemed suitable for recognizing the special characteristics of services and the contextual conditions associated with management practice.

The analytical generalization, and thus external validity of the findings was aimed to improve by discussing each theoretical proposition in relation to the selected theoretical background and other relevant literature. However, future research is needed for assessing and expanding the results of this study to other contexts either by conducting further case studies in other service industries, or quantitatively testing the formulated propositions with cross-industry assessments across a variety of service categories and networks. The validity and reliability of conducting case studies, and how they were assessed in this study, were discussed earlier in Chapter 4.

Unit of analysis

The context, and *the unit of interest* in the study were networks of actors purposefully created for supplying and developing different types of services or service concepts. However, the units of analyses were three-fold. For the most part, the unit of analysis was **a dyad** between the focal organization and its customers, suppliers and partners, or **a portfolio of dyads** between the customers, suppliers and partners. In few instances, the unit of analysis was **a network** constituting of three or more actors, including the focal organization and its suppliers, partners, or other stakeholders.

The former is mainly based on the fact that most network management structures in the studied networks, such as contracts, service specifications and regular meetings, are developed at the relationship level between the focal organization and individual suppliers or partners within a service category. In these cases, the purpose of management structures is to align the goals, interests, and perceptions of the two organizations, direct action of the supplying or partnering organization within a portfolio of relations, and foster interpersonal relationships between individuals within those organizations. The latter appear mainly when *strategic personal integration* occurs between the actors. Examples of such include partnership events organized by service buyers and participated by multiple suppliers; joint meetings between the focal organization and all of its suppliers in a specific service category; joint multiparty meetings in emerging networks during concept design or development project implementation stages; and the steering group meetings of emerging networks. In such occasions, network management can be considered to occur at the network level, where goals, interests and knowledge of multiple actors are aimed to integrate into a shared understanding and direction for the network.

The three-folded nature of the unit of analysis describes the multi-faceted nature of organizational networks and their management; in some occasions, the object of management is a relationship between buyers and suppliers, in others a portfolio or network of suppliers or partners within a same business function, and, in some cases, a cross-functional multiparty network (Möller and Halinen, 1999). The disadvantage of using multiple units of analysis within the case studies is that whether the object of management is a single relationship or a constellation of multiple actors most likely creates additional requirements for integration management in addition to those caused by the characteristics of the task, the network, or the environment. As a result, management in networks of multiparty constellations and networks of individual relationships may not be directly comparable because of the more complex power distribution issues, decision-making processes, and group dynamics associated with more than two actors in dyad. In this study, the issue arises when comparing the stable and established networks with those of emerging concept development collaborations. Thus, the results need to be evaluated and extended to other contexts with caution. This applies particularly the larger the organizational network gets where joint contracts are formed and interaction occurs.

Despite this challenge with multiple units or levels of analysis, the choice was important given this research objective. Whether management differs between the different levels was not the focus of this research. Rather, the aim was to explore the use of these multi-level management structures and the reasons they exist in networks of organizations. For this purpose, it seemed crucial not to lock oneself into a specific level of analysis, but instead to allow the unit of analysis to emerge and evolve as a result of the process of systematic combining, in which the data collection and analysis evolved simultaneously (Dubois and Gadde, 2002). Clearly, locking the perspective into only one level of analysis, for instance, the whole network (Provan et al., 2007), would have neglect-

ed some of the essential management structures and mechanisms occurring at the relationship level, producing only a partial picture of the reality.

One way to minimize the challenge with the naturally occurring units of analysis in the cases was the literal sampling and replication of the findings within each type of strategic network. In addition, the sizes of all the studied networks, in terms of number of actors, are rather low, with the exception of MC1 and MC2. Although the networks fulfill the general definition of a network consisting of three or more nodes (e.g., Borgatti and Foster, 2003; Thorrelli, 1986), future studies should include both large and small networks in the sample to investigate and control the effect of network size on uncertainties, particularly the complexity construct, across the different types of strategic service networks, and further to the management structures at different network levels.

Sampling of cases

The cases were theoretically sampled to represent different types of strategic networks and service exchanges for comparative purposes and to formulate theoretical propositions about the differences in network management. In addition, literal sampling was used to provide more than one embedded unit for each type of strategic network and similar service category. Only one of the service categories, the customer contact service of real estate investor 2, could not be replicated, because such an outsourcing strategy could not be identified during the initial case scanning within the field in other large organizations. Case selection was based on the exploratory interview study conducted in the beginning of the research project to ensure the selection of theoretically suitable, interesting and, to some extent, “best-practice” cases within the studied empirical context.

Because all cases are unique in some ways (Yin, 2009), selecting some other organizations, services and related networks under investigation might naturally have influenced the analysis and the results. To propose theoretical generalizations outside the context of the study, the critical boundary conditions must be identified within which the results can be expected to hold (Dubin, 1978; Yin, 2009). The important boundary conditions of the research relate back to the original motivations of the research, including the following: (1) the types of organizational networks, (2) the types of services, (3) the institutional and market context, and (4) the types of organizations studied.

First, the assumption of networks as strategic “networks of organizations” and the egocentric view on network management relate to the fact that power within the studied stable and established networks is distributed unequally. With regard to the stable and established networks, the buyer has to a large extent determined the contracts in advance, including the tasks that the service suppliers must perform, the structures and processes for coordinating and monitoring service supply, and other management structures with development-oriented objectives. Thus, the powerful service buyer has to a large extent influenced the network and management structures to be used in managing the network.

This approach distinguishes *the types of networks* studied, for instance, from policy networks, in which the outcomes and evolution of the network is to a certain degree a result of bargaining processes between the actors (e.g., Klijn and Koppenjan, 2006). Thus, the results should be considered to apply to other network settings with certain criticism. The types of networks that the findings would be expected to hold include networks with unequal power distribution in favor of a focal organization or organizations, such as other types of supply networks or project networks with technologically competent buyers, and innovation networks or alliances with an identifiable hub or some other dominant player.

Second, *the types of services studied* – real estate management and maintenance, and seniors' housing concepts – can be characterized as component services (Wynstra et al., 2006). In comparison to services that are purchased and developed by an actor for its own consumption and applied in its own value production process, triadic component services are primarily purchased and developed in favor of a third-party customer. Thus, the organizations buy and sell or jointly develop the services, whereas the ultimate receiver or perceiver of the service is a third-party end-customer, i.e., the residents. In addition, the services in the industrial context of residential real estate sector can be considered as rather simple commodity services when compared to a more professional type of services (e.g., Lewis and Brown, 2012), for instance, services purchased for maintaining high technology products or consultancy services.

These findings have at least two implications for network management practice, and thus for interpreting and generalizing the findings. First, in production services (e.g., Jackson et al., 1988), the conduct of services and service quality is controlled by the buyer, not only for the specific service delivery but also eventually when controlling the firm's output to the end-customer, for the production of which the service has contributed at some point in the production process. In component service provision, however, the service supplier contributes directly to the service performance perceived by the end-customer. As a result, the control of service provision is not "internally built" into the buyer's own production process; rather, the buyer must develop another means of controlling service output that is directly delivered either in the end-customer's premises or for the end-customer.

