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THE ROLE OF SOCIAL AGENCY IN SUPPLY CHAIN MANAGEMENT DECISION- MAKING

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The originality of this publication has been checked in accordance with the University of Turku quality assurance system using the Turnitin OriginalityCheck service.

ISBN 978-951-29-9104-4 (PRINT)
ISBN 978-951-29-9105-1 (PDF)
ISSN 2343-3159 (Print)
ISSN 2343-3167 (Online)
Painosalama, Turku, Finland 2022

UNIVERSITY OF TURKU
Turku School of Economics
Department of Marketing and International Business
Operations and Supply Chain Management
OSKARI RINTALA: The Role of Social Agency in Supply Chain
Management Decision-Making
Doctoral Dissertation, 101 pp. + appendices
Doctoral Programme of Turku School of Economics
November 2022

ABSTRACT

Global supply chains have expanded in both their size and embeddedness in the markets. The formation and development of relationships with suppliers and buyers has become key to sustaining competitiveness, whereas firms within the chains face increasing needs and demands from both internal and external stakeholders. Accordingly, decision-making within supply chains is expected to meet various objectives regarding, for example, organizational sustainability and performance.

To answer the challenges related to the decision-making, researchers in the field of supply chain management have recently been concerned especially with the theme of human behavior. Processes of individual decision-making in the context are often found to be irrational with relation to organizational aims and unexpected in their consequences on the level of supply chains. Yet, explanations with reference to individual psychology and social mechanisms relevant to the phenomena have received little attention, leaving the decision-making inefficient in practice.

This doctoral thesis addresses the gap in previous research by considering the interaction between the psychology of the individual decision-maker and the social environment of the supply chain. In this regard, the thesis contributes to the research paradigm of behavioral supply chain management by elaborating on what the interaction means for supply chain management decision-making. A social cognitive lens is adopted to describe how supply chain management decisions may be linked to various psychological characteristics of decision-makers and to put forward practical proposals on how to enhance decision-making in the context.

The compilation thesis builds on four original publications with a diverse background of theories on individual decision-making and organizational behavior. Literature relevant to supply chain management decision-making in general—and the topics of logistics outsourcing, organizational performance, and supply relationships in particular—is subjected to conceptual analysis for the development of propositions and hypotheses to be tested. To test the hypotheses, the research then employs empirical survey data from the Finnish State of Logistics Surveys 2014 and 2018, the European Social Survey 2016, and financial reporting data from the *Voitto+* and *Eikon* databases. One of the individual studies is conceptual by nature, whereas three follow a nomothetic approach where the data is analyzed using quantitative methods.

The results show how logistics outsourcing decisions are likely to be driven by attitudes, norms, and competence; the environmental and financial performance of companies may be linked to their respective institutional environments and ambidextrous business processes; and supply relationships should be managed with consideration to individual identity and leader rhetoric. The findings further support a view of the individual decision-maker as an intentional and subjectively rational social agent that lays the foundations to behavior on multiple levels of analysis from organizations to supply chains and markets.

Supply chain management decision-making could then be enhanced with behavior change techniques related to, for instance, increasing knowledge and setting goals that may be enforced from within or outside the supply chain. Hence, the results benefit business practitioners and policymakers across the boundaries of individual firms with ideas on how to acknowledge the human decision-maker in decision models vastly applied in the field.

KEYWORDS: Behavioral supply chain management; Human factor; Decision-making; Social agency; Social cognition; Mental representation; Rationality

TURUN YLIOPISTO

Turun kauppakorkeakoulu

Markkinoinnin ja kansainvälisen liiketoiminnan laitos

Toimitusketjujen johtaminen

OSKARI RINTALA: Sosiaalisen toimijuuden rooli toimitusketjujen

johtamista koskevassa päätöksenteossa

Väitöskirja, 101 s.+ liitteet

Turun kauppakorkeakoulun tohtoriohjelma

Marraskuu 2022

TIIVISTELMÄ

Maailmanlaajuiset toimitusketjut ovat kasvaneet laajuudessaan ja niiden johtamisella on yhä olennaisempi rooli markkinoiden toiminnan kannalta. Toimittaja- ja asiakassuhteiden luomisen ja kehittämisen merkitys yritysten kilpailukyvyn kannalta on korostunut, ja yritysten on kyettävä vastaamaan yhä moninaisempiin sisäisten ja ulkoisten sidosryhmien tarpeisiin ja vaatimuksiin. Päätöksenteon toimitusketjuissa odotetaan samalla täyttävän erilaisia tavoitteita liittyen esimerkiksi organisaatioiden kestävytyteen ja suorituskykyyn.

Tutkijat toimitusketjujen johtamisen alalla ovat viime aikoina kiinnittäneet huomiota erityisesti ihmisten käyttäytymiseen vastatakseen päätöksentekoon liittyviin haasteisiin. Yksilöiden päätöksenteon prosesseja on kontekstissa kutsuttu organisaatioiden tavoitteiden kannalta irrationaaliseksi ja suhteessa toimitusketjuihin seurauksiltaan odottamattomiksi. Yksilöpsykologiset selitykset ja ilmiöiden kannalta relevantit sosiaaliset mekanismit ovat kuitenkin jääneet vähemmälle huomiolle, ja käytännön päätöksenteossa on havaittavissa edelleen tehottomuutta.

Tutkimusaukkoon otetaan tässä väitöskirjassa kantaa käsittelemällä yksittäisten päätöksentekijöiden psykologian ja sosiaalisina ympäristöinä ymmärrettävien toimitusketjujen vuorovaikutusta. Tutkimus tuottaa uutta tietoa behavioraalisen toimitusketjujen johtamisen paradigmaan selventämällä tämän vuorovaikutuksen roolia toimitusketjujen johtamista koskevassa päätöksenteossa. Aihetta tarkastellaan sosiaalisen kognition näkökulmasta, joka auttaa kuvaamaan miten alalla tehtävät päätökset ovat yhdistettävissä päätöksentekijöiden psykologisiin ominaisuuksiin ja perustelemaan tapoja parantaa päätöksentekoa käytännössä.

Artikkeliväitöskirja perustuu monimuotoiseen päätöksentekoon ja organisaatioikäyttyymiseen liittyvään teoriataustaan, jota syvennetään neljässä erillisessä alkuperäisjulkaisussa. Tutkimuksessa ehdotetut propositiot ja testattavat hypoteesit on johdettu kirjallisuudesta liittyen toimitusketjujen johtamista koskevaan päätöksentekoon erityisesti logistiikan ulkoistamisen, organisaatioiden suorituskyvyn ja toimitussuhteiden aihealueilla. Hypoteesien testaamiseksi hyödynnettiin kyselyaineistoa Logistiikkaselvityksistä 2014 ja 2018 sekä Eurooppalaisesta sosiaali-tutkimuksesta 2018, ja taloudellisia raportteja Voitto+- ja Eikon-tietokannoista. Yksi osatutkimuksista on käsitteellinen, kun taas kolmessa nomoteettiseksi luonnehditussa tutkimuksessa käytettiin määrällisiä menetelmiä aineiston analysoimiseksi.

Tulokset osoittavat kuinka logistiikan ulkoistamispäätökset voivat perustua päätöksentekijöiden asenteisiin, normeihin ja kompetenssiin; kuinka yritysten ympäristöllinen ja taloudellinen suorituskyky ovat yhdistettävissä yritysten institutionaalsiin ympäristöihin ja ambidekstriaan liiketoiminnan prosesseissa; ja kuinka toimitussuhteiden johtamisessa tulisi ottaa huomioon yksilön identiteetti ja johtajan retoriikka. Löydökset tukevat näkemystä, jonka mukaan päätöksentekijä on toiminnaltaan tarkoituksenmukainen ja subjektiivisesti rationaalinen sosiaalinen toimija, jonka toiminta luo perustan käyttäytymiselle analyysitasoilla organisaatioista toimitusketjuihin ja edelleen markkinoihin.

Toimitusketjujen johtamista koskevaa päätöksentekoa voidaan parantaa käyttäytymisen muuttamisen tekniikoilla liittyen esimerkiksi tiedon lisäämiseen ja tavoitteiden asettamiseen sekä ketjujen sisä- että ulkopuolelta. Tulokset antavat liiketoiminnan harjoittajille ja päättäjille yli organisaatorajojen ideoita miten ottaa päätöksentekijä huomioon alalla laajasti sovelletuissa päätösmalleissa.

ASIASANAT: Behavioraalinen toimitusketjujen johtaminen; Inhimillinen tekijä; Päätöksenteko; Sosiaalinen toimijuus; Sosiaalinen kognitio; Representaatio; Rationaalisuus

Acknowledgements

I recently ran into the concept of Fata Morgana, described as a mirage that floats above the horizon like a castle in the sky. Mirages share the attribute that one can approach them from many a direction without ever catching up on them. As the old cliché captures, however, the most valuable thing is not the destination but the journey. During the journey I have dreamt, learnt, failed, and succeeded. Puzzles have been solved and knowledge created. And finally, I have arrived at a place where I am standing just underneath the castle and thank myself for the perseverance.

Journeys are seldom journeyed alone, and I am deeply grateful to all those who have supported and inspired me. First of all, I could not have learnt the ropes of being a researcher without Professor Juuso Töyli, Dr. Tomi Solakivi, and Dr. Sini Laari. Thank you for your guidance as supervisors and contribution as coauthors, together we witnessed how the most complex ideas may become something beautiful with hard work. Also, thank you for keeping me company around the world, I find peace in reminiscence of the slopes near Riezlern.

Thank you Professor Jari Juga and Associate Professor Katri Kauppi for familiarizing yourself with my work and providing the expert insight that helped me put final touches on my dissertation during the pre-examination process. Your encouraging words and insightful comments are very much appreciated. Furthermore, thank you Katri Kauppi for agreeing to act as my opponent, I am looking forward to our discussions and honoring you at *karonkka* given the possibility.

During my studies, I have been taught by the best at Turku School of Economics. Accordingly, having been employed by the university for over five years, I have had the privilege to enjoy the company of many amazing colleagues in the Operations and Supply Chain Management unit. Professor Lauri Ojala and Dr. Tuomas Kiiski, I owe you a great deal for introducing me to the possibilities of an academic career and advising me in its pursuit. Professor Harri Lorentz, thank you for your exemplary leadership through this rapidly changing business environment. Dr. Vesa Kilpi, Dr. Anu Bask, Dr. Jarmo Malmsten, and Sari Tähtinen, it has been a pleasure to work together. Minna-Liina Ojala and Pauliina Lautiainen, it is starting to feel possible to

get a doctoral degree; trust the process. Alekski Paimander, thank you for the camaraderie, I wish you all the best.

I could not have done my research timely without proper funding in place. I am thankful to University of Turku Graduate School and Turku School of Economics Support Foundation for enabling my full-time studies. I would also like to thank Turun Kauppaopetussäätiö, Savings Bank Research Foundation, Emil Aaltonen Foundation, Finnish Association of Purchasing and Logistics, and Alfred Kordelin Foundation for the generosity that helped me pay the bills. I can proudly say that I achieved what was promised. I am also thankful to Jenni Heervä for coordinating my doctoral studies, as well as others in the Steering Committee of the Doctoral Programme of Turku School of Economics for facilitating the work of us doctoral researchers.

Several further special mentions should be shared. Valtteri N., thank you for your intellectual curiosity and shared discussions regarding questions of both life and science. Tuomas, I admire your will to better the common good, never stop being critical. Joni, Dani, Valtteri A., Niilo, and Atte, thank you for enriching my world and accompanying me for adventures big and small. World keeps getting busier yet we find time to relax and play games. Vilma, your warmth and interest in all things social psychology are contagious. Dr. Savu Rovanto, thank you for sharing the research journey with me, whether it be at conferences, courses, or yoga classes. Dr. Tri Tran, I salute you and your vast talent in everything you undertake. I thank Sam Stacy for keeping me fit, and Dr. Martti Ajo for listening. To all my other friends, you are the ones everyone needs and deserves in their lives, I am forever grateful.

The ultimate thanks go to my closest family for their unconditional love. Thank you Essi for putting up with the academic lifestyle even after your graduation. Thank you dad, mom, and Eevi for always being there for me. Thank you grandmothers Eeva and Katri, grandfathers Olavi and Hannes, and uncle Matti. I have never felt left without support, and now it is finally time to celebrate big.

Helsinki, November 2022

Oskari Rintala

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List of Original Publications

This dissertation is based on the following original publications, which are referred to in the text by their Roman numerals:

- I Rintala, Oskari – Solakivi, Tomi – Laari, Sini – Töyli, Juuso – Ojala, Lauri (2021) Drivers of logistics outsourcing: examining transaction costs, core competences and planned behavior. *International Journal of Physical Distribution & Logistics Management*, Vol. 51 (3), 259–280.
- II Rintala, Oskari – Laari, Sini – Solakivi, Tomi – Töyli, Juuso – Nikulainen, Reetta – Ojala, Lauri (2022) Revisiting the relationship between environmental and financial performance: the moderating role of ambidexterity in logistics. *International Journal of Production Economics*, Vol. 248, 108479.
- III Rintala, Oskari – Laari, Sini – Solakivi, Tomi – Töyli, Juuso (2022) Fulfilling expectations or overachieving: the role of market values in the linkage between environmental and financial performance. *Business Strategy and the Environment*, Vol. 31 (3), 768–781.
- IV Rintala, Oskari (2021) How to not lose oneself: the case for relational identity in collaborative supply relationships. In: *The 33rd Annual NOFOMA Conference Proceedings*.

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1 Introduction

1.1 Background

The business organizations of today are characterized by their embeddedness in broad social systems encompassing numerous intra- and interorganizational stakeholders from employees and managers to customers, suppliers, shareholders, competitors, and (non-)governmental organizations (Scott & Lane 2000; Meixell & Luoma 2015). In response to such complexity, the management of interorganizational operations has been a focal topic in business research since the 1980s when the concept of supply chain management (SCM) made its first appearances in literature (Cooper et al. 1997; see Houlihan 1985). Within the SCM discipline, businesses are conceptualized to form supply chains and networks among which companies are “*directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer*” (Mentzer et al. 2001, 4). The management of supply chains is, correspondingly, concerned with how businesses are related to one another within the supply chain, and how the activities and processes between organizations can be improved (Frankel et al. 2008; Ellram & Cooper 2014).

Traditional SCM has, however, been criticized for inadequately portraying, defining, and incorporating human behavior in research. Studies have underlined a gap between SCM theory and practice, that is, a disconnection between what is assumed in operational models and how people behave (Bendoly et al. 2006; Sweeney 2013; Sanders et al. 2016; Schorsch et al. 2017). This gap between the optimal and the actual behavior of human actors is familiar to other business disciplines where behavioral matters have been previously addressed. Behavioral economics, in particular, has established that the economic actor systematically fails to make the optimal decision and is, instead, driven by heterogeneous preferences and multifarious beliefs influenced by their social environment (Becker & Murphy 2000; Thaler 2016). These findings have received support also in the SCM context where studies have pointed out ways in which decision-makers deviate from normative models of decision-making and the assumptions of rationality that come with (Carter et al. 2007; Fahimnia et al. 2019). The individual decision-maker does not seem to comply with the neoclassical assumptions of *homo economicus*—the

beliefs that people are utility maximizing and mainly self-interested, rational decision-makers (Boudreau et al. 2003; Gino & Pisano 2008; Wiseman et al. 2012).

The growing interest in behavioral issues has been further elaborated within the recently emerged paradigm of behavioral supply chain management (BSCM) which examines human behavior and its effects in the SCM context (Fahimnia et al. 2019). BSCM answers explicit calls for more focus on the people dimension of supply chains (i.e., the “soft-wiring”; Sweeney 2013) and for the incorporation of behavioral realities into models and theory in the field (Tokar 2010). BSCM adopts the premise that individual level attributes and managerial actions are interrelated with supply chain processes and structures (Barnes & Liao 2012; Tangpong et al. 2019) and aims further at explaining differences in these across firms where the “traditional” models do not suffice (Carter et al. 2007; Croson et al. 2013). Schorsch et al. (2017) situate BSCM at the intersection between research in the SCM context and behavioral research, the latter characterized by the following assumptions: people are (a) motivated beyond monetary payoffs, (b) people’s behavior may depend on mechanisms unconscious to the actor, and (c) the outcomes of people’s behavior are not always optimal for a specified objective function.

Previous research in BSCM has largely focused on discussing SCM-related decision-making in terms of many theories within numerous areas of study. Behavioral issues have been argued to be significant in research settings regarding, for example, sustainable supply chain management, relationship management, inventory management, risk management, and contracting (e.g., Hornibrook et al. 2008; Loch & Wu 2008; Wu & Chen 2014; Kirchoff et al. 2016; Fahimnia et al. 2019; Kumar 2020). Through borrowing from and having dialogue with other disciplines researchers have begun to better understand why individual decision-makers make the decisions they do and how the coalitions of people interacting with each other among supply chains could be managed (Stock 1997; Halldórsson et al. 2015).

The interdisciplinary dialogue is still, however, very much underway. Where traditional SCM has overlooked human behavior, previous research within BSCM has put relatively little emphasis on social aspects of the behavior (Erjavec & Trkman 2020). Supply chains are not only economic and capital-driven exchange mechanisms but embody complex social realities of multiple agents participating in common operations (Fayezi et al. 2012; Randall & Mello 2012). Furthermore, it is suggested that supply chains should be understood as interwoven with political-economic phenomena in their broader contextual environment (Wieland et al. 2021). SCM phenomena reside and emerge on various hierarchically nested levels of social ordering—from individuals and groups to companies, supply chains, and economic systems—and require multilevel theorizing to be understood (Carter, Meschnig & Kaufmann 2015).

Along these lines, Schorsch et al. (2017, 254, 255) explicitly outline “*integrating cognitive and social psychological research*” and “*strengthening the concept of [social] emergence and applying meso-level theory approaches*” as current research gaps and future research opportunities in BSCM. While the diverse social realities on the multiple levels of analysis have been previously addressed particularly in the field of social psychology that “*attempts to explain how society influences the cognition, motivation, development, and behavior of individuals and, in turn, is influenced by them*” (Cartwright 1979, 91), there remains many an issue to be unveiled and areas to be explored in SCM.

1.2 Purpose and scope of the thesis

The little attention given to the social aspects of supply chains has come short in describing and bettering the related activities and processes to the fullest, whereupon there exists ambiguity in how the human factor translates into business outcomes and how it may be complemented (Hoberg et al. 2020). This thesis adopts a social psychological approach to investigate the themes and to show how various psychological factors come to being, develop, and manifest in the social environment of the supply chain. Assumptions about human behavior are examined through the lens of a social cognitive perspective that considers the role of cognition in behavior and finds out how the way people embrace the world influences their decision-making (e.g., Fiske & Taylor 2013; Augoustinos et al. 2014.). To this aim, the first research question sets out to identify what is relevant in the SCM context:

RQ1: What psychological characteristics of individuals are related to supply chain management decision-making?

Answering the first research question extends previous studies that have sporadically addressed socially developed characteristics (e.g., values, norms, attitudes, trust, and moral conceptions) and their manifestation in interrelations between individuals and groups among supply chains (e.g., Gullett et al. 2009; Swaim et al. 2015; Eriksson & Svensson 2016; Su et al. 2017). Following the social cognitive perspective, social actors, as in individuals and the social systems they make up, evolve in interaction with one another and may influence their environment through their actions (Bandura 2001). The social actors then become social agents where they can intervene in the course of events by enacting and legitimating representations of themselves socially through action (Giddens 1984; Meyer & Jepperson 2000).

In this regard, Tangpong et al. (2010) note that researchers should look at agency at the individual level when trying to understand interorganizational dynamics. Hence, the focus here is directed at the individual who both lays the foundation for,

and is bounded by, phenomena on the other levels of analysis (Schorsch et al. 2017; see Billet 2006). The agents are involved in solving decision problems (i.e., making decisions), defined after Tversky and Kahneman (1981, 453) by “*the acts or options among which one must choose, the possible outcomes or consequences of these acts, and the contingencies or conditional probabilities that relate outcomes to acts.*” Supply chain management decision-making, accordingly, refers to the process where individuals and groups make decisions for planning, implementing, and controlling the supply chain (Manuj & Sahin 2011).

Understanding the problems in behavioral terms is the first step toward changing behavior (Michie et al. 2014). That is, to know the psychological characteristics is to know where to aim improvements to make a difference. In this respect, the second research question is concerned with the ways in which SCM decision-making can be supported:

RQ2: How to enhance decision-making within the supply chain management context from a social cognitive perspective?

The social cognitive perspective directs attention particularly at the importance of the concept of mental representations (or cognitive representations). In cognitive decision-making processes, new and existing information and knowledge are argued to be organized into such cognitive symbol structures with impacts on behavior (Simon 1978a). Accordingly, the mental representations based on decision-makers’ prior experience and learning are argued to mediate the relationship between their sensory perception and interpretation of phenomena (Marcel et al. 2010; Shaw 2015). With its focus on the individual agent, the social cognitive perspective puts emphasis on the role of behavior change techniques to modify the mental representations and other sociostructural factors fundamental to human behavior (see Luszczynska & Schwarzer 2020).

The two research questions are elaborated on in four original publications included in the compilation thesis. To provide a comprehensive understanding of the subject matter, the articles follow an embedded design where they approach the research aim from different perspectives and use data from multiple different sources (Creswell & Plano Clark 2011). In this regard, the articles constitute a multilevel model where different theories and methods are used to address the systemic levels from the individual to the company, the supply chain, and the economic system. This systemic structure is implemented in research on the topics of logistics outsourcing, organizational performance, and supply relationships, as demarcated in **Figure 1**.

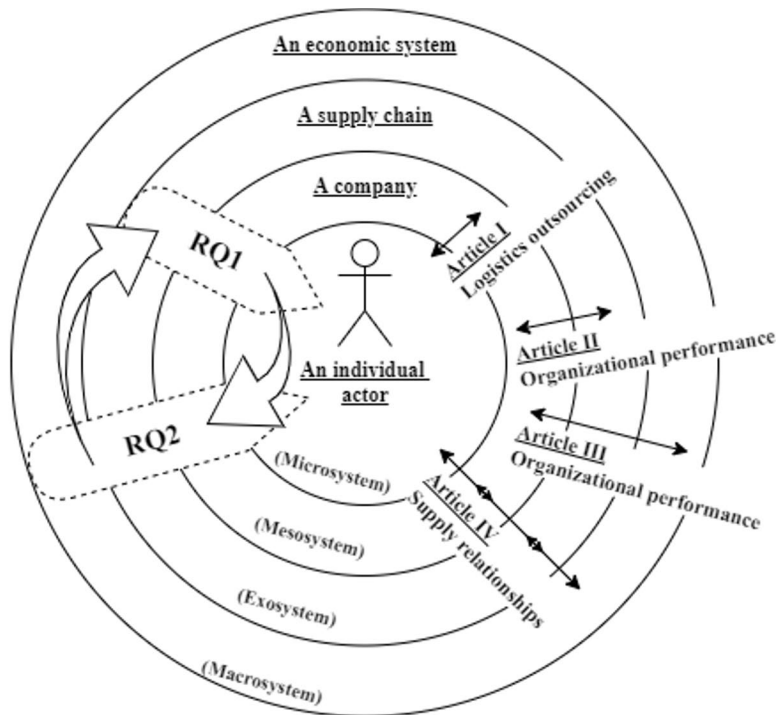


Figure 1. The systemic relationship between the levels of analysis, the research questions, and the original publications addressed in the thesis.

The multilevel model draws inspiration from the ecological systems theory that considers individuals' social ontogenesis as a function of the individual and their environment (Bronfenbrenner 2002). The individual is assumed to act amidst a social environment classified on the levels of *micro* (the bidirectional relationships between the individual and those in their immediate environment); *meso* (the interactions between the microsystems); *exo* (social structures and institutions that affect the microsystems); and *macro* (cultural factors that may influence the other levels). Accordingly, the original publications move from an examination of the relationship between the characteristics of individuals and company level decision-making (**Article I**) to consider the decision-making in relation to the way the firm is disposed toward their respective supply chains (**Article II**) and markets (**Article III**) and, ultimately, mechanisms of social ordering that pertain to all the levels (**Article IV**). Each of the articles contribute to both the research questions in an interrelated fashion where the identified characteristics inform the suitable ways of improvement on the different levels that, when applied, influence SCM decision-making.

Finally, the research scope is defined by the SCM context besides the behavioral dimension. SCM is often considered together with activities in other closely related areas of research such as logistics, marketing, production management, and

operations management. Following Mentzer et al. (2008), SCM includes these areas and extends the scope of inquiry to the inter-organizational level. The boundaries, however, are not always that clear and the concept of logistics, in particular, has been used interchangeably with SCM (Sweeney et al. 2018) or defined as the planning, implementing, and controlling of the various flows SCM is concerned with (Stock et al. 2000). Nonetheless, although SCM revolves around the concepts and logics borrowed from the related areas of research, the field may benefit further from applying theories from elsewhere to provide reasoning for managerial decisions (Halldorsson et al. 2007). Hence, this research derives from literature regarding SCM, the areas of research related to SCM, and social psychology.

1.3 Contribution

After Kuhn (2012), scientific paradigms gain ground through assimilating new discovery into established knowledge, whereby scientists are able to study phenomena from a broader perspective or with more precision. Here, the added scientific and practical value resides in bridging the disciplines of SCM and social psychology, which provides an integrative account of views, methodological preferences, theories, and empirical evidence between the two. Organizational theories have been argued to have the potential to advance SCM research by clarifying the organizational basis of interorganizational behavior (Moxham & Kauppi 2014). Accordingly, it can be argued that social psychological theories on human behavior may help explain the behavior of individuals and groups both within and across organizations in (inter)organizational contexts. This thesis connects the levels of analysis to expand the current understanding on the factors related to SCM decision-making, as in the antecedents, the consequents, and the contingencies regarding decision problems relevant to the field. Therefore, the thesis contributes to the level of maturity SCM has as an established scientific discipline by providing a sought-after interdisciplinary perspective to the subject matter.

The contribution can be further situated at the intersection of the three concepts of particular importance to this research: SCM decision-making, BSCM, and social agency. The relationships between the concepts are illustrated in the Venn diagram in **Figure 2**.

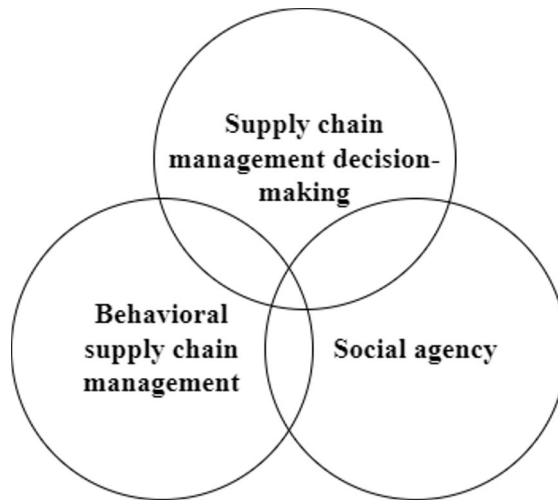


Figure 2. The relationship between SCM decision-making, BSCM, and social cognition.

The main contributions of the thesis lie in where the three concepts intersect. Here, the thesis extends the premise that supply chain phenomena are based on the behavior of individual decision-makers by showing how psychological characteristics are of relevance to organizational decision-making. Consideration is given, particularly, to how the way individuals' representations of the social world originate and manifest as organizational decisions. The adopted social cognitive perspective renders possible the study of how, on the one hand, individuals' social environment influences their cognitions and consequent behavior, and, on the other hand, the individuals influence the environment through their actions. Taking better account of behavioral factors then yields, as put by Thaler (2016, 1597), models of decision-making with higher R^2 than before.

The research further contributes where researchers have been interested in the contrast between the what-is and what-should-be in SCM decision-making (Tokar 2010). In this regard, the identified psychological antecedents of decision-making may drive behaviors either optimal or suboptimal from the organizational viewpoint. Therefore, the better understanding on the factors related to the decision-making helps both academics and practitioners to uncover possible deficiencies in the decision-making and aim improvements in ways that make a difference.

The contributions of the original publications span the topics of logistics outsourcing, organizational performance, and supply relationships considered in the publications. **Article I** examines different theoretical perspectives for outsourcing decision-making and contributes to a search for behavioral factors as drivers for logistics outsourcing (e.g., Merminod et al. 2019; Large et al. 2021). **Article II** and **Article III** take part in the conversation on business sustainability by bringing

forward the role of logistics and institutional environment to the environmental and financial performance of business organizations (Bask et al. 2018; Kauppi & Luzzini 2022). **Article IV** extends on previous research concerned with issues of identity and management thereof in supply relationships (Min et al. 2008; Ambrose et al. 2018). All in all, the original publications contribute by showing how the behavioral perspective may be applied to solve current problems in different areas of research.

The thesis makes use of both conceptual and empirical analyses. Conceptual analysis is used to make sense of previous research and to form theoretical arguments that are further supported by extensive data gathered in both domestic and international settings. Empirical survey data is derived from the Finland State of Logistics surveys 2016 and 2018, and the European Social Survey 2016. The survey data is studied together with financial reporting data collected from the Voitto+ and Eikon datasets. Together the data from Finnish trading and manufacturing companies as well as from European individuals and public companies provide a comprehensive view into the relationship between individual psychology and SCM decision-making and, thus, answer to the call for more multilevel theorizing (Carter, Meschnig & Kaufmann 2015). The empirical data is analyzed with mainly quantitative research methods which, in connection with behavioral considerations, provides a sought-after multi-methodological approach to study SCM (Choi et al. 2016).

1.4 Structure of the thesis

The research is structured by following the three stages of logistics research outlined by Mentzer and Kahn (1995): 1) from idea generation to substantive justification, 2) from theory construction to methodology, and 3) from methodology to conclusions and future research. In the first stage, previous literature in the research area is reviewed to provide support and justification to the research endeavor. The second stage is concerned with deriving the theories, constructs, research hypotheses, and methodological choices that best support the research and employing them to the research aim. In the third stage, issues of research validity and reliability are addressed, data is analyzed, and conclusions are drawn to both add to the existing body of knowledge within the discipline as well as to influence future research.

The stages are carried out in the two parts of this thesis: the summarizing body of the thesis and four original publications. Key literature and the elements pertaining to the research design—theories, constructs, and methodological choices—are presented in the summarizing body. The theoretical basis of the thesis is then elaborated in the four original publications. Each of these research articles addresses distinct theories presented in distinct research settings to contribute to the research aim and answer the two research questions. Finally, the findings outlined in the articles are synthesized in this summarizing body for concluding the thesis and

presenting proposals for future research. The structural relationship between this summarizing body and the original publications is illustrated in **Figure 3**.

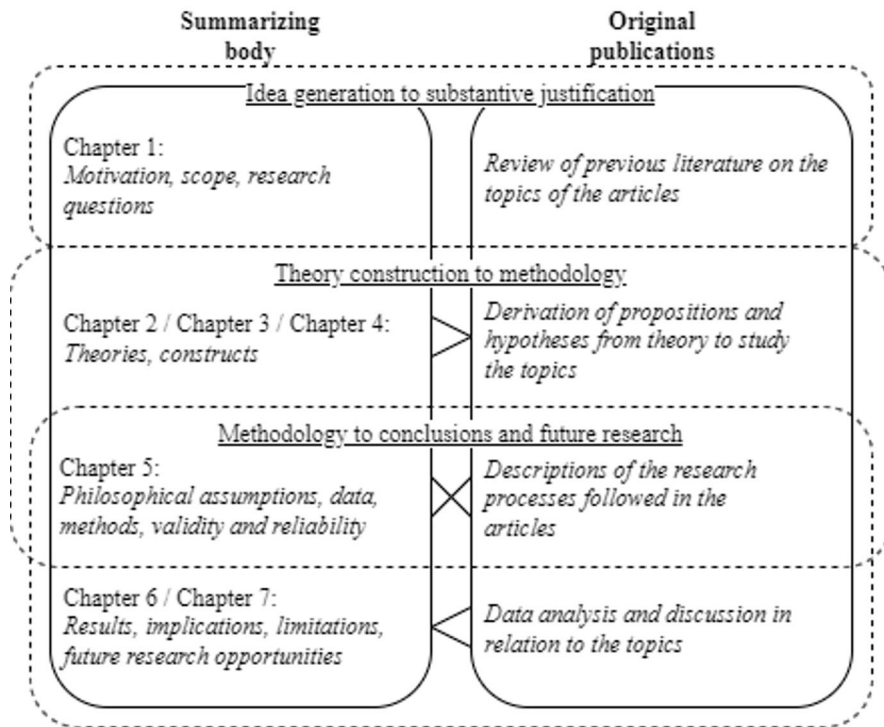


Figure 3. The relationship between the summarizing body and the original publications.

The results of the thesis are arrived at by using different logics of reasoning. Inductive generalizations from previously observed phenomena as well as retroductive reasoning for examining these phenomena from a new perspective are used to justify the research questions and theories addressed in each article. Logical deduction, in turn, is used to derive conceptual and empirical propositions from the theory base to illustrate the relationships among various research constructs addressed in the articles. (see Kovács & Spens 2005.)

The original publications are included in the thesis after references. References to the publications are made in **boldface** along the summarizing part.

2 Decision-making in the supply chain

2.1 An overview of supply chain management decision-making

Following Carter, Rogers and Choi (2015), a supply chain can be conceptualized in terms of its structure and its boundary. Supply chains are structured by a network of agents (i.e., nodes) capable of making decisions and the transactions consisting of supply chain flows (links) between them. It is assumed that each agent tries to control the processes within their reach to increase performance for their benefit. On the supply chain level, the performance is improved through the better use of internal and external capabilities for an alignment between supply chain members (Chen & Paulraj 2004). The performance is then argued to be realized as potential supply chain surplus, referring to a difference in the value provided to the end-customer and the costs incurred by the chain members in aggregate (Chopra & Meindl 2016).

The boundary of the supply chain, in turn, conveys the relativity of the supply chain with respect to some particular agent (i.e., focal agent). The part a firm plays in a supply chain depends on whose point of view is adopted; a firm may be, for example, the upstream supplier for a part it produces and the downstream customer for the raw materials required to produce the part. The relativity of the chain is further underlined by the idea that the chain is to be viewed from the perspective of a focal agent and it is bounded by the knowledge of the agent about the nodes in the specific supply chain (Carter, Rogers & Choi 2015; Busse et al. 2017). The idea is parallel to the concept of a managed supply chain—the part of the supply chain (or network) that exists because of the collective and intentional efforts of the chain members. On the contrary, supply chain can also be characterized as a natural phenomenon that emerges organically through the formation and maintenance of business relationships. (Mentzer et al. 2001; Min et al. 2008.)