Second, in component services, the service provider has two different, inter-related customers with possibly differing perceptions about service performance: the contract relation with the buyer and the service relation with the end-customer. In production services, the buyer and the service receiver are usually part of the same entity or organization, and thus any misalignment in perceptions regarding service performance can be handled and communicated internally between the contract-level and the service-receiver level. For component services, the same process must be implemented external to the buying organization both between the buyer and the service supplier, the buyer and the end-customer, and in some cases, even between the service supplier and

the end-customer. This process creates a further need to align goals and expectations among the different parties, i.e., managing integration in the network.

Based on the elaboration of the two characteristics of component services for network management, the findings can be considered to present evidence of management structures developed for higher, or at least different, integration requirements than what are found in production services or other types of manufacturing contexts, where the manufacturer controls and delivers the final output to the end-customer. Combined with the notion of technologically competent buyers, this finding would also rule out at least some more professional services (Lewis and Brown, 2012), in which information asymmetry occurs for the supplier's benefit because the service exchanges require more extensive bidirectional information sharing (Sampson, 2000) than in commodity services, such as those studied here. The areas in which the results are expected to apply include similar component service contexts such as outsourced health care, logistics, customer contact service or product maintenance in various industries, or manufacturing settings that are spatially decentralized into multiple geographical locations. Such areas also might include the manufacturing operations of multinational corporations, with the exception of the possible effect that different national institutional environments create to manage service operations (Trauttman et al., 2009).

Third, the study examined the management of integration within a single industry, the real estate services sector in the Finnish *institutional context*. However, it is possible that different industries or national contexts with different institutional properties present different contextual conditions that further create differing management requirements than those identified in this study. Similarly, the domestically oriented and polarized *market structure* of the Finnish real estate services sector might essentially differ from larger domestic economies or from sectors with higher levels of internationalization. The institutional and market contexts relate to the supply environment characteristics of the service exchanges, where regulations, norms, and operating cultures, as well as power structures, market turbulence and speed of change may vary to a large extent across industry and national boundaries. Because it is difficult to predict the impact of such environmental conditions on these findings, similar studies should be conducted in other institutional and market contexts to reveal the important contextual factors associated with possible differences in service network management.

Fourth, *the organizations studied* are all large in size and have high service purchasing or delivery volumes to coordinate and monitor when compared to the industry average and a number of supplier and customer relations to manage. Accordingly, the organizations represent a rather high formalization of management structures both within and outside of their organizations. This factor might distinguish the structuring of organizations and networks studied from the structure of networks formed by small and medium enterprises, start-ups, or entrepreneurs, often investigated when considering, for instance, a firm's innovation activities or internationalization efforts (e.g., Ruokonen et al., 2006). Accordingly, the results should be considered as repre-

sentative of integration management applied by large or semi-large organizations, in which the organization's size has resulted in the division and formalization of intra-organizational structures (e.g., Chandler, 1962; Pugh, 1970), possible also affecting the organization of organizational boundaries.

Data sources

The data sources in relation to the different integration mechanisms and contextual conditions were primarily limited to **interviews** in the focal and supplying or partnering organizations. This approach has both advantages and disadvantages regarding the trustworthiness of the research. One advantage is that interviews grant information on a variety of management structures used to manage integration within the networks and between the organizations. Another advantage is that interviewing informants from multiple organizational levels and organizations granted information regarding the types and contents of both the "designed" mechanisms from the perspective of the strategic management and "actual" mechanisms from the perspective of the operational management. The disadvantage is that the information provided by the informants is often a synthesis of common practices supported with exemplary situations, with the less frequently occurring "ad-hoc" and informal practices remaining possibly hidden from the researcher. This approach also aligns with the pragmatic realist approach, in which the "unobservables" might limit the researchers' view of the complete phenomenon (Van de Ven, 2007).

Suitable data to assess the impersonal mechanisms for information transfer would have included different types of **documents**, such as service contracts and maintenance manuals, and access to the information and communication technology databases used to coordinate and monitor service activities. Although these data were also requested from the informants in the case organizations, access was denied by the majority of the organizations and therefore data based on those sources would have remained incomplete. To assess the personal mechanisms used for information transfer, **observations** in formal meetings, field visits, and strategy events would have triangulated the understanding regarding the information contents discussed and presented during those interactions. What may have remained unknown is the actual content, and thus the type of personal integration, among the organizations at different levels. Although the interviews may have revealed the common agenda set for the personal meetings between individuals at different levels, the "true" agenda also may have included other types of information exchange than originally designed. For instance, meetings characterized as operational, focusing on quality control and problem solving, may in some occurrences or between certain individuals, have also included discussion and activities interpreted as development-oriented. Clearly, observation methods might have reduced some of the gaps in understanding and possibly revealed informal information exchange outside of the formal agenda.

Despite these obvious benefits, observations were purposely not used by the researcher for two reasons. First, the three emerging service network cases were retrospective, and thus, observation was not possible to conduct for the

early innovation and concept development stages of the cooperation, which were of primary interest in the study. Second, following the strategic ontology of networks, the focus of the study was on structures that are deliberately designed to manage the networks and service exchanges. Therefore, it seemed reasonable to also rely and focus on the perceptions of the managers who have been designing and utilizing those management structures. If, for instance, an emergent perspective of networks and an institutional perspective had been selected as the underlying theoretical ideas, interviews and the formal management structure would have most likely fallen short of providing sufficient data and understanding of the phenomenon of managing strategic service networks.

6.5 Future research

The findings and the limitations of the study reveal the following interesting directions for further research to improve the validity of the findings and to expand the study's theoretical scope. First, the study investigated the management of integration from an information-processing perspective, assuming that organizational structures are designed to create sufficient capacity to process information in response to the integration requirements derived from the organizational context. Different theoretical perspectives and assumptions, such as the neo-institutional perspective, might provide complementary or even alternative explanations as to why the management of integration is structured in a particular manner. Future studies could analyze the same or similar networks assessed in this study through other theoretical lenses to reveal possible institutionally grounded factors that might contribute to the structuring of networks and their management.

Second, the study focused on specific types of service networks created for supplying and developing component services (Wynstra et al., 2006) in which the services are purchased or developed in favor of a third-party customer. As discussed previously, the type of service may cause differing integration requirements, further reflecting the management of integration. Future studies could conduct similar analyses to investigate integration management in other types of service and industrial contexts, including production services (Jackson and Cooper, 1988), consumption, instrumental and semi-manufactured services (Wynstra et al., 2006), or professional services (Lewis and Brown, 2012). Such an investigation could also include the enhancing and constraining processes and the effects of the regulatory, normative, and cultural-cognitive elements in different industrial and cultural contexts (Scott, 2008). This approach might reveal whether and to what extent the contextual factors identified in this study are universal in also explaining differences in integration management within other service contexts or whether completely new factors are needed.