Chopra and Meindl (2016, 18–19) categorize supply chain decisions into three categories based on their frequency and the time frame of their impact: (1) supply chain strategy or design, (2) supply chain planning, and (3) supply chain operation. Supply chain strategy or design span the longest time frame and is concerned with strategic decisions that define the configuration of and allocation of resources within

the chain. The decisions in this category answer to issues such as whether to outsource business functions, where to locate production and warehousing facilities, what to produce and store at the facilities, and what modes of transportation and information systems to use. Supply chain planning, in turn, refers to companies defining the operating policies to be followed given the constraints established when deciding on the chain strategy and design. The decisions are related to, for example, meeting market demand or managing inventories. After the supply chain is configured and the planning policies are defined, decisions have to be made on the operational level on how to best prepare for and meet individual orders.

The three levels resemble the commonly adopted distinction into the strategic level, the tactical level, and the operational level of SCM decisions, respectively (cf., Schneeweiss 2003). Decisions on the different levels are also often made by decision-makers in different hierarchical positions in the organization. Here, the strategic level is related to decisions made by the top-level management, the tactical level to decisions by mid-level management, and the operational level to decisions by low-level managers, supervisors, as well as the rest of the workforce (Gunasekaran et al. 2004). On all the levels, researchers have then emphasized the role of various quantitative and qualitative tools and support systems to aid in decision-making (e.g., multi-criteria decision-making, collaborative decision-making, distributed decision-making, fuzzy approaches) (Schneeweiss 2003; Cruz 2009; Liu et al. 2013; Fahimnia et al. 2015).

Such tools and support systems for supply chain management decision-making are useful in helping with decision problems characterized by clearly defined boundaries and parameters (Alexander et al. 2014). Researchers have, however, brought up how supply chain complexity may pose a challenge to decision-makers striving for the optimal choice. There exist numerous elements that contribute to the complexity of the supply chains that emerge through the normal course of business. Manuj and Sahin (2011) put forth several of these elements, including supply chain size and structure, customer expectations, environmental conditions surrounding the chains, globalization, and organizational restructuring processes. After Liu et al. (2013), decision-making in complex supply chains may be a demanding task due to the needs to consider various types of flows, engage numerous stakeholders, and make decisions in multiple different times and places. This is all key to a characterization of supply chains as complex adaptive systems where changes in one part of the system may lead to unexpected changes in some other part (Choi et al. 2001). In this regard, SCM decision-making may be challenging, as all links cannot be explicitly managed yet decisions made outside these links may influence the managed structure (Lambert & Cooper, 2000).

The dynamics of supply chain complexity are well illustrated with reference to phenomena such as the bullwhip effect and the ripple effect that have received vast

attention in research (e.g., Cantor & Macdonald 2009; Dolgui et al. 2018). The bullwhip effect refers to a phenomenon where fluctuations in downstream demand in the supply chain result in amplified upstream demand orders due to incomplete or distorted information between supply chain partners (Lee et al. 1997). Wilding (1998) has described such inefficiencies in SCM decision-making processes with the term chaos, referring to how small changes in the decision rules applied by decision-makers may set in motion patterns of behavior leading to suboptimal costs to the system. The ripple effect, in turn, refers to a situation where a disruption in one part of the supply chain propagates toward its other parts and, ultimately, affects the chain negatively to an extent depending on the resilience of the supply chain (Li & Zobel 2020).

To enliven this complex reality, researchers have advocated the application of theories classified grand, middle range or small-scale to the study of SCM decision-making (Arlbjørn & Halldorsson 2002; Carter 2011; Craighead et al. 2016; Stank et al. 2017). Grand theories are all-encompassing theories addressing a broad range of phenomena that do not attach to some specific context. The middle-range theories bridge theory and practice through providing theoretical explanations to industry situations. Small-scale theories are concerned with hypotheses and propositions on the connections between concepts. Effectively, different theories have been applied to examine the structure and the boundaries of the supply chain and to support decision-making in the context. Outlooks on theories and their use in SCM are discussed by, for example, Chicksand et al. (2012), Stank et al. (2017), and Gligor et al. (2019). The theories presented in the next chapter are employed in the original publications as theoretical tools for examining SCM decision-making.

2.2 Organizational theories for supply chain management decision-making

2.2.1 Transaction cost economics

Transaction cost economics (TCE) is based on the idea of transactions between individual actors as the basic unit of economic analysis, as proposed by Commons (1931). Later, Coase (1937) associated market transactions with costs other than price and argued these may be controlled through the establishment of a firm. Such transaction costs are the potential *ex ante* and *ex post* costs associated with carrying out market exchanges, occurred due to lack of information between the parties involved in it (Dahlman 1979). The costs can be further viewed as costs of contracting; individual decision-makers are only boundedly rational and given to opportunism, whereupon contractual arrangements are needed to facilitate the exchange between the parties (Williamson 1981).

Transaction costs may be assessed to define firm boundaries through the selection of the most economical organizational governance structures. In particular, models based on TCE help to assess the relative transaction costs associated with market contracting, hierarchical organization, or intermediate modes between the two (Arnold 2000; Ellram & Billington 2001; Holcomb & Hitt 2007). Here, transaction costs are seen to be determined by the three distinct elements of frequency, asset specificity, and uncertainty (Williamson 1981). The transaction costs associated with an exchange relationship are the higher the less frequently a transaction occurs, the more investments need to be customized to the particular transaction, and the more uncertainty there is about the behavior of the other party, respectively.

SCM literature has largely focused on outsourcing activities as the means for market contracting. Applied into the domain of outsourcing decision-making, relatively high transaction costs of exchange with a party external to the firm would suggest carrying out the function internally within the organization, whereas costs of exchange lower than those associated with the hierarchical structure would advocate outsourcing. While TCE alone may not be sufficient in itself to fully explain outsourcing decisions (Holcomb & Hitt 2007; McIvor 2009), it is argued to provide a sound foundation for the assessment of firm boundaries from a broad systems perspective within the SCM context (Williamson 2008). Accordingly, applications of TCE in the context have been argued to have potential in contributing to the theoretical foundation of the field especially when focused on the costs of hierarchical governance structures (Anand & Gray 2017). Ketokivi and Mahoney (2020), for instance, discuss how SCM research may help elucidate the micro-level processes and structures essential to the formation of organizational boundaries. In this regard, **Article I** contributes to the discussion by deriving from TCE to investigate the role of decision-makers' assessments of the specificity of intraorganizational logistics assets in logistics outsourcing.

2.2.2 Resources, competences, and capabilities

The relationship between the characteristics of the firm and its position in the market has been examined from many perspectives. Penrose (1955) situated the causes of, and limits to, the growth of firms to human decisions that require resources for their planning and execution; growth is driven by resources available for making related decisions yet ultimately limited by market demand. Accordingly, after the resource-based view (RBV) of the firm, a firm may be looked at as a set of resources, and strategy in terms of the resource position of the firm vis-à-vis other resource holders (Wernerfelt 1984). Firms may develop and maintain sustained competitive

advantage with resources that are rare, valuable, inimitable, and nonsubstitutable (Barney 1991), such as people (Wright et al. 2001).

The idea of internal firm resources as sources of competitive advantage has been further elaborated in approaches such as the core competence approach (CCA) or the dynamic capabilities approach (DCA). CCA prompts firms to identify and develop competences that provide them with access to different markets, contribute to perceived customer benefits, and are difficult to imitate (Prahalad & Hamel 1990). It is argued a firm may develop competitive edge by focusing on the skills and knowledge that bring such benefits and, thus, consider others for outsourcing (Quinn & Hilmer 1994). Furthermore, such core competencies are characterized by their strategic flexibility reflected in how easily they may be redeployed and reorganized for future business needs (Hafeez et al. 2002). Competences possessed by supply chain managers and logisticians may also be treated as a requisite for successful decision-making in the SCM context (Heaslip et al. 2019). Of the original publications included in this thesis, **Article I** adopts CCA as a theoretical lens to address the strategic importance of logistics to the firm and its relationship to logistics outsourcing decisions.

DCA, in turn, is based on the concept of dynamic capabilities that reflect an organization's ability to achieve new forms of competitive advantage through their "*ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments*" (Teece et al. 1997, 516). Within the SCM context, dynamic capabilities are linked to behaviors such as assessment, development, or evolvement in relation to the supply chain partners of a company (Beske 2012). Accordingly, the supply chain itself represents a dynamic capability where firms develop and leverage attributes such as supply chain visibility and agility to respond to the changing business environments (Lee & Rha 2016).

RBV, CCA, and DCA together emphasize how organizations may benefit from both exploiting their existing resources, competences, and capabilities, as well as exploring new ones. The relationship between the exploitation and the exploration has been addressed in more detail in studies on organizational ambidexterity. An ambidextrous organization has the ability to both increase the alignment between intraorganizational characteristics (e.g., strategy, structure, and culture) and meet changes in their competitive environment (Tushman & O'Reilly 1996). Organizational ambidexterity, thus, signifies the organization's ability to manage the tensions that originate from the contradictory processes of knowledge extension versus knowledge creation, or of incremental versus radical innovation (Andriopoulos & Lewis 2009). The ability may emanate from distinct units, individuals, configurations, and processes across the organization and have positive performance implications (Raisch et al. 2009; Weiss & Kanbach 2021). **Article II** derives from DCA and organizational ambidexterity logics to study how

ambidexterity in logistics operations contributes to environmental and financial performance within the firm.

Researchers have recently directed their attention at the role of interorganizational resources, competences, and capabilities. Shou et al. (2018) and Fayezi and Ghaderi (2022), for instance, discuss how the configuration of interorganizational relationships may contribute to benefits at the firm level when resources between the parties are properly aligned. Sandberg et al. (2021), in turn, conducted a literature review on interorganizational dynamic capabilities that firms may use to leverage the resources and competences of other organizations. They distinguish between different types of such capabilities based on who controls and may benefit from the use of a capability, which further sets boundaries to the means of coordinating and utilizing assets between firms in a network. In this regard, the original publications address the benefits of logistics to the focal firm by considering both the internal (in-house/exploitative logistics) and the external (outsourced/explorative logistics) logics of organizing the function.

2.2.3 Institutional theory

Research in institutional theory provides more of a macro level lens to the study of organizational activity. After the theory, organizations are influenced by social institutions that provide them with rationalized templates for action, cognition, and emotion (Meyer & Rowan 1977; Lawrence et al. 2011). Organizations are driven by both social and economic motives in the face of the pressures; by conforming, organizations may legitimate their actions in their social environment and adopt actions of other actors deemed previously successful (Kauppi 2013). Scott (2014) has described these pressures with three elements that make up or support institutions, classified regulative, normative, and cultural-cognitive. The regulative element comprises formal and informal rules and the related sanctions and rewards. The normative element is concerned with social obligation with values and norms as its basis. The cultural-cognitive element refers to institutions as a shared understanding indicated by, for example, common beliefs and shared logics of action.

DiMaggio and Powell (1983) distinguish between coercive, mimetic, and normative isomorphic processes through which organizations become more homogeneous in forms and practices. After coercive isomorphism, organizations conform to pressures exerted by other organizations and cultural expectations by following the formal and informal rules imposed by laws, regulations, policies, social conventions, and such. Mimetic isomorphism refers to the process of following the actions of others perceived more legitimate or successful in response to uncertainty in organizational decision-making. Normative isomorphism stems

from professionalization that develops in formal education and professional networks that span organizations. Isomorphism, however, is rarely total. Meyer and Rowan (1977) make the case for the possible decoupling of organizational behavior from rationalized institutions, as the latter may conflict with local demands for organizational efficiency and arise from different parts of the organization's environment.

Although the focus of institutional theory has, traditionally, been on the organizational and societal levels of analysis, some insights have linked it back to the individual level. As noted by Suddaby (2010), institutions as instruments of cognition should more often direct attention at how the institutions are processed by individual agents. Accordingly, Lawrence et al. (2011) emphasize how institutions are created, maintained, and disrupted by individual actors reflecting on and operating in the institutional environments they are embedded within. In this regard, it has been argued within SCM literature that supply chain members may act as institutional entrepreneurs that initiate institutional change across multiple tiers of the supply chain (Grimm et al. 2022). The conformity to the institutional pressures on the higher levels of analysis has then been addressed especially with reference to the topic of sustainable supply chain management where the institutional environments are seen as important determinants of sustainable SCM practices (Sauer & Seuring 2018; Kauppi & Luzzini 2022). **Article III** included in the thesis follows institutional theory to address how businesses may gain legitimacy in the markets with environmental performance and, consequently, perform better financially.

2.3 Outcomes of supply chain management decision-making

2.3.1 Organizational processes and structure

Given the complexity of SCM decision-making, the related decisions have been argued to be sequential where a single decision may induce numerous future opportunities and related choices (Wu & Pagell 2011). Hence, instead of looking at all the potential outcomes and consequences of individual SCM decisions, it may be convenient to view the decisions in terms of their influence on the organization or the supply chain the decisions are made within. Outcomes of interest to SCM research have included, for example, (transaction) costs, cycle times, inventory levels, and customer satisfaction (Gunasekaran et al. 2004; Manuj & Sahin 2011). Accordingly, organizational theories such as those presented in Chapter 2.2 have been proposed to be suitable for addressing the relationships among various

organizational prerequisites, SCM, and outcomes related to elements such as flexibility and responsiveness toward changes in demand (Halldorsson et al. 2007).

Decisions may also be assessed in terms of their impact on the structure of the organization or the supply chain. Here, corresponding outcomes of interest have included the extent of internal or external integration within the supply chain (Stock et al. 2000; Flynn et al. 2016), or the magnitude of outsourcing (Solakivi et al. 2011). In this vein, **Article I** is concerned with the drivers for, as well as outcomes of, logistics outsourcing decisions in Finnish manufacturing companies. Furthermore, SCM decision-making may have an influence on various processes both within and between organizations, whereupon the processes may be examined in terms of characteristics such as the level of ambidexterity (Kilpi et al. 2018), or ethics (Ferrell et al. 2013). **Article III** examines ambidexterity in logistics based on different levels of exploitative and explorative processes in Finnish manufacturing and trading companies.

2.3.2 Organizational performance

Together with other organizational initiatives, SCM practices ultimately contribute to organizational performance that reflects organizational behavior over time (Li et al. 2006). Organizational performance is a multidimensional concept referred to with numerous different types of performance. A way to structure the dimensions of overall organizational performance is provided in discussion on the concept of the triple bottom line (TBL). The TBL is an accounting framework that may be used to examine the sustainability of business organizations in terms of their economic, environmental, and social performance (Elkington 1998). The performances have been further addressed with respect to supply chain operations and strategy as the basis for sustainable supply chain management (Brockhaus et al. 2013). With increasing stakeholder pressures for businesses to be sustainable, businesses should evaluate their operations in terms of the possible influence on the three types of performance (Mangla et al. 2020).

Information about the performance outcomes is obtained with performance measurement, a process which Neely et al. (1995) refer to as quantifying action. In this vein, the types of performance measured within the original publications are environmental performance and financial performance (i.e., economic performance). Environmental performance is defined as “*a firm’s effectiveness in meeting and exceeding society’s expectations with respect to concerns for the natural environment*” (Judge & Douglas 1998, 245). The performance is, therefore, often operationalized with reference to either the reduction of harm to the natural environment or improvement of the environmental situation of the company (Zhu & Sarkis 2007). Regarding the latter, environmental performance may be assessed

besides the environmental impacts with indicators related to regulatory compliance or the state of organizational environmental processes (Delmas & Blass 2010).

Financial performance of the firm may be assessed with accounting-based or market-based measures (McGuire et al. 1988). Accounting-based measures reflect the firm's internal efficiency, whereas market-based measures indicate how the firm is valued in the market (Orlitzky et al. 2003). In their literature review on the financial impacts of SCM, Shi and Yu (2012) further sort the measures into the following categories (first four categories are accounting-based and the last one is market-based):

- Asset/capital utilization (return on assets; return on equity; return on investment)
- Profitability (profit margin; return on sales; return on value added; cost of goods sold; economic value added)
- Cash flow (cash flow margin)
- Comprehensive (Altman Z-scores; overall financial index)
- Market value (Tobin's q; Sharpe ratio; abnormal stock returns)

Besides those mentioned above, financial performance may be assessed with accounting-based measures of company solvency and liquidity such as gearing and quick ratio, respectively (e.g., Durrah et al. 2016; Dananti et al. 2017). As for the market-based measures, total shareholder return (TSR) has been studied in connection with SCM practices (Ellram et al. 2002) and is suggested to be an adequate measure to depict market expectations regarding the retention of or changes in financial performance (Burgman & Van Clieaf 2012).

Finally, it is important to note here that the outcomes of SCM decision-making may be linked to each other. Especially the link between environmental performance and financial performance has been widely addressed and empirically established on numerous occasions (Endrikat et al. 2014; Hang et al. 2019). The connection between the environmental and financial performance of European publicly listed companies is examined in **Article III**, whereas **Article II** is concerned with the causal relationship in Finnish manufacturing and trading companies. Elsewhere, decisions related to, for example, supply relationships have been linked to performance outcomes on the organizational level (e.g., Kotabe & Mol 2009; Solakivi et al. 2015). The management of supply relationships is scrutinized in **Article IV**.

3 Decision-maker in the supply chain

3.1 The developing view on the human agent

The current understanding on decision-making in business owes much to a perspective on organization studies termed the Carnegie School, developed mainly during the 1950s and 1960s. Pertinent works such as *Administrative Behavior* (Simon 1947) and *A Behavioral Theory of the Firm* (Cyert & March 1963) have long been recognized as cornerstones for the study of firm behavior. The perspective highlighted how little was known about the processes of decision-making in firms and so drew researchers' attention to the importance of micro level factors such as individuals and groups in organizational behavior (Gavetti et al. 2012). In particular, it was established how there are limits to individual rationality: individuals are satisfied with less-than-optimal choices, they often lack information important in making decisions, and they tend to not look far enough in their search for solutions to problems (Argote & Greve 2007). In other words, using the term coined by Simon (1955), individuals are only "boundedly rational".

These new cognitive foundations of firm behavior were in contrast with the traditional economic theory of the firm that assumed organizations and their members as rational actors with perfect knowledge and the goal to maximize profits. Here, the assumed model of rational choice proposed an expected utility hypothesis after which individuals make choices under risk by maximizing a function of subjective utility based on their preferences and risk appetite (von Neumann & Morgenstern 2004). Kahneman and Tversky (1979) then argued in their prospect theory that people assess their choices between alternatives in terms of potential gains and losses instead of a general utility function, and that they are more sensible to the losses than the gains (see Starmer 2000 for a review of alternative descriptive theories of choice under risk). This abandonment of the idea of economic decisions as optimal set the scene for behavioral economics, where the man was now considered bounded by their rationality, willpower, and self-interest (Mullainathan & Thaler 2000). That is, people are not only limited in their ability to find the optimal choice. They also procrastinate, exercise self-control, and take selfless actions, thus ignoring subjective utility and failing to choose the optimum in their economic decision-making.

Coming to the field of SCM, the point has been made that the rational analysis of SCM decisions should be supported with behavioral considerations related to bounded rationality (Alexander et al. 2014). Researchers have often approached the subject with studies on judgment and decision biases supply chain managers as irrational agents subject to. Carter et al. (2007) listed 76 biases, including availability cognition bias, reference point bias, and confirmatory bias that represent the ways in which supply managers may violate the assumptions of objectively rational behavior. There are also several empirical considerations for deviations from rationality in forms of groupthink (Ribbocono et al. 2016); overconfidence exhibited by supply chain employees (Doyle et al. 2021); risk averse behavior of supply chain partners (Cannella et al. 2018); or non-optimizing behavior when dealing with the newsvendor problem. Potential remedies are also discussed: Kaufmann et al. (2009; 2010), for instance, recommend debiasing the supplier selection task by creating bias awareness and questioning a choice before making it.

The view on the human agent has been yet developing. Felin et al. (2017) critiqued behavioral economists for merely replacing one form of omniscience with a different one, that is, economic omniscience with perceptual omniscience. They question the normativity of the assumption that one could know the objectively optimal choice individuals consistently fail to make. Instead, rationality is to be understood as a function of agents' active interaction with, and reactions to, their social environment; it is related to how individuals perceive, interpret, and express their reality. In this regard, rationality can be treated as either objective or subjective. Objective rationality refers to "*behavioral correspondence to the best-evidenced knowledge available*" (Packard & Bylund 2021, 5), whereas subjective rationality takes into account the boundedness of the actor and comprises the "*continuous process of intentional improvement of a present state of affairs toward a higher-valued one*" (ibid., 8).

In SCM, the process of intentional improvement may be translated into one where individuals make decisions by collecting relevant information and relying on its analysis when making a choice (Haines et al. 2010). The individual acknowledges the information to the extent they see it procedurally reasonable given their preferences and possible trade-offs between them (Hirschauer et al. 2012). In this vein, this thesis approaches rationality with the understanding that the way individuals structure the world is not necessarily aligned with the goals of business organizations. Respectively, there exists no one optimal solution for every decision problem, but the decision-maker must balance between organizational demands for, for instance, economic, environmental, and social dimensions of sustainability (Wu & Pagell 2011).

The concept of subjective rationality could be further scrutinized in terms of views from social psychology. In this connection, the social actor has been

understood as a function of their motivation and cognition, whose relative importance for behavior has been emphasized in different ways over time. The prevailing view of the social actor is that of an “activated actor” who aims at social surviving and thriving yet is cued heavily, and often unconsciously, by their social environments (Fiske & Taylor 2013). Motivationally, decision-makers go beyond their self-interest: they have a basic instinct for self-preservation to survive (Pyszczynski et al. 1997) and they are intuitively disposed toward social cooperation to thrive (Rand et al. 2014). Meanwhile, cognitive cues from the environment activate mental representations the individual is more or less aware of and that delineate the possible subsequent behavior (Carlston 2010). This (social) cognitive process is discussed in more detail in Chapter 4.1.

3.2 How decision-makers tie the chain together

The individual in business organizations has been considered with reference to human capital that comprises the individual characteristics like skills, knowledge, and abilities that organizations may leverage to their advantage (Wright & McMahan 2011). For supply chains, researchers have directed attention to various managerial, technical, and human skills, or “multi-skilling”, as important for the person responsible for making SCM-related decisions (Giunipero et al. 2006; Jin et al. 2010; Ellinger & Ellinger 2014; Huo et al. 2016). These individuals are mainly in positions related to logistics, SCM, procurement, and such, whereas typical job titles and descriptions in the field include terms such as demand planning, product planning and control, supply chain coordination and planning, and operations analysis. Yet, the supply chain manager does not stand alone in their efforts, as they work in cross-functional environments where their involvement in other organizational activities may be beneficial to the firm (Pagell 2004; Turkulainen & Swink 2017).

Sweeney (2013) refers to supply chains as human chains comprising of people (as, e.g., customers and suppliers) and the relationships among them (the relationships between teams, functions, divisions, and organizations). The people and the relationships between them resemble the components structuring the supply chain, the nodes and the links (cf., Carter, Rogers & Choi 2015). The importance of the individual for the supply chain and its structure is further underlined in the notion of the individual decision-maker as a boundary spanner. Individuals span the boundaries of the chain by creating and maintaining both intra- and interorganizational relations driven by a cooperative motive (Tsai et al. 2000; Brass et al. 2004). Through repeated interaction with other individuals within the chain, the boundary spanners bridge interpersonal networks and promote positive relational dynamics (Zhang et al. 2011; Chakkol et al. 2018; Dekker et al. 2019).

The thus formed interorganizational ties themselves represent a significant asset to organizations within supply chains. In terms of the social capital theory, the ties contribute to social capital that comprises the actual and potential resources the involved parties gain access to in their network of relationships (Nahapiet & Ghoshal 1998). Accordingly, economists have used the concept of social capital to describe the complementary relationship between social influence and the utility of economic behaviors to the actor (Becker & Murphy 2000). Researchers in sociological economics, in particular, have emphasized that social relationships and institutions shape actors' views the world and what they value about it (Swedberg 2009).

Both the relationships between individuals and firms among supply chains as well as the related processes of interaction are important for the attainment of social capital (Ketchen & Hult 2007; Min et al. 2008). As to the characteristics of the relationships between supply chain members, or supply relationships, researchers have applied the social capital lens to discuss the role of features such as social reciprocity and trust as potential alleviators of uncertainty and facilitators of performance (Ireland & Webb 2007; Krause et al. 2007). As to the nature of the interaction, studies on business-to-business relationships exhibit how especially collaborative efforts between supply chain members may either improve or be detrimental to the businesses' capabilities and performance. For example, Klein and Rai (2009) discuss how the relationships between suppliers and buyers may benefit from moving beyond transactional arms-length relationships to ones where the parties share strategic information with each other. Villena et al. (2011), in turn, consider situations with too much social capital: taken to an extreme, social capital may hamper objectivity in decision-making and create occasions for opportunistic behavior.

The significance of relationships to SCM is not restricted to that of collaborative ones. Granovetter (1973) argues in their seminal article *The Strength of Weak Ties* that both strong and weak ties are important for the structure of social networks. While the strong ties resembled by firms in close collaboration with each other may foster the flow of information between the companies, weak ties help the information to reach broader audiences by bridging together otherwise local social systems. In supply chain terms, strong ties between parties provide them with reliability, while weak ties offer them flexibility (Ketchen & Hult 2007). Such observations have been accompanied by research concerned with the multilevel relationships between individuals and groups nested within supply chains, with references made to, for example, social network analysis and complex adaptive systems (Carter, Meschnig & Kaufmann 2015). The former has been used to map and visualize the network structure of supply chains on various levels of analysis from individuals to companies, economies, countries, and so on (Borgatti & Li 2009; Wichmann & Kaufmann 2016; Han et al. 2020).

It is only one of the features of the supply chain as a complex adaptive system that a change in one part of the chain may lead to unexpected changes in some other part of the chain, as stated in Chapter 2.1. Other relevant features of the system are that it is populated by social agents and that the behavior of the agent propagates in the system and, thus, both influences and is influenced by the mental models of other agents within the chain (Choi et al. 2001). Accordingly, to envision a rather reductionist picture of the interconnectedness among the social agents within the supply chain as a complex adaptive system, one may consider the adoption of sustainable business practices along a chain. An individual decision-maker may have influence on the sustainability of a company when, for example, a manager introduces and implements a sustainability initiative (Stoughton & Ludema 2012). Such an initiative may then spread through interaction within the supply network to other actors who consequently adopt sustainability practices to an increasing extent (Meqdadi et al. 2017). Meanwhile, the initiative may be associated with positive or negative spillover effects not intended by the decision-maker to occur. To borrow a hypothetical example from Carter et al. (2020), a firm with the intent of reducing their carbon emissions upgrades their facilities to LED lights, which may have the unintended consequence of increased light pollution for nearby residents.

The previous example illustrates a way in which decisions made within a supply chain may influence other parties in direct or indirect connection with the decision-maker. The decision-maker is, thus, connected to the social worlds both within and outside the boundaries of the supply chain, and both their decision-making and its outcomes are affected by the social environment at large. The theories next discussed and applied in the original publications to bring further structure to the understanding of the behavior of the social agent.

3.3 Theories for understanding the social in supply chain management decision-making

3.3.1 Theory of planned behavior

The theory of planned behavior (TPB) is a social cognitive theory that extends on its antecedent called the theory of reasoned action (TRA). The latter was put forth by Fishbein and Ajzen (1975) to predict individual behavior based on attitudes, subjective norms, and behavioral intentions. Ajzen (1991) later included the component of perceived behavioral control into the model to account for behaviors over which people have no control due to possible external hindrances. Attitude is defined as “*a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor*” (Eagly & Chaiken 2007, 585), and it reflects the valence that an individual decision-maker places on the potential

outcomes of the behavior in question. Subjective norms refer to the social acceptability of the behavior as perceived by the decision-maker and the related pressure to perform or not to perform it. The perceived behavioral control is derived from the concept of self-efficacy, “*the conviction that one can successfully execute the behavior required to produce the outcomes*” (Bandura 1977, 193) and may be linked to individual’s perceived competence in a work role (Spreitzer 1995).

The TPB represents a view after which the mental representations of various objects are behavioral dispositions acquired by the individual in transactions between them and the environment. The dispositional view assumes that mental representations such as attitudes are relatively stable over time and contexts and may be made observable through instrumentation (Eagly & Chaiken 2007; cf., Schwarz 2007 for a discussion on the contextualized construction of attitudes). After the TPB, the more positive the attitude, the more encouraging the subjective norm, and the more control the individual has over the behavior, the stronger their intent to behave accordingly. The intention is then linked to overt behavior. (Fishbein & Ajzen 2010.)

While many social cognitive theories including the TRA and TPB have traditionally addressed mainly issues of individual health behavior, the theories have been at times applied to study organizational issues including knowledge-sharing behavior or business process outsourcing (e.g., Lin & Lee 2004; Bock et al. 2005; Gewald et al. 2010). In this regard, the TPB and its variations have been argued to be applicable to study decision-making in the SCM context as well (Swaim et al. 2016; Francisco & Swanson 2018; Merminod et al. 2019). Large et al. (2021), for instance, recently used the theory in a thought experiment to study German-speaking supply chain managers’ intentions to participate in logistics outsourcing project groups. **Article I** complements the previous findings by adopting the TPB as a theoretical lens to study logistics outsourcing decision-making in Finnish firms from a behavioral perspective.

3.3.2 Values, beliefs, and norms

According to Rokeach (1973, 5), a value can be defined as “*an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence*”. The concept is further elaborated in the theory of basic human values by Schwartz (e.g., 1992) where values are arrayed into 4 higher-order value types and 10 mainly universal individual values: self-transcendence (universalism, benevolence) vs. self-enhancement (power, achievement, hedonism) and openness to change (hedonism, stimulation, self-direction) vs. conservation (tradition, conformity, security). The activation of the mental representations of values is linked to behavior that is motivationally congruent with the individual value basis (Maio 2010).

The relationship between individual values and behavior is described in more detail in the value-belief-norm (VBN) theory. Stern et al. (1999) initially developed the theory to examine the behavioral basis of social movement support and studied its application in the context of environmentalism. The VBN theory posits that individual values are linked to beliefs on whether there exists a threat to a valued object (e.g., environmental conditions) and whether the individual has control over the sources of the threat. The beliefs are then linked to personal norms, as in feelings of obligation that the individual should act. Finally, the norms are linked to behavior. The value basis of behavior has since been addressed in the organizational context with evidence of both a direct link from individual values to organizational behavior as well as indirect diffusion of values from one member of the organization to another and then to manifest behavior (Arieli et al. 2020).

The VBN theory may help in identifying the multiple variables that determine a behavior and, thus, to efficiently direct behavior change techniques (Stern 2000). This observation is applicable to SCM too as supported by findings on the significance of the elements of values, beliefs, and norms for behavior in the context. For instance, supply chain managers' value-based concern and responsibility toward the environment were found to be linked to sustainable supply chain management practices by Paulraj et al. (2017). Gupta and Gupta (2019), in turn, argue that the behaviors of decision-makers relevant to SCM are linked to the decision-makers' cultural backgrounds of values and norms. Research has also suggested that institutional logics on levels of analysis higher than the organization have micro-foundations in individual values, beliefs, and norms (Glaser et al. 2017). In this regard, **Article III** uses the VBN theory to illustrate how individual values and beliefs are linked to behaviors on the levels of companies and national markets.

3.3.3 Identity and organizational behavior

The concept of identity has been focal to research with a focus on the motivational bases of individual behavior. The identity of an individual distinguishes them from other people via differentiation of the individual vs. others (i.e., personal identity) or the groups the individual belongs to vs. other groups (social identity) (Onorato & Turner 2004). Accordingly, identification with an object serves as a means toward the fulfilment of the self-concept through motives related to (self-)enhancement, verification, expansion, actualization, and so on (Leary 2007). Identity entails a sense of the self—the mental representation of oneself (Kihlstrom & Cantor 1984)—built upon and studied on different levels of the self (i.e., individual, relational, and collective) and analysis (intrapersonal, interpersonal, and group) (Epitropaki et al. 2017).

Identity has been studied in the organizational context mainly with reference to organizational identity, defined as the “*central and enduring attributes of an organization that distinguish it from other organizations*” and that represent the collective understanding of “*who we are as an organization*” (Whetten 2006). In this regard, the significance of identity for organizational behavior has been further addressed in terms of identity theories such as social identity theory (SIT; Tajfel & Turner 1979; Tajfel 1982) or the theory of intergroup leadership (Hogg et al. 2012). Following SIT, individuals may identify with and exhibit favoritism towards their organizations, whereupon their behavior is likely to be in line with organizational values and beliefs (Ashforth & Mael 1989). After the theory of intergroup leadership, in turn, collaborative aspirations among organizations may benefit from leadership that acknowledges the unique roles and contributions of the groups involved. In this regard, Rast et al. (2020) addressed identity on the relational level with scale development and validation of a measure of intergroup relational identity. Kershaw et al. (2021), in turn, established that leader rhetoric that promotes intergroup relational identity is suited for intergroup relationships where individuals may find their identity distinctiveness threatened.

The importance of intergroup leadership has been noted to be pivotal in the management of relationships between supply chain partners, as described in the literature review by Mokhtar et al. (2017). Accordingly, an identity shared among supply chain partners has been proposed to be linked to benefits such as cultural competitiveness (Ireland & Webb 2007), social capital (Min et al. 2008), and operational performance (Corsten et al. 2011). Ambrose et al. (2018) recently studied how fostering a superordinate identity among individuals in sales and operations planning teams enhances related process performance in organizations. **Article IV** examines how organizations may also benefit from fostering intergroup relational identities that promote the role of involved parties’ distinctive identities and contributions towards common goals in supply relationships.

4 A behavioral view of supply chain management decision-making

4.1 Individual decision-making as a social cognitive process

While many of the studies referred to so far have been devoted to describing the possibly suboptimal decision-making and its outcomes (i.e., the whats), the mechanisms underlying behavior (the whys) have received less attention. The social cognitive perspective or “lens” is particularly useful for an examination of the role of the individual level psychological factors in social contexts such as the organization or the supply chain. Put briefly, social cognition is focused on how people process information and make sense of themselves and those around them. At the heart of social cognition are the questions of how the individual social actor comprehends the world around and how they contribute to social phenomena at large. (Fiske & Taylor 2013; Augoustinos et al. 2014.) The vastness of themes considered with reference to social cognition is represented in models illustrating how things like motivation, goals, beliefs, and attributions affect the ways individuals behave or do not behave (Armitage & Conner 2000).