Third, the qualitative case study relies on analytical generalizability and does not enable statistical generalizability of the findings to populations. First, future studies should operationalize or use previously used operationalization

for the uncertainty constructs to distinguish among the three types of strategic networks, the construct validity of which could be examined using confirmatory factor analysis. Second, the associations among integration mechanisms, service-related contextual conditions, and the type of strategic network should be quantitatively investigated by sampling a variety of industries and product and service categories.

Regarding the theoretical scope, the study is, first of all, limited to an examination of the management of integration and its *antecedents*. Although this study investigated the antecedents of network management in different types of strategic service networks, only the final case study of three emerging networks incorporated the consequences of network management in terms of network evolution. Although data from the stable, established networks also included the perceptions of service performance, this criterion was not used as the means of theoretically sampling the cases. Instead, the cases were sampled based on the researcher's perception of representing "best-practice" cases within the Finnish residential real estate industry for organizing service supply, the development of which was based on purposeful strategies and actions, not merely serendipitous evolution, as in some other cases identified during the exploratory interview study. Thus, given the objectives of this study, the sampling of cases based on their performance was not the primary intention. Future studies might extend the scope of the research by incorporating outcome measures for achieved integration (Lawrence and Lorsch, 1967; Turkulainen and Ketokivi, 2012, 2013) and the resulting service, firm, or network performance, and selecting additional cases from each service and network category that also vary in their performance. Alternatively, large-n sampling would enable the statistical analyses of network management structures and service, firm, or network performance associated with different contingency variables.

Second, the study examined the management of integration from a contingency perspective, identifying relations between individual context and management variables. When combining the resulting propositions, the study's findings provide a fruitful platform for examining the configurations of contextual variables and the management of integration. Although methodologically challenging, a configuration perspective might offer further insight into the optimal types and levels of integration in different service categories, networks, and environments (Das et al., 2006; Flynn et al., 2010).

A viable strategy for investigating possible alternative explanations stemming from different worldviews regarding networks or choices of theoretical assumptions would have been to select more than one alternative theoretical frame as the basis for analyzing the same case networks. Furthermore, the same networks could have been examined from the two alternative perspectives – strategic and emergent – one at a time, providing two alternative yet not necessarily mutually exclusive explanations for the existence of the perceived integration mechanisms. For instance, an interesting research objective would be to assess whether the mechanisms for managing integration in service networks are indeed implemented because of information-processing re-

quirements versus whether their use is dependent on various institutional forces and institutionalized practices within and between firms or within the industry. This type of inquiry would then investigate the actual decision-making processes in networks, possibly adopting observation and/or ethnographic methodologies.

Finally, an important area of future research is to develop the case sampling so that each of the studied focal organizations has engaged in the three types of networks – stable, established, and emerging. This approach is important because organizations often simultaneously operate in different types of networks and environments. As already shown in this study, the different networks require different organizational and administrative structures and processes to successfully exploit and align with the current business environment and to explore and adapt to future challenges and opportunities (Farjoun, 2010; Gibson and Birkinshaw, 2004; O'Reilly and Tushman, 2004; Shreyögg and Sydow, 2010).

The phenomenon is generally referred to as organizational ambidexterity, and in the context of inter-organizational networks, external ambidexterity (Raisch et al., 2009) or alliance ambidexterity (Tiwana, 2008). Whereas the majority of similar studies have thus far focused on the design of different types of ties and their relation to organizational performance (e.g., Capaldo, 2007; Tiwana, 2008), future studies should aim for a more in-depth investigation of how organizations, when engaged in networks aimed at exploitation and exploration (March, 1991), design and structure management for the different types of networks and network relations. An interesting question then would be how and through which knowledge and learning processes the different network management designs are able to facilitate the appropriation of value from the different types of strategic service networks, resulting in overall organizational and network performance.

The learning process continues to better understand the how's and why's of managing strategic service networks.

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Appendix 1: List of interviews and informants

Case 1: Real estate management and maintenance service supply network of Investor 1

Interviewee(s)	Date	Duration (min)
Real estate investor 1, director, real estate investments	24.11.2010	104
Real estate investor 1, manager, real estate investments	21.2.2011	103
	15.4.2011	92
Real estate investor 1, director, real estate business	19.4.2011	70
	31.10.2012	71
Real estate investor 1, director, housing business, capital region, executive board member & director, customer relations and communication, executive board member	27.4.2011	123
Real estate investor 1, manager, business development	13.6.2011	57
Real estate investor 1, manager, housing services, key procurements	18.1.2013	133
Housing management supplier 1*, director, customer relations	7.12.2010	81
Housing management supplier 1*, manager, stakeholder and media relations, executive board member	14.4.2011	115
Housing management supplier 1*, CEO, executive board member; manager, stakeholder and media relations, executive board member & director, building management services, capital region	30.6.2011	73
Housing management supplier 1*, brand manager	29.2.2012	92
Housing management supplier 1*, customer relationship manager, large residential investors	30.11.2012	110
Housing management supplier 1*, director, housing management business	7.12.2012	79
Housing management supplier 2, director, customer relations	10.1.2013	80
Maintenance and cleaning supplier, CEO, housing company services	22.12.2010	104
	13.5.2011	59
Maintenance and cleaning supplier, director, business development, executive board member	6.5.2011	87
	13.5.2011	54
Maintenance and cleaning supplier, director, capital region services	3.5.2011	76
Maintenance and cleaning supplier, director, procurements	13.5.2011	74
Maintenance and cleaning supplier, customer relationship manager, large customer relations	13.2.2013	81

*Same company and related informants as for Case 2

Case 2: Real estate management and maintenance service supply network of Investor 2

Interviewee(s)	Date	Duration (min)
Real estate investor 2, director, real estate business	22.11.2010	135
	12.4.2011	50
	20.4.2011	89
	9.5.2011	61
	19.10.2012	~60
Real estate investor 2, manager, property services, capital region	6.5.2011	94
	15.11.2012	94
Real estate investor 2, manager, technical maintenance	8.11.2012	59
Housing management supplier 1, unit manager*	31.10.2012	58
Housing management supplier 1, director, executive board member*	16.11.2012	33
Customer contact service supplier, director, call center services	4.10.2012	~50
Customer contact service supplier, call center unit manager	23.11.2012	45
Technical maintenance supplier 1, manager, sales and marketing	7.11.2012	84
Technical maintenance supplier 2, customer relationship manager	6.2.2013	69

*Same company as in Case 1, but informant related to customer contact service

Case 3: Real estate management and maintenance service supply network of Municipal housing company 1

Interviewee(s)	Date	Duration (min)
Municipal housing company 1, CEO & Manager, marketing	18.1.2011	122
Municipal housing company 1, CEO	5.11.2012	101
Municipal housing company 1, Property manager	21.1.2013	84
Housing management subsidiary, Customer relationship manager	22.1.2013	79
Maintenance and cleaning service supplier, Director, business development & Manager, household services	17.2.2011	96
Maintenance and cleaning service supplier, Director, sales and marketing	12.4.2011	97
Maintenance and cleaning service supplier, Director, sales and marketing & Manager, household services	11.4.2011	66
Maintenance and cleaning service supplier, Director, real estate services	10.5.2011	66
Maintenance and cleaning service supplier, Manager, business development	10.5.2011	69
Maintenance and cleaning service supplier, Regional manager, Real estate services	13.3.2013	58