Following the social cognitive perspective, individual behavior is to be considered in terms of the environment the behavior takes place within. In this regard, already Lewin (e.g., 1939; see also Ahokas 2017) described behavior as a function of the person and the environment, or as a function of the individual’s so-called life-space. Following Lewin (1943), the life-space represents the individual and their environment as it exists for them. Accordingly, at a given time there are processes in the physical or social environment external to the individual, and only some stimuli penetrate a *boundary zone* that separates that what is processed by the individual from the external environment. The ways in which the stimuli are chosen and become cognitively processed for behavioral responses have been further discussed in terms of theories on selective attention and perception (Driver 2001).

Fiske and Taylor (2013, 11–16) present a Stimulus->Organism->Response (S-O-R) framework to demonstrate the cognitive features of social behavior at the intersection of the social environment and the individual actor. The individual interprets social stimuli based on the imagined social desirability of the behavior

they associate with the stimuli (e.g., “What would my friends/mother/colleagues/the recipient etc. think of my behavior?”). Correspondingly, the interpreted stimuli are reasoned about in the boundedly rational manner people are capable of due to their limited cognitive resources. The organism part, thus, includes how people structure their thoughts and feelings about the options available to them. The process ends up in a response, that is, an intention to behave (or not to behave) in some way. A very similar view is expressed by Greifeneder et al. (2018, 25–35) in their discussion on the cognitive sequence of individual information processing. Inputs from the social environment are attended to and encoded based on the individual’s prior knowledge, which then provides the basis for subsequent inferences, judgments, and decisions. The process may then surface as overt behavioral responses to a decision problem at hand. The model shown in **Figure 4** is inspired by the previous views on behavior in social contexts.

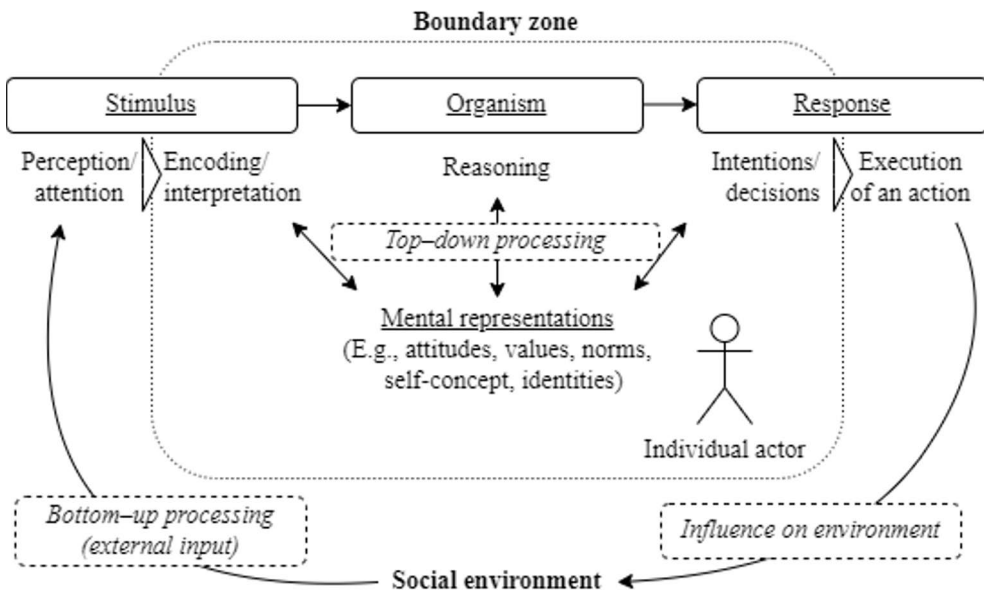


Figure 4. The social actor and the social cognitive process of information processing.

The figure situates the individual mind limited by the boundary zone within the social environment wherefrom individuals receive stimuli and which they influence with decisions put into action. The social cognitive processes in between are characterized with a duality in the sense that they may be either implicit or explicit, unconscious or conscious, automatic or controlled, or heuristic or deliberate (Evans 2008). In this vein, supply chain managers may apply such distinctive yet parallel cognitive processes when making decisions based on intuitive elements such as

experience, emotions, and gut feeling, as well as deliberate, analytical thinking linked to (objective) rationality (Carter et al. 2017). Finally, the individual has influence on the social environment where they put the decisions into effect, referred to as the execution of an action.

What underlies the different types of social cognitive processes are mental representations such as attitudes, values, norms, self-concept, or identities. Mental representations are argued to reside in connectionist networks that are structured when stimuli from the social environment and previous knowledge structures of the individual decision-maker are activated in connection with each other (Van Overwalle & Siebler 2005). Accordingly, the representations are based on parallel cognitive networks of associations that are activated when some object is encountered and subjected to evaluation (Carlston 2010). In case multiple different networks are activated as a response to a stimulus, the set of associations the brain uses to interpret the situation depends on factors such as physical setting, social context, or other representations recently activated (Shaw 2015).

In this regard, it is posited that mental representations are related to the information processing of individuals both bottom-up where the external environment attracts attention and informs the representations, as well as top-down, where the representations direct attention to objects of interest to the individual and help process the related information (Wolfe et al. 2003). Neisser (1976) describes the process as a perceptual cycle where the individual's search for information is guided by their schemas (i.e., mental representations), whereupon information is acquired from the environment that then modifies the existing schemas to relate the perceiver to their environment.

The interplay between such bottom-up and top-down processes in decision-making has been further considered in previous research on business behavior. Crusius et al. (2012), for example, discuss the interplay between individual and situational factors in economic behavior with reference to concepts such as priming, mindsets, and social comparison. Hahn et al. (2014), in turn, describe how business managers' subjective representations regarding corporate sustainability may direct how they search, interpret, and utilize information for solving decision problems. Mental representations, thus, provide individuals with cognitive heuristics to make sense of complex situations (see Gigerenzer & Brighton 2009; Katsikopoulos & Gigerenzer 2013).

Mental representations are not to be considered merely on the individual level. On the collective level, the representation may become shared among different social milieus. These shared representations are referred to as social representations, the concept coined by Moscovici (1961/2008) and since defined by them (1988) as systems of values, ideas, and practices that establish order by enabling individuals

to orient themselves to the material and social worlds around and to communicate to bring structure to the aspects of these worlds in a common code.

Following the analysis by Bauer and Gaskell (1999), the social context provides the functional locus where meaning is elaborated among the subject, the object, and the project. Subjects are individual actors concerned with some object of an abstract idea or concrete entity, further linked to some temporally dynamic context where the representation makes sense, as in the project. Within the context, social representations bridge the individual and the group together in processes of interaction and communication directed at mutual understanding regarding the object of the representation (Duveen & Lloyd 1990). The benefits of shared representations are illustrated by Skippari et al. (2017) who argue that the convergence between representations of relationships among supply chain members are related to collaboration in innovation activities.

Finally, decision-making *per se* may be addressed as a social representation. In this regard, Laroche (1995) associates organizational decision-making with organizational activity represented by its members. After them, organizational activity is not merely a chain of numerous sequential decisions but rather based on a continuous flow of cognitive structures shaping cognitive processes where interpretation replaces choice.

4.2 From individual decisions to supply chain outcomes

4.2.1 Behavioral supply chain management as an integrative approach

The vast research efforts on SCM decision-making and individual behavior in the context are brought together viewed through the lens of BSCM. Good references to the reader are offered by recent studies on the topic by Fahimnia et al. (2019) and Tangpong et al. (2019).

Schorsch et al. (2017) introduce a meta-theory of BSCM after which behavioral outcomes within supply chains are to be considered in terms of the behavioral context, (inter)individual psychological factors, and potential moderators. They follow a systems approach in considering these four core elements as theoretical generalizations that become explicit in practical business settings.

The *behavioral context* where the decisions are made is defined by the types of actors on different levels of analysis (e.g., individual, company, supply chain, or economic system) as well as the relationships between them. To consider the context is important, as the contexts of organizations or supply chains affect the behavior of individuals and, further, the relationships between them (Carter, Meschnig &

Kaufmann 2015). The context also relates to the characteristics of the task, that is, how complex the decision problem at hand is (Bonner 1999). Decision-making is, thus, characterized by who decides and on what.

Once the context is known, one can move on to examine the *psychological factors* as behavioral antecedents within the context. The meta-theory considers the individual agent as the lowest level of analysis wherefrom the psychological factors as exhibited on the higher levels originate. Schorsch et al. (2017) classify the research on the factors into five distinct flows: 1) research on values, beliefs, perceptions, and how these become shared in groups; 2) research on cognitive limitations and their effects on SCM decision-making; 3) research on the social preferences of individuals and groups; 4) research on the nature of social bonds among individuals and groups; and 5) research on trust and its effects on SCM decision-making.

The psychological factors are directly connected to *behavioral outcomes* that refer to the implications the behavior has on the relations between individuals and groups including issues of relationship effectiveness, although the behavioral lens could be applied to any outcome variable of interest to traditional SCM research. The behavioral outcomes may also be examined in relation to organizational decision-making models. In this regard, researchers have been interested in how the outcomes realized in business practices often deviate from the assumptions employed by the models. Bendoly et al. (2006) apply an intention, action, and reaction framework to examine the contrasts between model assumptions and behavioral realities. The categories of intentions, actions, and reactions refer to the goals of individual decision-makers, their behavior and its outcomes in the context, and how the outcomes are taken into account in subsequent decision-making, respectively. After Tokar (2010), the intention, action, and reaction framework can be used as a tool in SCM research to compare the what-is and what-should-be in terms of the assumption categories, help to determine possible deficiencies, and direct improvement efforts where needed.

As to the mechanisms through which phenomena on the individual level move to other levels of analysis, social action is of importance. As with social representations, the interaction among individual agents is important for the establishment of ties between the individual and the collective in the context (Methot et al. 2018; Dekker et al. 2019). Borgatti and Li (2009) derive from social network analysis to suggest three more classes of ties among social actors: similarities, social relations proper, and flows. Besides communicating with each other in direct interaction, individuals are tied by 'presocial' conditions such as location or membership to a group, role-based relations, and flows comparable to those attributable to supply chains.

The role of individual decision-makers' social cognitive processes in decision-making on the higher levels of analysis from organizations to supply chains and economic systems can be further described with the concepts of *emergence* and *convergence*. The concept of *emergence* plays a significant role in the meta-theory of BSCM. Put concisely, the theory of emergence declares that “*the whole is more than the sum of its parts*” (Ablowitz 1939, 2). Translated into the organizational context, the organization is a whole anchored in individual level characteristics such as the cognitions, emotions, and perceptions of decision-makers. Collective properties emerge when individuals initially distinct in their characteristics unite and, thus, create new patterns of behavior that would not exist outside the collective. (Fulmer & Ostroff 2016.) Accordingly, within BSCM, emergence is used to illustrate how individual boundary spanners and the relations among them constitute phenomena on the network level, which in turn may exhibit characteristics not completely reducible to the lower level (Schorsch et al. 2017).

While emergence describes the transition of between-individual behavioral dynamics to broader social contexts, *convergence*, in turn, captures how the variance between the individual level elements decreases moving from the individual level to the higher levels of analysis (Fulmer & Ostroff 2016). The differences between the levels of analysis are captured in the discussion by Martin (1992; see also Stoughton & Ludema 2017) on the manifestation of culture in organizations in fragmented, differentiated, and integrated ways. On the individual level, ambiguity is unavoidable and sustained by the multiplicity of fragmented subjective views on organizational matters. Moving on to the group level, organizations may comprehend multiple sub-cultures or groups of people with different views in conflict with one another. On the level of organizations, cultural manifestations are integrated and so characterized by consistency and organization-wide consensus.

Convergence is also characterized by top-down processes where phenomena on the lower levels are constrained and shaped by contextual effects (Kozlowski & Chao 2012). Accordingly, Schorsch et al. (2017) distinguish between environmental, structural, and procedural *moderators* that may influence the connection between the psychological factors and behavioral outcomes in the SCM context. The environmental aspects (e.g., actor homophily, market condition) cannot be controlled, whereas the structural (supply chain design, technology) and procedural (formalization, information sharing, various temporal aspects) may be altered through managerial action. The moderator may strengthen or diminish the relationship between psychological characteristics and behavioral outcomes depending on the nature of the moderator and the psychological factor(s) it interacts with. Generally speaking, the moderators may be seen to represent any properties that may have an effect on the relationship by restricting or enabling actor responses, behaviors, and interactions (see Fulmer & Ostroff 2016).

4.2.2 The interaction between the individual and the whole within the original publications

Randall and Mello (2012) emphasize the need for research in SCM to address the supply chain as a complex adaptive system with a focus on the interaction between the individual and the whole. Following this notion and the view of supply chains nested within economic systems as the scene for social action, the proposed social cognitive perspective elaborates on the role given to the individual actor in SCM decision-making. To this end, theorizing relevant to BSCM and the social cognitive lens are brought together in **Figure 5**. The figure summarizes how the previously addressed theories and concepts are considered in the original publications that are further situated on the different levels of analysis from the individual to the company, the supply chain, and the economic system.

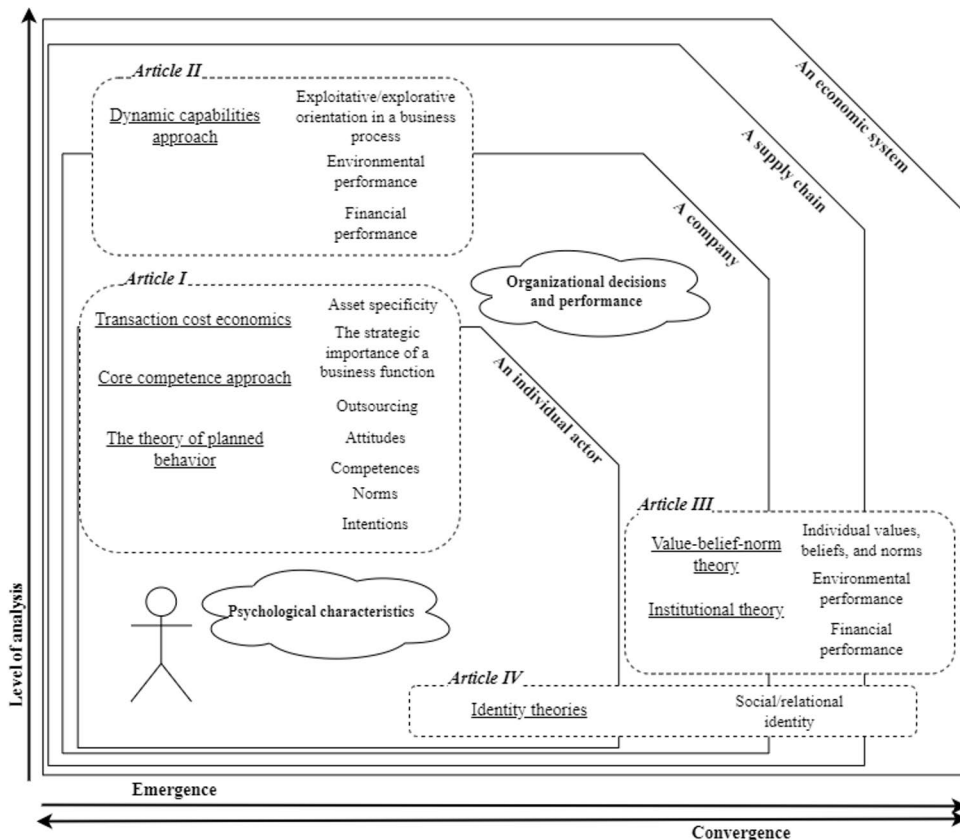


Figure 5. A framework for addressing the role of social agency in SCM decision-making from different theoretical perspectives.

The individual social actor and their psychological characteristics are at the locus of the framework and common denominators to all the other levels of analysis. The actor interacts with other individuals in their temporally and spatially varying social environments, be it with people like their colleagues, friends, family, and so on. The interaction cues and produces mental representations upon which the individual actor behaves (i.e., makes decisions) and so, in turn, affects their social environment. The decisions then manifest as organizational decisions and performance, and further contribute to phenomena on the levels of supply chains and economic systems.

The mechanisms of emergence and convergence capture the transition from the individual level dynamics to phenomena on higher levels of analysis. Behavior on the other levels emerge from individual actors structuring, interpreting, and acting upon their representations about the social environment. The behavior is not random, but the system moves towards order and stability through convergence dictated by social norms (Epstein 2001). As a result, a group displays more homogeneity in perceptions and communicative behavior than a mere collection of individuals (Ervin et al. 2017). Complete homogeneity of behavior, however, is not supposedly achieved, or as Shaw (2015, 83) states: “*social systems are most likely to be characterized by subgroups of shared representations, not system-wide consensus.*” Hence, organizations, supply chains, and economic systems differ from other groups residing at the corresponding levels of analysis.

Like mental representations, the theories presented in **Figure 5** structure the world into a form that is easier to comprehend, and importantly, measure. In this regard, a definition of theory by Suddaby (2015, 407) as “*a way of imposing conceptual order on the empirical complexity of the phenomenal world*” is followed here. The order can be considered in terms of the six building blocks of effective theory development efforts outlined by Whetten (1989): what, how, why, who, where, and when. The blocks capture the concepts included, the causal relationships between the concepts, assumptions underlying the relationships, and the contingencies surrounding the relationships relevant to SCM (Ketchen & Hult 2011).

Besides structuring the phenomenal world, theories can be assumed to have a performative role in shaping behavior. According to Halldórsson et al. (2015), the role of theory in SCM is not only to describe what the supply chain is, but it extends also to its ability to consider what the chain does or what it should do to reach the desired level of achievement. Decision-makers’ representations of organizational decision-making and decisions can be further described as self-fulfilling prophecies that direct organizational action (Laroche 1995). Respectively, where the theories contribute to the representations, these may be used to bring structure to and rationalize organizational decision-making.

Finally, the formation of mental representations as well as the patterns of interaction between individuals may be expected to have a temporal aspect that is

omitted from **Figure 5** for clarity yet could be pictured as the z-axis. In this regard, Bauer and Gaskell (1999) present a “Toblerone model of common sense”, where a section of the Toblerone (the chocolate) represents the representation of an object at a time. The elongation prior and after the section represent the development of the representation in the social context in the past and in the future. Accordingly, Bronfenbrenner (2002) discussed how changes in the individual or the environment can change the dynamics between them over time (the “chronosystem”). Time is also a supra-individual characteristic of institutions, referred to as the *longue durée* of institutional time by Giddens (1984, 35).

5 Methodology

5.1 Philosophical assumptions

Kuhn (2012) famously used the concept of paradigm to portray the knowledge defining the conventions about approaching subject matters within a scientific discipline. A paradigm provides researchers with i) the criteria for identifying research problems important to the discipline; ii) tools for solving the research problems; iii) criteria for assessing the validity of solutions proposed; and iv) the conventions and forums for presenting and communicating research results (Kiikeri & Ylikoski 2004, 57–60). The conventions are developed during a pre-paradigmatic period where legitimate methods, problems, and solutions are debated over, whereas agreement defines an established paradigm. In this regard, SCM could be described to be en route to what Kuhn called normal science, a state where definitions, theories, and values for doing research have been consolidated into knowledge and practices shared among the adherents of the discipline (Vafidis 2007; Ascef et al. 2014).

The types of historical conventions represented in scholarly debate have been discussed by Burrell and Morgan (1979). They map different perspectives on scientific issues on an objective–subjective dimension that captures how research paradigms differ mainly in whether they address the social world as objectively approachable or whether the focus is on the subjective experience of the individual, respectively. Furthermore, they (ibid.) distinguish between four sets of assumptions that underwrite different approaches to social sciences: ontology, epistemology, human nature, and methodology characterize the way research approaches the world and its subjects of interest. *Ontology* is concerned with the essence of reality (“What is there?”; Niiniluoto 2002, 125), whereas epistemology addresses the relationship between knowledge and the reality (“How we know?”; Tennis 2008, 103). Assumptions regarding *human nature* address the relationship between human beings and their environment, that is, if the actor is controlled by, or the creator of, their environment. *Methodology* refers to the ways of obtaining knowledge about the social world, the nature of which is assessed in terms of the other sets of assumptions.

Traditionally, a vast majority of SCM research has set off from a functionalist paradigm, as shown by Burgess et al. (2006) in their systematic literature review. This paradigm, as described by Burrell and Morgan (1979), approaches its subject

matter from an objectivist point of view and adopts that individual behavior is aimed towards the regulation of social affairs. These ideas are further tangential to positivism that is typical of SCM research and associated with a quantitative nature and objective testing of predefined theories or concepts (Sweeney 2013). These premises, however, should not be seen to restrict the ways of conducting SCM research in the present. Instead, as Singhal and Singhal (2012) argue, SCM research may benefit from multiple perspectives gained using multiple research paradigms or methods. Accordingly, this research including the original publications are based on views that depart from the functionalist paradigm.

The main backdrop of the thesis is initiated by critical realism, a philosophical approach with its development credited to Roy Bhaskar (see e.g., Bhaskar 1979). Critical realism sets apart the reality and the knowledge about it by positing that entities may exist independent of knowledge about them (Fleetwood 2005). Critical realism is argued to have both positivist and interpretivist features, the latter associated with a subjectivist nature; critical realism maintains the positivist understanding of objective reality, and the interpretivist view of social phenomena based on shared concepts and their interpretation (Ekström 1992; Hoddy 2019).

Gorski (2013) discusses how Bhaskar has elaborated on the relationship between the reality and the knowledge about it in terms of a distinction between three ontological domains: the real, the actual, and the empirical. Causal laws are based on the mechanisms of interaction between entities on multiple layers of existence, all captured by the domain of the real. Mechanisms activated but not necessarily observed belong to the domain of the actual. The domain of the empirical consists of mechanisms both activated and observed. Adamides et al. (2012) discuss the relationships between the domains in the SCM context with reference to the bullwhip effect. Generally, supply chain members and their relationships are considered in the domain of the real. The interaction between the parties then manifests in the domain of the actual in specific forms and at specific time instances as, for example, decision-making related to ordering and producing. What is experienced by the individual decision-maker of the process constitutes the domain of the empirical.

The three domains of critical realism structure the philosophical underpinnings of the thesis and may be used to illustrate the relationship between the individual decision-maker and the social world they are part of. On the one hand, it is assumed that individual behavior at the level of the actual produces the social world and its mechanisms at the level of the real. In this regard, the thesis derives from ontological individualism where social phenomena are traceable back to the actions of individuals as well as their interaction with each other and the outside world (Hodgson 2007; Sugden 2016). On the other hand, the thus-produced social world is understood to both enable and restrict the actions available to the individual decision-maker at any given time through the activation of mechanisms related to social

norms. Both action and its consequences in the SCM context are argued to be socially constructed (see Berger & Luckmann 1966/1994) where they achieve their meaning in relation to social circumstances characterized by multiple levels of stakeholders, time horizons, and performance metrics (Carter et al. 2020).

The individual actor, however, is not seen to be merely governed by the social norms. Instead, the individual is assumed to be purposive and intentional in their actions. Following Merton (1936), social action is assumed to be purposive in the sense that social actors aim at the attainment of some goal by the action. However, the actors are not necessarily aware of this goal or the consequences of their actions to the social environment. Giddens (1976, 76), in turn, defines an intentional act as “*any act which an agent knows (believes) can be expected to manifest a particular quality or outcome, and in which this knowledge is made use of by the actor in order to produce this quality or outcome.*” Accordingly, the domain of the empirical may be approached with reference to the experience of the social actor and premises derived from what has been labeled social action theory: First, human action can be understood in relation to the subjective meaning, perception, and intentionality of actors (Ekström 1992; an idea closely associated with the notion of *verstehen* elaborated in the works of Max Weber). Second, the action should be treated in terms of clearly specified and distinct concepts defining the action, whereas the role of theory is to reproduce reality as well as to gain insight into and construct it (Adriaansens 1979; see Parsons 1949).

Following critical realism, science develops new knowledge about the social world through the discovery of the mechanisms of interaction existing within the world and the conditions under which they activate (Hoddy 2019). Although the knowledge may never cover everything that exists at the domain of the real, scientific inquiry may approach the real through what could be called a hermeneutic process (see Niiniluoto 2002, 144). Accordingly, the original publications follow different methodologies to obtain knowledge about the social world. **Article IV** is theoretical and descriptive by nature, and the research approach could be characterized as conceptual where it is based mainly on previously developed theories and concepts and uses analysis, synthesis and logical argumentation to build theory and provide theoretical explanation to phenomena (Neilimo & Näsi 1980; Jaakkola 2020). **Article I**, **Article II**, and **Article III**, in turn, could be described as nomothetic where they are based on the testing of hypotheses and aim at establishing causal explanations and general laws in the empirical data (Neilimo & Näsi 1980; Kasanen et al. 1993, 255).

The methodologies applied in the thesis share the assumption that the researcher has the role of an onlooker that conducts inquiry from outside the phenomena under study. In this regard, the research follows an *analytical approach* described by Arbnor and Bjerke (1997). The approach adopts the assumption that scientific

knowledge can, and should be, created without subjective human inference. Accordingly, it is posited that objects of interest to the research may be studied independently of each other although causally interrelated. Hence, while the original publications examine social worlds that are based on the subjective experiences of individual actors shared in interaction between them, the research treats the worlds as something that may be objectively examined and measured.

5.2 Research constructs and data

5.2.1 The operationalization of the research constructs

Knowledge regarding the psychological characteristics of individuals and their relatedness to SCM decision-making was created through argumentation and empirical assessment of both individual level subjective measures (i.e., perceptions) as well as objective measures. The measurement items corresponding each construct are shown in Appendix 1 together with construct means and standard deviations.

The subjective measures allow the researcher to access the constructs of interest via the study of respondents' perceptions about them (Orlitzky et al. 2003; Richard et al. 2009). These perception-based measures reflect the theorized constructs understood as ontological entities existing in nature and assessable with scientific inquiry (Henseler 2017). Most of the research constructs were measured with claims evaluated by respondents on five- or six-point Likert-scales ranging from "Strongly disagree" to "Strongly agree" or "Not like me at all" to "Very much like me", respectively. The research constructs with subjective measures are presented in **Table 1** together with relevant references.

The suitability of using such self-reported accounts of mental representations is supported by previous studies. As to the psychological characteristics, the meta-analysis by Hofmann et al. (2005) showed a significant correlation between self-reported representations and representations studied with the implicit association test that is an implicit measure of the representations. Montabon et al. (2018), in turn, advocate the use of single respondent surveys in SCM research as means to retrieve pragmatic, experience-based insight from respondents.

Table 1. Subjective measures in the original publications.

Construct	Operationalization	References
<i>Article I</i>		
The perceived specificity of logistics	4 items (5-point scale)	Zailani et al. (2017)
The strategic importance of logistics	"	Solakivi et al. (2011)
Positive attitude toward outsourcing logistics functions	"	Lin & Lee (2004), Gewald et al. (2006),
Encouraging subjective norm in outsourcing logistics functions	"	Benamati & Rajkumar (2008),
Competence in outsourcing logistics functions	"	Fishbein & Ajzen (2010), Gewald (2010),
Intention to outsource logistics	"	Juga et al. (2010)
The level of outsourced logistics	"	Gonzalez et al. (2015), Solakivi, Ojala, Lorentz et al. (2018)
<i>Article II</i>		
Exploitative orientation in logistics	4 items (5-point scale)	Azadegan & Dooley (2010),
Explorative orientation in logistics	"	Kristal et al. (2010)
Ambidexterity in logistics operations	Sum of the two orientations	
Corporate environmental performance	6 items (5-point scale)	Laari et al. (2016)
<i>Article III</i>		
Benevolence + Universalism	5 items (6-point scale)	Schwartz (2003),
Self-direction	2 items (")	Davidov et al. (2008)
Stimulation	"	
Hedonism	"	
Achievement + Power	4 items (")	
Security	2 items (")	
Conformity + Tradition	4 items (")	
Climate change beliefs	6 items (varying scales)	Poortinga et al. (2014)
<i>Article IV</i>		
Relational supply chain identity	N/A	E.g, Min et al. (2008), Hogg et al. (2012), Rast et al. (2020)

Objective measures were used in **Article II** and **Article III** as both dependent variables and covariates. The measures may be further characterized as absolute or relative (Ahi & Searcy 2015): the absolute measures describe the state of the measured object as is, whereas the relative measures describe the state of the object relative to others. In **Article II**, accounting-based measures of financial performance were used to address the performance of the sample firms relative to other firms in their respective subindustry. In **Article III**, the environmental performance measures were, correspondingly, based on the position of the firm with respect to others in the

industry. Here, the financial performance measures were market-based and absolute. The objective measures are listed in **Table 2**.

Table 2. Objective measures in the original publications.

Construct	Operationalization	References
<i>Article II</i>		
Financial performance	Return on assets/ Gearing/ Quick ratio (Normalized industry percentile rank, 0–1)	Chen & Shimerda (1981), Töyli et al. (2008), Lan (2012), Dananti et al. (2017), Huang & Wang (2017)
Industry ¹⁾	1 = manufacturing, 2 = trading	
<i>Article III</i>		
Environmental performance	Resource use/ Emissions reduction/ Innovation/ Total environmental score (Industry percentile rank, 1–99)	Zhu & Sarkis (2007), Refinitiv (2021)
Financial performance	Total shareholder return (Change in return index)	Pedersen & Rudholm-Alfvin (2003), Rappaport (2006), Burgman & Van Cleaf (2012)
Share of foreign sales ¹⁾	Share of international sales of net sales	
Firm size ¹⁾	Ln(Total assets)	
Country-level environmental performance index ¹⁾	0 = worse than peers, 1 = better than peers	Hsu et al. (2016)

¹⁾ Control variables

5.2.2 Data sources

The research data was collected from multiple sources using both the subjective and objective measures. The subjective data was collected mainly with surveys. Surveys are suitable for measuring things like attitudes, preferences, beliefs, and behavior of individuals and groups to get information about the current and predicted state of things as well as for testing causal propositions (Weisberg et al. 1996, 14–18). The research method provides insight into the surveyed respondents' cognitions as they are prompted to interpret and process information relevant to the surveyed topic

before selecting an answer to a question or a claim (Krosnick 1999). In this regard, survey research provides an efficient method for gathering data in a fast and clear way to test the research hypotheses (Wright 2005; Montabon et al. 2018).

The survey data was collected from three sources: 1) The Finland State of Logistics 2016 survey (Solakivi et al. 2016); 2) The Finland State of Logistics 2018 survey (Solakivi, Ojala, Laari et al. 2018); and 3) The European Social Survey 2016 (NSD 2016). The Finland State of Logistics survey is a biennial national survey first conducted by the Ministry of Transport and Communications in Finland in 1992 and by the supply chain management research team at the Turku School of Economics since 2006. The survey provides insight into the conditions and performance of Finnish logistics market based on responses acquired from Finnish trading and manufacturing companies, logistics service providers, as well as consultants and educators in the field. The survey has been distributed to firms of different sizes from micro to large as measured using turnover (as per the European Commission definition in EU Recommendation 2003/361), and it has been able to cover the majority of turnover in the focus industries with over 2 700 responses at best.

The European Social Survey is a biennial cross-national survey that has measured the beliefs, values, and behavior of individuals across Europe since its establishment in 2001. The survey gives timely information on various aspects of European societies through interviews on themes such as politics, attitudes to climate change, or subjective well-being, among others. In 2016, for example, quantitative data was gathered from 44 387 individual respondents in 23 countries. Both the Finland State of Logistics survey and the European Social Survey have been highly consistent in structure over the years, allowing for comparability within the surveys.

The objective data consisted of firm performance data collected from the Voitto+ database and the Eikon dataset. Voitto+ is a financial statements database by Suomen Asiakastieto containing data from approximately 100 000 Finnish firms based on business identity codes. The Eikon by Refinitiv provides access to performance and financial data for over 30 000 publicly listed firms across over 180 countries (Refinitiv 2021; 2022). The data sources and samples used for each article are specified in **Table 3**.

Table 3. Data sources and methods used in the original publications.

	Research topic	Data source(s)	Sample	Methods of analysis
<i>Article I</i>	Logistics outsourcing	FSoL ¹⁾ 2018 (survey)	N = 110 Finnish manufacturing companies	Exploratory factor analysis, partial least squares structural equation modelling
<i>Article II</i>	Organizational performance	FSoL 2016 (survey), Voitto+ database (financial reporting data)	N = 146 Finnish manufacturing and trading companies	Confirmatory factor analysis, moderated regression analysis
<i>Article III</i>	Organizational performance	ESS ²⁾ 2016 (survey), Eikon database (performance data)	N = 44,387 individuals / N = 920 companies in Europe	(Multilevel) latent profile analysis, moderated regression analysis
<i>Article IV</i>	Supply relationships	Academic literature	N/A	Conceptual analysis

¹⁾ The Finland State of Logistics survey

²⁾ The European Social Survey

The respondents to the Finland State of Logistics surveys held positions in upper management, middle-management, and operative and specialist functions. The companies in the survey samples were sized from small (annual turnover below €10m) to medium (turnover €10–50m) and large (turnover over €50m). Accordingly, the unit of analysis to which data is directly attached to is either the individual (**Article IV**), the organization (as represented by the individual, **Article II**), or both (**Article I**, **Article III**).

The response rates for the Finland State of Logistics survey samples were 5.0% in 2016 and 9.3% in 2018, whereas the response rates in the European Social Survey 2016 varied between 42.7 and 69.6% by country. Some further procedures were taken in the articles to arrive at the final analysed samples. Particularly, cases with more than 25% missing data were excluded from the samples in **Article I** and **Article II**. Missing Completely at Random tests (Little & Rubin 2002) were carried out to study the missing value patterns, after which missing data was imputed using the expectation-maximization algorithm. In **Article III**, the analysis was based on data from 23 countries that were covered by both the European Social Survey and the Eikon database.