Case 4: Seniors' housing concept development network 1

Interviewee(s)	Date	Duration (min)
Investor, director, financial service business	17.12.2008*	54
	10.11.2010	106
Investor, director, financial service business & manager, financial service development	28.1.2010	105
Investor, manager, financial service development	18.3.2011	78
Investor, CEO, financial service business	3.5.2011	72
Investor, CEO, real estate investments & project manager	1.2.2010	~60**
Real estate investor, director, business development	26.11.2010	84
Nursing service supplier, CEO	16.11.2010	94

*Interview conducted in a previous research project related to the same seniors' housing concept development

**Recording ended before finishing the actual interview.

Case 5: Seniors' housing concept development network 2

Interviewee(s)	Date	Duration (min)
Real estate investor, director, project development	22.12.2008*	92
Real estate investor, manager, housing services	9.3.2011	~70**
Real estate investor, project manager	14.3.2011	69
Real estate investor, staff, sales and marketing	22.3.2011	73
Real estate investor, director, quality and business development unit	24.3.2011	89
Nursing service supplier, director, long-term care services	21.3.2011	93
Nursing service supplier, director, project development & service manager	24.3.2011	91

*Interview conducted in a previous research project related to the same seniors' housing concept development

**Recording ended before finishing the actual interview

Case 6: Seniors' housing concept development network 3

Interviewee(s)	Date	Duration (min)
Municipal urban development agency, project manager, urban planning	14.3.2011	77
Municipal geriatric care agency, director, long-term care	7.3.2011	107
Municipal housing company, CEO	10.11.2010 17.3.2011	117 84
Municipal housing company, project manager	7.4.2011	59
Municipal housing company, manager, housing management and maintenance services	7.4.2011	77
Municipal housing company, housing manager	17.3.2011	85
Nursing service supplier, director, geriatric care services & unit manager	8.3.2011	114
Nursing service supplier, service coordinator	11.3.2011	~30*

*Telephone interview, not recorded

Appendix 2: Interview protocols

INTERVIEW PROTOCOL FOR THE EXPLORATORY INTERVIEW STUDY (STAGE I)

o. Background information about the informant(s)

- Name and position in the organization
 - Main responsibilities
 - Work history
1. Describe briefly your organization, it's business, and products/services it produces.
 - The organization's position in the field of residential real estate sector
 - The organization's core business
 - For investors / building-owners: The number of apartments, dwellings, residents, and geographical locations of the dwellings.
 - Types of services the organization buys / supplies
 2. Describe the field of services and service business within the residential real estate sector, as you perceive it.
 - Types of services
 - Types of actors
 - Opportunities and challenges for the organization's business
 - Possible special characteristics of the industry
 3. Describe the supply network structure of your organization.
 - Types and amount of customers, suppliers, and other possible partnering organizations
 - Types of exchange relations with the customers, suppliers, and other possible partners
 4. How is the organization's service supply network managed?
 - Contracting of service suppliers
 - Coordination of service activities
 - Monitoring of service conduct and performance
 - Management of supplier/customer relations
 - Organization of development activities

Note:

1. The numbered questions are the main themes that were discussed with the informants.
2. The sub-questions are examples of follow-up themes that emerged during the conversation.

0. Background information about the informant(s)

- Name and position in the organization
- Main responsibilities
- Work history

5. Service categories

1. Which type of services does the organization buy / supply?
2. Does the organization classify or categorize the services in some way? If so, how and why?
3. How large are the different service purchases financially? (€/year; % of all purchases)
4. Since when has the organization started to buy / supply the different services?
5. Are some of the services more or less important than others? If so, in what way and why? Which are the most critical services and why?
6. Are the services regularly occurring, fluctuating, or needs-based?
7. Describe briefly the industry for each of the main service categories.

6. Supply network structure

8. Who are the organization's customers?
9. Which of the services are outsourced and which produced in-house?
10. Which type of suppliers does the organization have in each outsourced service category?
11. How many suppliers serves each service category?
12. Which type of organization the suppliers are? (e.g., size, industry)
13. How would you characterize the relations with the suppliers in each service category? (e.g., dependence, long-term vs. short-term)
14. Does the organization have partners besides those previously mentioned?

7. Supply network management

15. How are suppliers contracted in each service category, and why?
 - Which types of contracts are made with the suppliers?
 - What are the essential contents of contracts and/or service specifications?
16. How are service activities coordinated in each service category, and why?
 - How are service needs identified and information about them transferred within the supply network?
 - How are service activities scheduled / ordered? (e.g. service location, contents, frequencies, delivery date and time)
 - Who coordinates the service activities?
17. How are service activities controlled in each service category, and why?
 - How are service activities monitored?
 - Who monitors the conduct of services and the quality of services?
 - How are possible problems or deviations in service supply solved?
18. How is service performance evaluated for each service category, and why?
 - Which types of measures are utilized for performance evaluation?
 - How is evaluation conducted in practice? Who conducts?
 - How is evaluation reported and utilized?
 - How is the performance of individual suppliers / partners assessed?

19. Does the organization engage in development activities with its customers/suppliers/partners? If so,
 - In which service categories, and why?
 - How is joint development implemented in practice?
 - E.g., by whom, at which organizational levels, how frequently
 - What are the essential areas of development in the different service categories?
20. Does the organization have some other type of interaction with their customers, suppliers, or partners than those related to service supply coordination and control, and why?
 - E.g. relationship-building activities
 - At which organizational levels do these take place; who are involved; how often?
21. Is there something essential in relation to cooperation with the customers, suppliers, or partners that has not been discussed? Is there something else you want to add to the conversation?

8. Supplementary interviews

- Who else in the organization, in relation to related themes, could/should be contacted for an interview?
- Which customer/supplier/partner organizations could/should be contacted for an interview in each service category?
- Who in the customer/supplier/partnering organizations could/should be contacted as a potential informant?

Note:

3. The numbered questions from 1 to 20 are the main semi-structured questions that were asked from the informants as they appear.
4. The sub-questions are examples of follow-up questions that emerged during the interviews based on the informants' answers and the discussions with previous informants during the case study data collection.
5. For informants (often operational managers or customer relationship managers) associated with only one/few types of service exchanges or customer relations, only those service categories or customer relations were discussed in the interviews that were directly related to their area of responsibility and were the focus of the research.

Appendix 3: Examples of empirical data and coding

Table 28. Examples of empirical evidence for matching the embedded-cases with the ideal types of strategic networks

N	Case	Value activities	Aims	Network structure
Stable	MC1 & CL1	<p>Standardized service for the firm and in the industry</p> <p>"If we don't talk about housing management, but all other services, meaning maintenance and cleaning [...] It is more that kind of activity that can be purchased off-the-shelf. You don't really need to develop it that much (Real estate investor 1, Director of investment business)"</p>	<p>To achieve stable service quality throughout the supply network</p> <p>"The quality of some service supplier, already within the capital region, it can be said that locally or even between housing locations is completely diverse [...] it is extremely hard to achieve stable service quality" (Real estate investor 1, Director of housing business)</p>	<p>~ 50-60 suppliers (of which about 20 in the capital region)</p> <p>"We have hear in the capital region 16 maintenance companies and then some cleaning companies on top of that. Those activities are not necessarily combined, but we may have a different supplier for maintenance and cleaning. So in total about 20 and then the rural areas [...] altogether between 50 and 60" (Real estate investor 1, Director of property services)</p>
	MC2	<p>Simple service activities</p> <p>"They (maintenance and caretaking suppliers) don't do that kind of technical maintenance activities, nor does their competence suffice for those." (Real estate investor 2, Property manager)</p>	<p>To achieve locally end-customer satisfaction towards the service, but also cost efficiency</p> <p>"We have a quite far reaching resident democracy. Caretaking touches upon them (residents) and their wellbeing, so they are the ones making the decisions about the suppliers. [...] In some municipalities, we have been able to agree that we have called caretaking for the entire district for bids and then selected the supplier that has offered the lowest price for the overall service. And the heads of the housing location boards have agreed that we operate like this. (Real estate investor 2, Property manager)</p>	<p>136 suppliers</p> <p>"At the moment, if I recall correctly, we have 136 maintenance and caretaking suppliers" (Real estate investor 2, Property manager)</p>
	MC3 & CL3	<p>Standardized, simple service activities</p> <p>"The needs are in the end quite similar: that the apartments are warm, the corridors have lights, the yards are cleaned from snow, the grass is cut or protected from ice. The needs are so similar that it is quite hard to make the service very complicated" (Service supplier, Director of property services)</p>	<p>To achieve cost efficiency and stable quality throughout the supply network</p> <p>"Costs need to remain in control. And stable quality, we need to be sure that we are delivered the same...because we purchase with the same contracts we need to get similar service." (Housing management, Customer relationship manager)</p>	<p>4 suppliers</p> <p>"I think in cleaning there is currently five. There is one with a very low weight. And then in maintenance there are four" (Housing management, Customer relationship manager)</p>

Table 28. continues

Stable	AR1	<p>Clearly specified service activities</p> <p>"We have highly detailed specs for apartment renovations. We have two models, stone and stripe models, and they are specified so that these and those are the materials that we use and the end. (Real estate investor 1, Director of property management)</p>	<p>Operational efficiency, Predictability of costs</p> <p>"It makes the housing managers' work easier and we have made so, that we have priced the renovations according to our quality classification, so that the housing managers who order and the contractors know exactly which kind of renovation they will conduct for each apartment. It makes it much more smooth. And we have practically fixed almost all prices so that we know what it will cost. (Real estate investor 1, Director of property management)</p>	<p>~20 suppliers</p> <p>"We have two year contracts for apartment renovations. There are, what might be the number at the moment, there are about 20 companies" (Real estate investor 1, Regional manager/key purchaser)</p>
	AR2	<p>Clearly specified service activities</p> <p>"We have work descriptions for yearly contractors (apartment renovations). And they include all different materials. [...] in a way like ready-made design plans; which kinds of colors match and which kinds of tiles. If you select these kinds of tiles, what do the floors need to be, which wall colors, etc. (Real estate investor 2, Property manager)</p>	<p>Operational efficiency</p> <p>"We have pursued to purchase this kind of fixed-price yearly contractors [...] all our yearly contractors have the same pricing. It makes our invoicing and other (operations) easier, that they (contractors) haven't mixed working clothes and all sorts of nails and screws to those, but that the unit price for a specified, say, bathroom renovation is some 3,700 euro. No matter what size it is. That's always the average price" (Real estate investor 2, Property manager)</p>	<p>~15 suppliers</p> <p>"We use regularly 15 (suppliers), but we have made contracts with more than that" (Real estate investor 2, Property manager)</p>

Table 28. continues

N	Case	Value activities	Aims	Network structure
Established	AR3	<p>New contracting solution for the firm</p> <p>"This (apartment renovation) system has only recently been adopted, so its new, and we are learning it on both sides (buyer and supplier)" (Municipal housing company, CEO)</p>	<p>To improve predictability of costs</p> <p>"Previously it was implemented so that we basically had fixed hourly prices for these contractors, ordered from then and then they supplied, and we were wondering how many hours were spent. Now, we changed this the other way round, and we standardized the unit-prices." (Municipal housing company, CEO)</p>	<p>12 suppliers</p> <p>"We have now 12 contractors that conduct these apartment renovations. They have three year contracts" (Municipal housing company, Property manager)</p>
	HM1	<p>Continuous joint development, particularly mutual process interfaces</p> <p>"The industry, especially this kind of professional housing management, it is a little undeveloped field, or under development" (Housing management firm 2, Director of sales)</p> <p>"If we talk about housing management [...] We have developed it since (the beginning of outsourcing). One extensive component is information systems related to reporting but also handling of operational information. [...] Of course other type of operations and operating models have been also and are continuously developed." (Real estate investor 1, Director of investments)</p>	<p>To develop core business processes</p> <p>"We have worked quite a bit with our processes, gone through our core processes, and our partners (housing management) are closely attached to those. And we have our partners with when developing those core processes. Especially we cooperate when there are these mutual interfaces where we move from our to their processes. Those are the places that need be followed thoroughly through with them. And all in all, this kind of joint development activity is very strongly present." (Real estate investor 1, Director of housing business)</p>	<p>2 suppliers (long-term, but varying proportions of the investor's properties)</p> <p>"Strategic partners include these [supplier 1] and [supplier 2] housing management partners" (Real estate investor 1, Director of property services)</p>
	HM2	<p>Developing field</p> <p>"That kind of professional housing management in Finland, it has not existed for long" (Housing management, Customer relationship manager)</p>	<p>To improve purchasing efficiency</p> <p>"Large real estate investors have exploited their own volumes and made framing contracts [...] but clearly these management's customers have bitten their bones to the end, and now they want to bring their housing stock into a larger one and see if there are benefits to gain. But that's at an exploration stage at the moment." (Housing management supplier 1, CEO)</p>	<p>2 large suppliers (long-term, but varying proportions of the investor's properties), 1 small supplier (only few locations)</p> <p>"[Supplier 1] is our largest partner in housing management and they have about 5000, 4982 apartments. Then there is [Supplier 2] in [individual municipalities], and that is the second biggest of our external (housing managers)." (Real estate investor 2, Director of property management)</p>