5.3 Methods of analysis

5.3.1 Conceptual analysis

Conceptual analysis is an aspect of the scientific method concerned with the actions researchers engage in when they assess the clarity, precision, or specification of concepts, hypotheses, statements, theories, laws, and so on (Machado & Silva 2007). As for SCM research in general, conceptual research conventionally begins with a review of existing literature to summarize existing research and identify the concepts relevant to the topic of the study. The analysis of the relevant literature may then result in conceptual models and frameworks with related propositions and hypotheses to be tested, as exhibited by numerous conceptual studies in SCM-related issues (e.g., Seuring & Müller 2008; Dubey et al. 2017; Hazen et al. 2021). Accordingly, the original publications included in the thesis begin with a review of the topic addressed within each article.

Jaakkola (2020; see also Meredith 1993 for descriptions of conceptual methods) describes four different templates for conceptual research designs: theory synthesis, theory adaptation, typology, and model. Theory synthesis combines extant knowledge across previously established conceptual or theoretical boundaries to offer an enhanced view of some focal phenomenon. Theory adaptation starts with a theory or concept of interest that is then amended by an alternative frame of reference provided by other theories or concepts. Typology structures the extant knowledge on some phenomenon, concept or theory to reduce complexity surrounding the target. Model papers consider the relationships and mechanisms at play among some focal concept and other concepts of interest.

Lukka and Vinnari (2014) make a distinction between domain theory and method theory that is useful for analyzing the components of conceptual analysis. Domain theory refers to “*a particular set of knowledge on a substantive topic area situated in a field or domain,*” whereas method theory provides “*a meta-level conceptual system for studying the substantive issue(s) of the domain theory at hand*” (ibid., 1309). Method theory, thus, provides a theoretical lens for studying phenomena, concepts, and theories within a domain of interest. In **Article IV**, the identity theories previously addressed mainly in social psychology were synthesized and adapted to study supply chain collaboration within the BSCM domain. In a sense, such logic applies to the thesis overall where the argumentation provided derives from a synthesis of social psychology and the BSCM meta-theory to study SCM phenomena.

5.3.2 Exploratory and confirmatory factor analysis

Factor analysis is a statistical technique used to describe variability in a set of observed variables in terms of a smaller set of variables. The smaller sets of highly interrelated variables are known as factors that help to identify the underlying latent structure among the observed variables. Factor analysis may, thus, be used to reduce the number of variables representing a dataset and to simplify the examination of relationships among variables. The analysis may also be assessed in terms of factor loadings that indicate how much each observed variable contributed to each factor. (Hair et al. 2010.) Following Woods and Edwards (2008, 367), the factor analysis model can be written as:

$$\Sigma_{xx} = \Lambda \Phi \Lambda^T + D_{\psi}, \quad (1)$$

where Σ_{xx} is the $p \times p$ covariance matrix among manifest variables x_1, x_2, \dots, x_p , Λ is a $p \times m$ matrix of factor loadings that relate each factor to each manifest variable, Φ is an $m \times m$ matrix of correlations among m factors, and D_{ψ} is a $p \times p$ diagonal matrix of unique variances for each manifest variable.

Factor analysis methods are divided into exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). In EFA, the researcher may study the data without *a priori* assumptions about the underlying structure of the data. Accordingly, EFA is often used as the means for scale development, as it allows the observed variables to be related to any of the identified factors (Worthington & Whittaker 2006). The method can also be used in combination with CFA to recover an underlying measurement model then evaluated with CFA (Gerbing & Hamilton 1996). In this regard, EFA was used in **Article I** to check for uni-dimensionality of the measured items prior to proceeding with partial least squares structural equation modeling described in Chapter 5.3.3. There exist several different extraction methods and rotation criteria to use with EFA that are discussed in more detail by Schmitt (2011), for instance. Principal axis factoring and oblique rotation were used in this research.

CFA is a type of structural equation modeling (SEM) that differs from EFA in that in CFA parameters such as the number of factors and the pattern of indicator-factor loadings are specified in advance by the researcher (Brown & Moore 2012). Hence, the method requires a stronger conceptual background, and it is more suitable for confirming already established theories (Hair et al. 2014). In CFA, the researcher compares an estimated population covariance matrix to an observed covariance matrix, after which the goodness-of-fit between the matrices may be assessed with different indicators (Schreiber et al. 2006). CFA was employed in **Article II** to evaluate the scales used and assess them in terms of the Tucker-Lewis index, the comparative fit index, and the root mean square error of approximation.

5.3.3 Partial least squares structural equation modelling

In **Article I**, partial least squares structural equation modelling (PLS-SEM) was used to test a hypothesized framework for studying intentions to outsource logistics functions. PLS-SEM is a statistical modelling technique used to explain variance in dependent variables and particularly useful for theory development purposes (Peng & Lai 2012; Hair et al. 2014; 2018). The approach can be considered as a soft modelling approach that requires no strong assumptions regarding data distributions, sample size, or scale (Esposito Vinzi et al. 2010).

The models tested with PLS-SEM are referred to as path models that comprehend two elements: a structural model and a measurement model. The structural model represents the hypothesized relationships between the independent and dependent variables under examination, and can be written as (Esposito Vinzi et al. 2010, 49):

$$\xi_j = \beta_{0j} + \sum_{q:\xi_q \rightarrow \xi_j} \beta_{qj} \xi_q + \zeta_j, \quad (2)$$

where $\xi_j (j = 1, \dots, J)$ is the generic endogenous latent variable, β_{qj} is the generic path coefficient interrelating the q -th exogenous latent variable to the j -th endogenous one, and ζ_j is the error in the inner relation.

The measurement model refers to the latent variables (i.e., constructs) of interest and the indicator variables used to measure them, and it is tested in terms of the reliability and validity of the constructs (Hair et al. 2014). According to Henseler (2017), there are three types of measurement models—composite, reflective, and causal–formative—that follow different assumptions regarding the relationship between the latent constructs and the indicator variables. In composite models, the indicators are assumed to make up the constructs, whereas in reflective models, the constructs cause their indicators. In causal–formative models, the indicators cause the constructs. The measurement model studied in **Article I** was reflective, so the relation of each indicator variable to the latent variable can be written as (Esposito Vinzi et al. 2010, 50):

$$x_{pq} = \lambda_{p0} + \lambda_{pq} \xi_q + \varepsilon_{pq}, \quad (3)$$

where λ_{p0} is the loading associated to the p -th manifest variable in the q -th block, and ε_{pq} is the error term. The error is assumed to have zero mean and to be uncorrelated with the latent variable of the same block.

In **Article I**, the hypothesized framework was converted into a path model that was estimated with a PLS algorithm with parameter settings of a maximum of 300 iterations at the stop criterion of 10^{-5} and a bootstrap procedure with 5 000 samples, as suggested by Hair et al. (2014). The measurement model was addressed in terms of its construct reliability, convergent validity, and discriminant validity, and the

model was deemed acceptable for further analysis. The structural model was then evaluated in terms of variance inflation factors, path coefficients, coefficients of determination (R^2), and Stone–Geisser’s Q^2 , as suggested to be done in SCM research where PLS-SEM is used (Peng & Lai 2012).

5.3.4 Multilevel latent profile analysis

Multilevel latent profile analysis (MLPA) is a statistical method based on latent profile analysis (LPA), which is used to identify subtypes of interrelated cases among multiple observed indicators. MLPA extends LPA and it is used to study the relative prevalence of the single-level subtypes (level 1) across higher-level units (level 2) to proceed with latent profiles identified at both levels. The method takes into account that the observed single-level indicators may be dependent of each other, whereupon it is suitable to study hierarchical datasets where, for instance, individuals are nested within groups. (Mäkikangas et al. 2018; Lee & Yoo 2020.) The mathematical notation for determining the level 1 and level 2 estimates is discussed by Mäkikangas et al. (2018).

MLPA is a person-centered approach where it allows for intraindividual variation in patterns of values for certain criteria variables and, thus, relaxes the assumption of homogeneity in population as done in a variable-centered approach (Marsh et al. 2009; Mäkikangas et al. 2018). Furthermore, MLPA is often discussed together with multilevel latent class analysis that shares the same aim yet is technically based on categorical indicators, whereas MLPA is concerned with continuous indicators or those together with categorical ones (Bonito 2019; cf., Henry & Muthén 2010).

In this research, LPA and MLPA were used in **Article III** to study the relative frequency of individual level value orientations across the higher-level units of countries. First, a single-level profile solution was identified based on its theoretical aptitude and quantitative criteria of log likelihood, Akaike information criterion, Bayesian information criterion, and entropy value (see Berlin et al. 2014). Second, level 2 variations in the size of level 1 profiles were studied comparing the criteria values from the MLPA solution to those acquired in the first phase. Third, the level 2 profiles were estimated based on the relative frequency of level 1 profiles within and assessed in terms of the criteria.

5.3.5 Moderated regression analysis

Moderation is in question when the effect of variable X on some variable Y depends on or can be predicted by a third variable W. Moderation can be implemented into ordinary least squares (OLS) regression models by considering the interaction of the

moderation variable with the independent variable(s). The relationship between X , Y , and W could be written as follows (Hayes 2018):

$$Y = i_Y + f(W)X + b_2W + e_y, \quad (4)$$

where i_Y is the intercept, $f(W)$ is a function of W , b_2 is the coefficient for W , and e_y is the error term. Assumptions of the OLS regression model include that the relationship between the independent and dependent variables is linear, the errors are uncorrelated random variables, the errors are normally distributed, and the errors are of constant variance (i.e., they are homoscedastic) (Hayes & Cai 2007).

Moderated regression analyses were used in **Article II** and **Article III** to study the proposed theoretical models. The related regression models were estimated following hierarchical variable entry. In hierarchical multiple regression, the independent variables are entered into the model following a theory-driven causal priority to estimate the effects associated with each cause (Cohen et al. 2003). Accordingly, regression models were estimated both with and without the moderation term to find out whether the inclusion of the term contributed to changes in the variation accounted by the models (i.e., squared multiple correlations, R^2).

In **Article III**, the moderator variable was a multicategorical with three categories that were indicator coded with $k - 1$ variables and compared with each other with one of the conditions chosen as a reference group, following the process described by Hayes and Montoya (2017). Furthermore, Hayes and Cai (2007) recommend the use of a heteroscedasticity-consistent standard error estimator when conducting inferential tests in OLS regression to avoid situations where the assumption of homoscedasticity is compromised. A so-called HC3 estimator was applied in both articles concerned with moderation analysis. The estimator and its benefits have been discussed in more detail by Long and Ervin (2000) and Cribari-Neto et al. (2005).

5.4 Validity and reliability of the results

The types of validity and reliability assessed in this research are compiled in **Figure 6**. The definitions for validity and reliability, as well as those for the types of validity, are based on the works by Yin (1994, 32–38) and Mentzer and Kahn (1995). Zachariadis et al. (2013) discuss inferential validity from a critical realist view, whereas the specific types of construct validity have been described by Hair et al. (2010, 708–711).

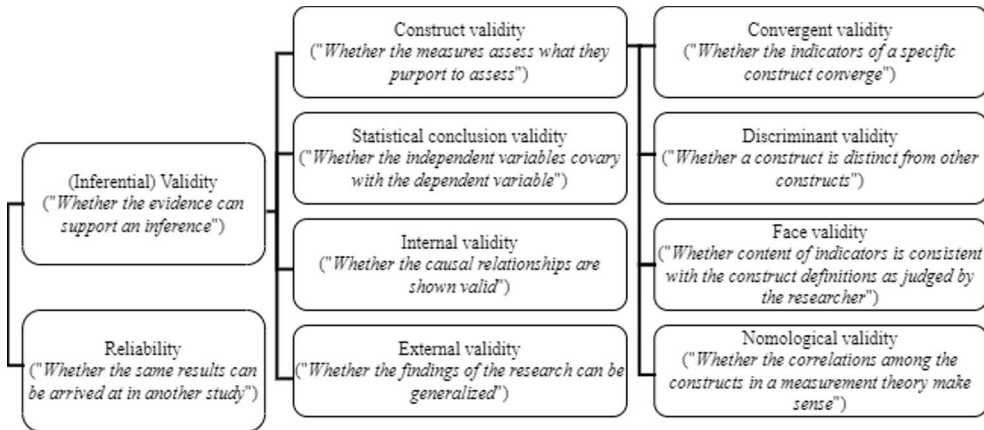


Figure 6. Types of validity and reliability considered in the thesis.

Construct validity is concerned with both how well the measures used in empirical research represent a construct of interest as well as whether all aspects of the construct are covered by the measures used (Dunn et al. 1994). In this regard, *convergent validity* of the research constructs was assessed in terms of factor loadings, average variance extracted (AVE) values, and construct reliability (CR). AVE and CR can be calculated as follows (Hair et al. 2010, 709):

$$AVE = \frac{\sum_{i=1}^n L_i^2}{n}, \text{ and} \quad (5)$$

$$CR = \frac{(\sum_{i=1}^n L_i)^2}{(\sum_{i=1}^n L_i)^2 + (\sum_{i=1}^n e_i)}, \quad (6)$$

where L_i represents a standardized factor loading, i and n refer to the number of items, and e is the error variance term. To establish convergent validity, measurement items with factor loadings that were statistically insignificant or below a threshold of .50 were dropped before subsequent analyses. Thresholds of .50 and .70 were then used for AVE and CR, respectively. (see Nunnally & Bernstein 1994; Hair et al. 2010.)

Discriminant validity was assessed with the Fornell–Larcker criterion and the heterotrait-monotrait (HTMT) ratio of correlations. Fornell and Larcker (1981) suggest discriminant validity is supported by AVE values greater than the corresponding inter-construct squared correlation estimates. However, the HTMT criteria based on a comparison of heterotrait-heteromethod correlations and monotrait-heteromethod correlations have been proposed to be more sensible in detecting discriminant validity issues (Henseler et al. 2015). HTMT of two constructs can be formulated as follows (ibid., 121):

$$HTMT_{ij} = \frac{1}{K_i K_j} \sum_{g=1}^{K_i} \sum_{h=1}^{K_j} r_{ig,jh} \div \left(\frac{2}{K_i(K_i-1)} \cdot \sum_{g=1}^{K_i-1} \sum_{h=g+1}^{K_j} r_{jg,jh} \right)^{\frac{1}{2}}, \quad (7)$$

where the left side of the equation represents the average heterotrait–heteromethod correlations of the constructs and the right side of the equation is the geometric mean of the average monotrait-heteromethod correlations of the constructs. HTMT was used in **Article I** and **Article II** where the ratios were examined together with HTMT_{.85} and HTMT_{inference} criteria.

Face validity (or substantive validity) is based on the researcher’s judgment on the linkage between a construct and the indicators used to measure it. The development of scales and the items used in this research are based on previous research and were discussed among the authors of the original publications. As to *nomological validity*, matrices of construct correlations were studied as part of the data analysis processes. The establishment of validity was further accompanied by pilot testing the scale developed for **Article I**, as suggested to be done in questionnaire development by Forza (2002).

For *statistical conclusion* validity, García-Pérez (2012) suggest researchers should consider whether the statistical tests used are suitable in terms of the research design and whether the methods are applied in a manner where the resultant Type-I and Type-II statistical error rates can be examined for validity as declared by the researcher. Accordingly, the methods employed in this thesis were chosen with their contribution to the research aims in mind and the examination of alpha values was done on the conventional levels of .01, .05, and .10 (see Hair et al. 2010, 9–10).

Of the original publications, **Article I** and **Article III** were cross-sectional by design, whereupon there was no empirical demonstration of causality between the research constructs. Instead, *internal validity* was based on arguments derived from the theoretical background of the articles. **Article II**, in turn, employed longitudinal data based on which stronger assumptions about causality can be made.

External validity was pursued mainly with representative sampling and statistical generalizations. The Finland State of Logistics surveys can be argued to be representative of the national logistics markets due to their coverage in the industries addressed. Moreover, the response rates of the surveys have been argued to be well in line with other surveys of similar scale in logistics research (Laari 2016). Accordingly, the randomly selected ESS sample is representative of all persons aged 15 and over in the studied countries (ESS 2022).

Statistical generalizations were further supported by examining multiple cases together. Here, the logic is that different sources of influence on an outcome tend to cancel each other, whereupon inferences can be made regarding the underlying behavioral dispositions of interest (Ajzen 1991, 180). The control variables described in Chapter 5.2.1 were also controlled for their possible influence on the outcomes of interest. Finally, the crossdisciplinary theorizing applied in this thesis

supports external validity by providing understanding of the focal phenomena at a higher level than when disciplinary boundaries are followed (Singhal & Singhal 2012).

Several further measures were taken to control for possible bias associated with survey research. Namely, nonresponse bias was controlled for with independent samples *t*-test (Armstrong & Overton 1977). Common method bias was considered for by allowing the respondents to the Finland State of Logistics surveys to remain anonymous, in addition to which marker variable approach and Harman's single factor test were used, as suggested by Craighead et al. (2011). Moreover, while it has been discussed whether single respondent surveys can be used to address more complex units of analysis, the decision-makers surveyed here were deemed to have relevant information concerning the subjects under consideration (see Montabon et al. 2018). Besides, the findings support a proposal of this thesis that the responses acquired from individual social agents are relevant for organizational behavior.

Reliability of this research is supported by the use of quantitative measures as well as the written descriptions of the research process applied in each of the original publications. These measures reduce the role of subjective interpretation in the analysis of the research data and provide researchers elsewhere steps to follow for replicating the current research.