Table 28. continues

Established	CS2	<p>New outsourcing solution for the firm and the residential real estate sector</p> <p>"We started cooperation in 2008, and it started in [one large municipality], after which it has expanded to many other municipalities, and next spring we talk about that they all (properties) are in the sphere of 24/7 service [...] In Finland, there is very little offering that would adjust to this. Of course there are those call center firms, but we wanted so that there is this interface with the field of real estate sector" (Director of property management)</p>	<p>To improve information handling and monitoring, and operations efficiency</p> <p>"We get information about the issues that are most often asked. And why we do so, the purpose is to get better insight into maintenance activities, and after that we can adjust maintenance contracts and make more detailed specifications that we perceive important. If there are some issues that come up all the time, we can start analyzing them, and do something if they cause problems." (Director of property management)</p>	<p>2 new suppliers (separate geographical regions)</p> <p>"We have [Supplier 1] service center that operates [three large municipalities and an individual district] and then [Supplier 2] operates [one large municipality]" (Director of property management)</p>
	TM2	<p>New outsourcing solution for the firm and the residential real estate sector</p> <p>"Maybe our biggest thing is that we have this separate technical maintenance. To my understanding it is very common in the commercial real estate sector" (Real estate investor 2, Property manager)</p>	<p>To improve service quality and effectiveness of proactive maintenance</p> <p>"Maintenance companies have very diverse competence and quality level, and that is a risk for a real estate investor, because those HVAC issues get easily slipped into a fault-repair type of activity, meaning that repairs are done when something breaks, which is the most expensive way in this technical side. So, proactive technical maintenance is important and we begun to emphasize that and decided to separate technical maintenance altogether." (Real estate investor 2, Director of property management)</p>	<p>2-3 suppliers (old/known, but different tasks and contracts than usual)</p> <p>"We have this technical maintenance. It covers the whole country and we have two actors there [Supplier 1] and [Supplier 2]." (Real estate investor 2, Director of property management)</p>

Table 28. continues

N	Case	Value activities	Aims	Network structure
Emerging	SH1	<p>No existing concepts in Finland; Novel for the actors</p> <p>"Senior housing has of course different types of competition, but we see that no one has this type of concept that we pursue. With similar idea and target group and everything." (Investor, Director)</p>	<p>To innovate a novel duplicable seniors' housing concept; Launch a pilot project; Learning and multiplying the concept to other locations</p> <p>"By combining these in a way that we have also the best possible actors, we can create a unique concept that no one else has [...] our clear plan was that we build a pilot before we expand. So that the pilot is constructed, get experiences, and see what comes up of all this" (Investor, Director)</p>	<p>3 focal actors; 3 other actors closely involved in the concept development stage</p> <p>"We then started to meet potential partners and asking for their interest [...] And then based on the joint discussions these [two organizations] clearly stood up. They were clearly most interested about this, and maybe their ideas and mindset were the closest to what we thought." (Investor, CEO)</p>
	SH2	<p>No similar concepts in Finland; Novel for the actors</p> <p>"As a project this has really been new for both of us. We were faced by novel issues, that must be confessed. A ready-made model did not exist." (Real estate investor, Contract manager)</p>	<p>To develop a novel, state-of-the-art seniors' housing concept that combines multiple levels of housing and services</p> <p>"There has been searched for a solution to meet today's and future's needs of the elderly. Meaning that differentiated support for living is offered. [...] both the building and living are combined, and the [nursing service supplier's] role is to provide and develop service offering from its perspective [...] it (the service model) is more advanced here (than in other locations) (Nursing service supplier, Director of long-term care)</p>	<p>2+1 focal actors; 6 other actors closely involved in different development stages</p> <p>"The concept for the building become as a joint effort between us and [the nursing service supplier]" (Real estate investor, Contract manager)</p> <p>"Represented was the landowner, the municipality's social and welfare agency of course because it is a legislative issue related to elderly population. Then there was [two people] from the public housing funding agency. Then [a person] from the Ministry of Environment. (Real estate investor, Project manager)</p>
	SH3	<p>Novel concept in the municipality and for the actors</p> <p>"This [second stage of the project] has offered us a new concept. We didn't have previously assisted individual living. So this is a new launch and one possibility, kind of a new step where you don't need to get institutionalized, but have a place where you have a nurse present more than if living at home" [...] this is already so large, and when our own operations come to this third stage, it is almost 150 residents and possible over 70 of our employees. And how many employees the [service supplier] has...it is a huge community." (Municipal geriatric care, Director of long-term care)</p>	<p>To develop a novel and cost-efficient seniors' housing concept that combines multiple levels of housing and services</p> <p>"We need apartments for the elderly, where they can live as long as possible, and where assistance is brought to them as they need, although very lightly or then more round-the-clock. It is thought that it would be within a same yard, so that one could move from one property to another if one's condition decreases. So the yard would remain the same." (Municipal urban planning, Planning manager)</p>	<p>3 focal actors; 4 other actors involved in different development stages</p> <p>I have been ideating these with (CEO of the municipal housing company) and then we had at that time (name) the director of geriatric care, so it was the three of us that thought that this could work out as a reasonable entity (Municipal urban planning, Director)</p> <p>"Also [Public housing funding agency] is strongly present, and also the project's largest funder in euros" (Municipal housing company, CEO)</p>

Table 29. Summary of integration mechanisms and examples of coding

Integration type	Mechanism	Representative quotation(s)
TYPE I: Operational-impersonal integration	Input vs. outcome-based specifications	"It more so, that service specifications indicate the amount of effort and task conduct. How often some maintenance activities are done, how often we visit somewhere, how often we clean and how often we collect garbage etc. Well, then there have appeared for instance for grass cutting this type of boundaries of less than 8 centimeters and snow removal before 7am." (Case 1: Maintenance service supplier, Customer relationship manager)
	Process specifications	"We have created service paths, meaning that those requests (from residents)...it is not just a call center, but we have a very specific concept through which the faults are solved, and that we could inform already during the phone call what the residents should do" (Case 2, Real estate investor 2, Property director)
	Detail of service specifications	"This contract between these three (focal) actors is a kind of framing contract, which does not include any details of the locations [...] what are the responsibilities etc., but they come then separately. It is very important that those are defined, and it has not been done for the (pilot project) to my knowledge" (Case 4: Investor, Director of investment services) "They include detailed specifications about the tasks, and operating principles are described, so they often almost are some 40 pages in length" (Case 2: Real estate investor 2, Property director)
	ICT-based monitoring	"Housing managers follow through the ICT-system what happens in their properties. They follow daily those issues that consider them, where they have been appointed to conduct service tasks. They follow weekly the tasks they have ordered and have those progressed, and then in two week to monthly intervals they follow which other things happens in their properties" (Case 1: Housing manager 1, Customer relationship manager)
	Spot checks	"We do spot check type of inspections. Completely randomly take locations nationally and visit the location. So, for instance, when the HVAC company has tested all the equipment, and gone through all the gauges, then we come and randomly, which they don't know in advance, make the check and inspect whether they have actually inspected and conducted them" (Case 2: Real estate investor 2, Director of property management)
TYPE II: Operational-personal integration	Informal interaction	"Time to time we have needed to give direct feedback to them if this (call center) thing haven't functioned well, so that they can possibly develop it [...] [...] just by email and telephone" (Case 2: Housing management supplier, Unit manager) "It (contacting and meetings) has mainly been needs-based" (Case 5: Real estate investor, Contract manager)
	Formalized interaction at operational level	"We have defined, for instance for maintenance, this type of fall and spring meetings. We have formulated a meeting agenda for the housing managers, in a way that at least these issues needs to be gone through in the fall and these in the spring meetings." (Case 1: Real estate investor 1, Director of property services) "We go into the properties and evaluate the property, compare it to what has been agreed upon, are tasks well conducted, is it clean, and so forth. That (daily monitoring) is one part. Then we have technical inspection, where issues are looked only from the contract's perspective, meaning that if some task is agreed upon we inspect whether it is done. Of course, you cannot inspect everything, say maintenance test for heating equipment. You come today and ask if it has been done, the maintenance guy can say he/she did it three times yesterday. You cannot know if he/she has done it. But then we ask for a work sample and they do it. They prove their competence that they can do it. [...] the technical inspection always have the supplier's employer with them, because there we talk about the interface that is handled by that employer." (Case 3: Municipal housing company's housing management, Customer relationship manager)
	Formalized interaction at functional level	"Ten times a year the service suppliers...actually this week is a meeting week. Now we discuss about what has happened in the properties, look at the results of technical field inspections, if there are unfinished work orders, i.e. go through the basic operations. Maybe go into some details but then talk about cooperation and what should be done, what has been agreed upon. It is a kind of general discussion, but then we have those basic issues that are gone through." (Case 3: Municipal housing company's housing management, Customer relationship manager)

Table 29. continues

TYPE III: Strategic-personal integration	Formalized interaction at contract-owner level	<p>"We (investor and technical maintenance supplier) have separately once a year a strategy meeting and a sort of feedback day, where we go through the nature of the whole operation" (Case 2: Real estate investor 2, Director of property services)</p> <p>"When we convene in a strategic steering group, we go through issues by numbers; how have we proceeded in which areas? And there comes suggestions from our side as well. Our job is to bring forth ideas and suggestions about how to improve cooperation, and then we have also initiated development projects in both sides" (Cases 1 & 2: Housing management, Director of Housing management business (same for Investor 1 & 2))</p>
	Interaction aimed at service development (functional)	<p>"We established these different task forces which then started to design that (concept). There was, of course, construction-related, building and architect design, which was more led from (the real estate investor partner's) side. And then we had a marketing task force where I was in. And then we further had a separate team focused on services, thinking of what kind of services were included. And that was more strongly steered by the (nursing service partner)" (Case 4: Investor, Service development manager)</p>
	Interaction aimed at service development (cross-functional)	<p>"The concept is led in a way that there is a management group with representatives from all (focal) companies, and it gathers regularly and makes uniformly decisions about the concept's locations and how to proceed with those, and which locations are the concept's locations, because we might have other types of cooperation in other locations, so the management group working is essential from decision making perspective. In practice, it consists of CEO-level representatives." (Case 4: Investor, Director of financial services)</p> <p>"We have had these, one could say regular meetings once to twice a year, where we have looked through the totality. We just now had one, participated by the (nursing service supplier's) representative, then me and the (director of geriatric care), and then the (municipal housing company) and the (housing management subsidiary), where we went through both concept properties, even property details. (Case 6: Municipal geriatric care agency, Director of long-term care)</p>
	Interaction aimed at relationship development	<p>"We organized a cooperation afternoon for those maintenance suppliers. We invited housing managers and everybody. [...] In many cases only hard directing is not enough but when you learn to know people... You need these kinds of interactions, and all the meetings and telephone communication and all. It brings more depth to it and you learn to know each other better, particularly if we search for partnering." (Case 1: Real estate investor 1, Director of property services)</p>
TYPE IV: Strategic-impersonal integration	Cost-related incentives	<p>"We have certain price mechanisms attached to performance measures in these (housing management) partnerships [...] we have four measures, including customer satisfaction, occupancy levels, energy, and maintenance costs, which are compared to the KYKI-index (national maintenance cost index)" (Case 1: Real estate investor 1, Director of property services)</p> <p>"There are defined limits to energy consumption and then, if we go under those we get bonuses and if we exceed them we get sanctions. They are amounts of megawatts and this type of efficiencies defined in contracts, heating oil consumption and the sort." (Case 2: Real estate investor 2's Technical maintenance supplier, Customer relationship manager)</p>
	Quality-related incentives	<p>"All tasks are listed and you give points whether the task is conducted or not. It's a dichotomy. And you collect points, where 8,000 is the target and 10,000 the maximum points. If one ends up under the target pays us back. If one goes over gets a bonus from us." (Case 3: Municipal housing company 1, CEO)</p>

Table 30. Summary of sources and levels of uncertainty and examples of coding

Source of uncertainty	Level of uncertainty	Representative quotation(s)
Novelty, Uniqueness	Low	"It is more that kind of activity that can be purchased off-the-shelf. You don't really need to develop it that much (Case 1: Real estate investor 1, Director of investment unit)"
	Moderate	"This (apartment renovation) system has only recently been adopted, so its new, and we are learning it on both sides (buyer and supplier)" (Case 3: Municipal housing company, CEO)
	High	"As a project this has really been new for both of us. We were faced by novel issues. It must be confessed. A ready-made model did not exist." (Case 5: Real estate investor, Contract manager)
Ambiguity	Low	"It can be said that we have quite extensive experience behind those things. How they (service specifications for housing management and maintenance services) are made. (Case 2: Real estate investor 2, Property director)
	High	"Now we didn't know, we hadn't had previously this type (of a project), so we did not know which all sorts of issues we might come up with, questions and issues. So, the kind that we would had thought through all scenarios, I don't say patterns but anyway paths, how one operates if that and that happens (--) maybe those might be now possible to compose after everything" (Case 5: Real estate investor, Regional manager)
Complexity (task)	Low	"The needs are in the end quite similar: that the apartments are warm, the corridors have lights, the yards are cleaned from snow, the grass is cut or protected from ice. The needs are so similar that it is quite hard to make the service very complicated" (Case 3: Maintenance and cleaning service supplier, Director of property services)
	High	"It (a new financial instrument) starts to be a quite difficult entity to comprehend. And then when you think the target group, plus 50, well of course there would be many kinds of people, but anyway, it's a really complicated thing" (Case 4, Investor, Director of financial services unit)
Complexity (network)	Low	"We have this technical maintenance. It covers the whole country and we have two actors there (Supplier 1) and (Supplier 2)." (Case 2: Real estate investor 2, Property director)
	High	"At the moment, if I recall correctly, we have 136 maintenance and care-taking suppliers" (Case 2: Real estate investor 2, Property manager)
Dependence	Pooled	"They go through all the technical equipment in the properties annually. They maintain them and repair minor faults on the spot" (Case 2: Real estate investor 1, Property director)
	Sequential	"Housing management gives promises for marketing, for instance, about the technical quality of the apartment when they inspect the apartment. And they make a work order to the contractor, and the order flows to marketing so that they can see what happens in the apartment when they offer it to a new resident. So, they see directly what is ordered from the contractor; new wallpapering, living room painting, renewal of bathroom tiling [...] Or then there is just a notice that no repair is required, and then sales must not promise anything." (Case 2, Real estate investor 2, Property manager)
	Reciprocal	"There has been of course a lot of preliminary discussions and this mutual need sort of perceived (--) there was an intensive, a kind of two-day workshop which launched this whole thing (--) in that workshop we crystallized the business strategy and what the core of the business strategy is. And that sort of launched the whole thing; what is each actors role and the general idea, and based on that business strategy we then continued on crafting the collaboration contracts (Case 4: Investor, Director of financial services unit)
Difference	Low	"We had done that (housing management) previously ourselves, so we knew how it should be implemented. We knew what resources it requires." (Case 1: Real estate investor 1, Director of investment unit)
	Moderate/Low	"Of course there are these call center firms, but we wanted so that there is an interface with the real estate industry. Now, (supplier 1) has security and (supplier 2) which is our other partner, they have of course these maintenance activities. (Case 2: Real estate investor 2, Property director)
	High	"We kind of cooperate closely with a completely different sector, actors from a different sector (--) we have been forced to learn quite a lot all kinds of nursing-related terminology that we understand what we are talking about." (Case 4: Investor, Director of financial services unit) "With the (municipal housing company), one can say it shows that, our job is a health care activity, a nursing activity, and then that is more about technology and then people talk about things in a different manner. (Case 6: Nursing service firm, Director of residential services)

Table 31. Summary of contextualized qualitative conditions and examples of coding

Context variable	Operational measure	Representative quotation(s)
1. Importance	Low to high	"We have sort of classified in a way that we have partners, then we have critical service suppliers, and then just basic service suppliers which are not that critical (Case 1: Real estate investor 1, senior executive of housing business & senior executive of marketing) "Strategic partners are these (supplier 1) and (supplier 2) housing management partners (--). And then these maintenance and cleaning firms are not in that high priority" (Case 1: Real estate investor 1, director of property management)
	Moderate	"From the resident's perspective cleaning might be even more visible, because if the corridor has not been cleaned then okay, but it does not necessarily cause us (building-owner) or the property any bigger problems" (Case 3: Municipal housing company, Property director)
	High	"Sales and housing management suppliers (-- they must be seen as the priority. That's the basic infrastructure. (Case 2, Real estate investor 2, Property director)
2. Novelty	New in the industry	"The purpose is to challenge the markets especially in the real estate maintenance sector. The traditional model is that the residents have multiple interfaces through which they are in contact, meaning an interface with a housing manager, possibly with a technical housing manager, and a maintenance firm. Now the purpose is to centralize all those in one place." (Case 2: Customer contact service firm, Director of call center services)
	New for the firm	"This (apartment renovation) system has only recently been adopted, so its new, and we are learning it on both sides (buyer and supplier)" (Case 3: Municipal housing company, CEO)
	Standardized service	"It is more that kind of activity that can be purchased off-the-shelf. You don't really need to develop it that much" (Case 1: Real estate investor 1, Director of investment business)
3. Complexity	Mutual interfaces	"There are these interfaces where one kind of shifts from our process to our partner's process" (Case 1, Real estate investor, Senior executive, housing business)
	Simple	"Cleaning, you don't need to specify it so much, but it is a fairly simple service" (Case 3, Service supplier, Service manager)
4. Type of end-customer contact	No interface	"HVAC maintenance is more like, they do inspections and system maintenance. It represents a different (service) profile). Its not linked to the end-customer interface." (Case 2, Real estate investor, Property director)
	Technical	"(-- Apartment renovations. In principle, the resident comments then the outcome of that" (Case 2: Real estate investor 2, Property manager)
	Functional	"The residents call in one number which serves 24/7. There we have a duty officer that takes the call. Then we have this (ICT-application), where we start filling those. There's a certain questionnaire that follows a certain path throughout the process, through which one defines the customer's challenge or problem. When going through the whole path of questions it (information about the customer's need) directs to the right place, either to the housing manager, technical housing manager, or the maintenance firm." (Case 2: Customer contact service firm, Director of call center services)
5. Spatial complexity	Low	"Service center is a national nerve-center, which is responsible for urgency surveillance, directing security to locations, and customer service." (Case 2: Customer contact service firm, the firm's official webpages)
	High	"Apartments in 32 municipalities across Finland. The firm owns 13 856 apartments" (Case 2: Real estate investor, annual report 2011) AND "It is always one municipality. And from that municipality's unit, marketing and sales comes from one supplier, one supplier delivers housing management, one has roof maintenance, and HVAC maintenance is from one supplier" (Case 2: Real estate investor, Property director)
6. Relational complexity	Low	"In cleaning there is currently five. There is one with a very low weight. And then in maintenance there are four" (Case 3: Housing management, Customer relationship manager)
	High	"There are, what might be the number at the moment, there are about 20 firms" (Case 1: Real estate investor 1, Regional manager/key purchaser)

Table 31. continues

7. Importance of individual actors	Low	"If there (in apartment renovations) appears some technical problems, for instance, the damp-proof course fails or something like that, then in many times if we come across these kinds of issues we change the contractor. So they know that, roughly speaking, the contract ends if one blunders." (Case 2: Real estate investor 2, Property manager)
	High	"We might even ask them opinions and notions in those things in the middle of the year, or at least from these most significant maintenance suppliers" (Case 1: Real estate investor 1, Director of property management)
8. Fluctuation	Regular	"We have maintenance programs and cleaning programs in which the service frequencies are defined for each location; which things are implemented daily, which weekly, what is done twice a month, monthly, or whatever the interval is" (Case 1: Real estate investor 1, Director of property management)
	Irregular	"All occupational endings of apartments take place on a certain moment of the month, meaning the last day of each month. And we are supposed to be able to implement, say 30 renovations simultaneously." (Case 1: Real estate investor 1, Senior executive, housing business)
9. Industry culture	Local variation in operating principles	"In the end, Finland is quite a large country. So in Rovaniemi (northern municipality) one functions differently than in Helsinki (southern municipality). Those kinds of unified ways of operating and driving them in throughout the organization, I would say it is a bit challenging every now and then. Although we have quite good housing managers, many of them are really independent and operate independently with principles that they have recognized as well functioning, although we might had better." (Case 1 & 2, Housing management supplier, Customer relationship manager)
	Local variation in service quality	"Many of those maintenance and caretaking companies is the like that they are not able to operate with a stable quality nationally, but they have a lot of problems in that. In some municipalities they are good and in some other bad." (Case 2, Real estate investor 2, Property director)

Designing and managing strategic service networks are key managerial capabilities and sources of competitive advantage in the modern networked service economy. This dissertation investigates how and why strategic service networks are managed focusing particularly on the management of integration in component service networks. The study reveals patterns of integration mechanisms reflecting the sources and levels of uncertainty characterizing stable, established, and emerging component service networks. Managerial requirements of the exchanged services, supply network structures, and the supply environment are discussed as well as ways of coping with changing uncertainty. The findings assist firms in designing effective organizational structures for managing their component service networks particularly in, however not limited to the residential real estate sector. The study advances contingency theories of industrial network and service supply chain management.



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