Then again, the role of subjective interpretation should not be dismissed altogether, given the roots of this thesis in critical realism. After Zachariadis et al. (2013), the validity of studies based on critical realism is concerned with their ability to identify generative mechanisms—the mechanisms bound to physical objects and social processes that determine actual phenomena—underlying observed phenomena. Following Danermark et al. (2002, 42–45), these mechanisms can be approached with conceptual abstraction aimed at determining the properties that make objects what they are at a certain moment. Accordingly, the role of conceptual analysis in this thesis is to uncover mechanisms that provide plausible explanations for that what is empirically observed and, thus, provide support to inferential validity. For example, the social cognitive process of information processing in **Figure 4** illustrates a theoretical view on how the mental representations, discussed in more detail in the original publications, form and influence the social environment. The original publications, then, provide empirical traces about the events purportedly caused by the generative mechanisms.

6 Results

6.1 Overview of conceptual and empirical results

Each of the four original publications contributed to answer the two research questions outlined in Chapter 1 with conceptual results supported by empirical inquiry. The results related to the theories, topics, and practices addressed in the original publications are summarized in **Table 4**.

Table 4. Summary of results related to the theories, topics, and practices addressed in the original publications.

Findings related to...			
	Theory	Topic	Practice
Article I <i>An examination of the behavioral drivers to logistics outsourcing</i>	<ul style="list-style-type: none"> Logistics outsourcing is an intentional activity that may be studied in terms of the TPB Decision-makers consider transaction costs and core competences in relation to third-party logistics partners 	<ul style="list-style-type: none"> Behavioral factors related to decision-makers' psychological characteristics explain logistics outsourcing intentions and decisions 	<ul style="list-style-type: none"> Outsourcing decisions may be influenced through the identified psychological characteristics with the TPB as a potential managerial tool
Article II <i>An examination of the interaction between ambidexterity in logistics and organizational performance</i>	<ul style="list-style-type: none"> Ambidexterity as a dynamic capability helps organizations to adapt to their environment and perform better 	<ul style="list-style-type: none"> A positive virtuous cycle between environmental and financial performance is enhanced by ambidexterity in logistics 	<ul style="list-style-type: none"> Organizational performance may be enhanced by promoting an explorative orientation to logistics (through, e.g., leadership and investments)
Article III <i>An examination of the interaction between institutional value environment and organizational performance</i>	<ul style="list-style-type: none"> Behaviors in organizations and markets are driven by individual values Organizations may attain market legitimacy and leverage their performance through conformity to individual values prevalent in the institutional environment 	<ul style="list-style-type: none"> The relationship between environmental and financial performance is positively enhanced by conformity to market values 	<ul style="list-style-type: none"> Decisions regarding, e.g., facility locations and supplier selection could be informed by the values represented in the markets Regulative pressures and environmental policies are important drivers of business sustainability
Article IV <i>An examination of the role of identity in supply relationships</i>	<ul style="list-style-type: none"> Individuals and firms identify with one another among supply chains, as argued in the social identity theory and the theory of intergroup leadership 	<ul style="list-style-type: none"> Successful supply chain collaboration is related to identity threats and their management in supply relationships 	<ul style="list-style-type: none"> Supply chain managers should use proper rhetoric based on the relative power between supply partners for identity management in supply relationships

As seen in the table, the results span the topics of logistics outsourcing, organizational performance, and supply relationships. The original publications extend the discussion within these subject areas with several theoretical and managerial implications. Accordingly, the various theories presented in Chapters 2.2 and 3.3 were used to identify the relevant psychological characteristics theorized as mental representations in this summarizing part of the thesis, and to inform ways to enhance SCM decision-making.

The relationship between these factors and organizational decision-making was assessed empirically by testing research hypotheses against the gathered data. The relationships tested among the studied concepts are presented in **Table 5**.

Table 5. Summary of results related to the empirical hypotheses tested in the original publications.

		Relationship	Outcome
Article I			
N = 110 Finnish manufacturing companies	H1	Positive attitude toward outsourcing logistics functions -> Intention to outsource logistics (+)	Supported
	H2	Encouraging subjective norm in outsourcing logistics -> Intention to outsource logistics (+)	Supported
	H3a	Competence in outsourcing logistics functions -> Intention to outsource logistics (+)	Supported
	H3b	Competence in outsourcing logistics functions -> The level of outsourced logistics (-)	Supported
	H4	Intention to outsource logistics -> The level of outsourced logistics (+)	Supported
	H5a	The perceived specificity of logistics -> Intention to outsource logistics (-)	Not supported
	H5b	The perceived specificity of logistics -> The level of outsourced logistics (-)	Not supported
	H6a	The strategic importance of logistics -> Intention to outsource logistics (-)	Not supported
H6b	The strategic importance of logistics -> The level of outsourced logistics (-)	Not supported	
Article II			
N = 146 Finnish manufacturing and trading companies	H1	Corporate financial performance -> Corporate environmental performance (+)	Partially supported
	H2	Corporate environmental performance -> Corporate financial performance (+)	Partially supported
	H3a	Corporate financial performance <-> Corporate environmental performance (+), enhanced by exploitative orientation in logistics	Partially supported
	H3b	Corporate financial performance <-> Corporate environmental performance (+), enhanced by explorative orientation in logistics	Partially supported
H3c	Corporate financial performance <-> Corporate environmental performance (+), enhanced by ambidexterity in logistics operations	Partially supported	
Article III			
N = 44,387 individuals / N = 920 companies in Europe	H1	Individual values and environmental beliefs -> Value-based classes of people	Supported
	H2	Value-based classes of people -> Country groups	Supported
	H3	Environmental performance -> Financial performance, moderated by Country groups	Supported

Of the seventeen outlined hypotheses, eight received statistical support, five were partially supported, and four were not supported. The results of the three nomothetic articles (**Article I**, **Article II**, and **Article III**) as well as the conceptual article (**Article IV**) are described next in more detail.

6.2 Article I: In search of arguments for logistics outsourcing

Article I is concerned with drivers of logistics outsourcing intentions and decisions in Finnish manufacturing companies. Individual decision-makers' intentions to

outsource logistics were examined in terms of arguments based on TCE, CCA, and TPB. Particularly, nine hypotheses were studied to establish how individual level characteristics and organization level elements are together related to outsourcing decision-making.

Individual decision-makers within the studied companies exhibited results in line with what was hypothesized after TPB and proposed by Merminod et al. (2019). The psychological characteristics of positive attitudes, encouraging subjective norms, and competence were positively related to the intention to outsource logistics functions. Furthermore, competence and the intention were directly related to the level of outsourced logistics within the companies. Meanwhile, it was found that neither the perceived specificity of logistics (assets) nor the strategic importance of logistics to the firm were related to the intentions or the outsourcing decisions as was presumed after TCE and CCA. Yet, contrary to the hypothesis, the strategic importance of logistics was related positively to the level of outsourced logistics. The relevant path coefficients and significance values are shown in **Figure 7**.

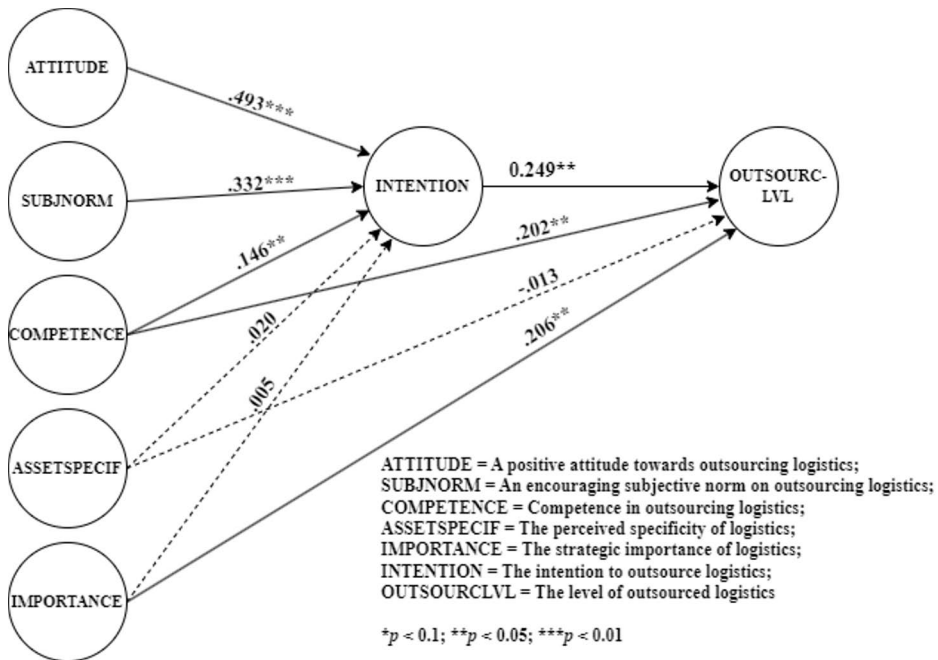


Figure 7. Statistical relationships among the drivers of logistics outsourcing (modified after Figure 1 in Article I).

The results contribute to the scarce research on the influence of psychological characteristics in the outsourcing domain (e.g., Mantel et al. 2006; Marshall et al. 2015). It was concluded that the psychological characteristics of individuals may

explain logistics outsourcing decisions better than normative guidelines proposed in organizational theories. Decision-makers that are content with the third-party logistics services they receive do not have to base outsourcing decisions on the state of logistics within their firm. Instead, they may outsource even the logistics functions that are specific and strategically important if the outsourcing service provider is able to deliver satisfactory service.

Article I, thus, advocates the importance of relationship characteristics such as service performance and customer satisfaction in outsourcing decision-making (see Juga et al. 2010). It is implied in the article that contentment in outsourcing relationships is linked to positive evaluations of outsourcing in general, whereupon decision-makers are more likely to outsource. Mental representations may so be informed in particular relationships yet generalize to impact decision-making elsewhere. Meanwhile, it was established that decision-makers may more often than not direct their attention from firm-specific characteristics to those emergent in the interrelationships between business organizations when making decisions. The characteristics of asset specificity and core competences were put forth after TCE and CCA, respectively.

As to practical propositions, it was suggested in **Article I** that the TPB may be used as a managerial tool for determining an individual's propensity to outsource logistics and direct improvements where necessary. Behavior change techniques based on the components of the theory include providing information on consequences of the behavior, providing information about other's approval of the behavior, and prompting intention formation through encouragement toward behavioral resolutions (Abraham & Michie 2013).

6.3 Article II: Ambidextrous processes for performance

Article II examines the relationships among corporate environmental performance, corporate financial performance, and ambidexterity in logistics. It was found that the strength of the relationship between corporate environmental and financial performances was affected by the ambidexterity among the sample of 146 Finnish manufacturing and trading companies. Corporate financial performance during 2014 and 2015 did not impact corporate environmental performance in 2016 when ambidexterity in logistics was not added to the equation. Accordingly, the results regarding the relationship between corporate environmental performance in 2016 and corporate financial performance during 2017 and 2018 were not that convincing: without ambidexterity in logistics, corporate environmental performance impacted only gearing of the three tested financial performance measures (i.e., return on assets; gearing; quick ratio) at the $p < .10$ level of statistical significance.

In practice, ambidexterity in logistics operations was presumed to be based on the sum of the dimensions of exploitative orientation in logistics and explorative orientation in logistics. The overall ambidexterity measure as well as the dimensions were then considered separately as moderators of the relationships from corporate financial performance to corporate environmental performance and back. The standardized coefficients, interaction terms, and significance values obtained from related model estimations are shown in **Figure 8**.

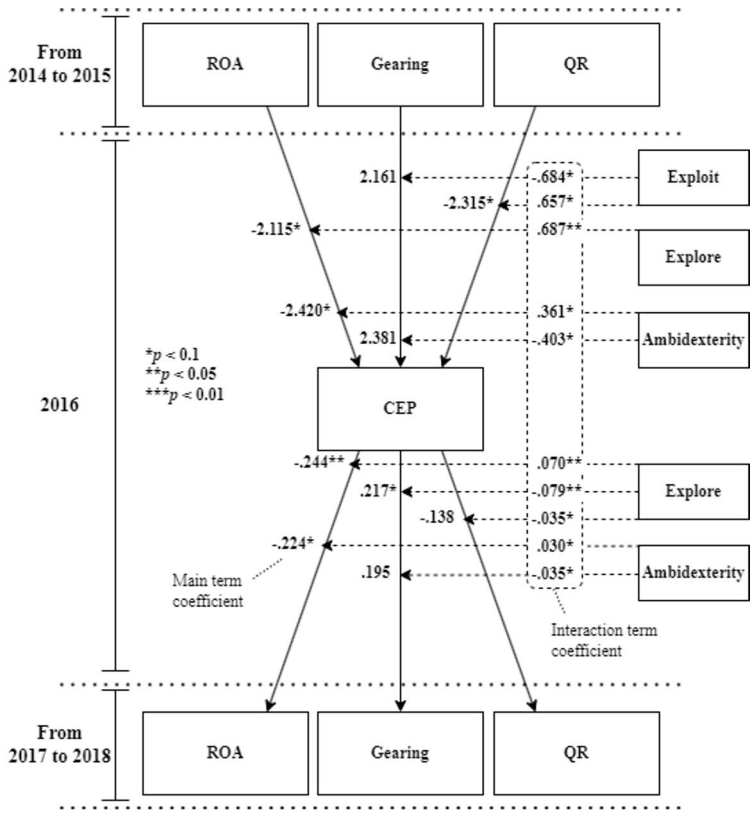


Figure 8. A graphical illustration of the relationships among corporate financial performance, corporate environmental performance, and ambidexterity in logistics (modified after Figure 4 in Article II).

ROA = Return on assets; QR = Quick ratio; CEP = Corporate environmental performance; Exploit = Exploitative orientation in logistics; Explore = Explorative orientation in logistics; Ambidexterity = Ambidexterity in logistics operations // Ambidexterity represents the sum of Exploit and Explore

The results show that both exploitative and explorative logistics activities, as in the intensification of current operations and seizing novel opportunities, are important

in terms of organizational performance. Ambidexterity in logistics helps organizations translate their resources into performance. Accordingly, the article contributes to the domain of organizational performance in general, and organizational sustainability in particular. The link between environmental performance and financial performance remains to be widely debated with inconclusiveness about its causality, polarity, and strength, for example. In the article, the analysis based on longitudinal data revealed a bidirectional relationship between the performances when moderated by logistics ambidexterity and, thus, provided support to the existence of a virtuous cycle between the performances (see Endrikat et al. 2014).

Previously, ambidexterity has been considered mainly as an attribute of organizations or the individuals within (i.e., as structural or contextual ambidexterity; Raisch et al. 2009; Patel et al. 2013). The subjective measures of logistics ambidexterity adopted in **Article II** tie the two together where it captures ambidexterity on the level of organizations through the perceptions of individual decision-makers. Logistics ambidexterity is ambidexterity in the form of a business process and refers to how decision-makers understand the exploitative and/or explorative foundations of logistics within their firm.

The finding that the way individuals perceived logistics was related to organizational performance is especially interesting, given **Article I** where the perceived specificity or strategic importance of in-house logistics were not related to organizational decisions. To put it bluntly, the way individual decision-makers perceive logistics seems to be relevant for decision-making but not necessarily in the ways previous organizational theory would suggest. In terms of psychological characteristics on the individual level, or mental representations, the study touched on the subject of supply chain orientation as an attitudinal aspect that contributes to explaining the logic of the moderation. Supply chain orientation has been discussed as a mindset adopted by individual decision-makers regarding how the management of supply chain activities may positively impact organizational performance (Omar et al. 2012). In this vein, the exploitative and explorative orientations of logistics are indicative of the decision-makers' mental representations of logistics in their firm.

6.4 Article III: Value-based behavior for market legitimacy

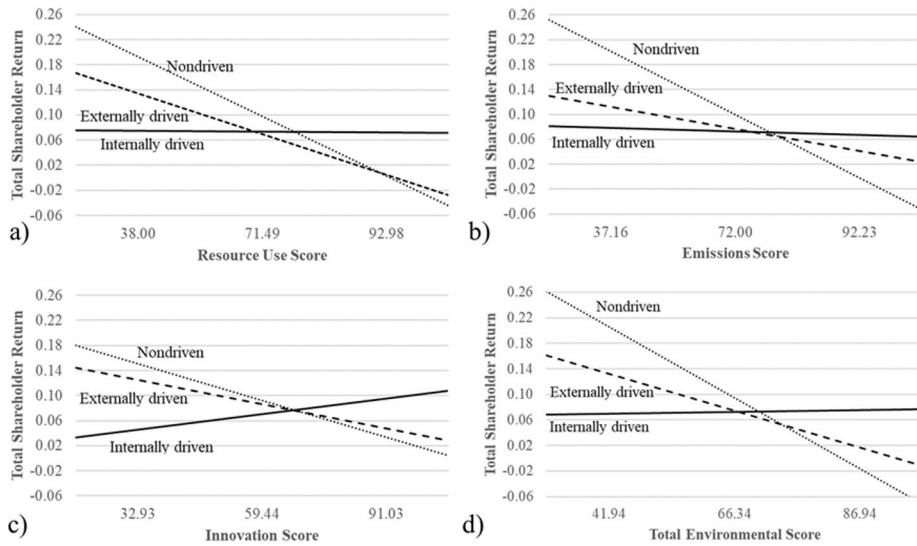
The results of the previous **Article II** point to how ambidexterity in logistics should be considered besides other potential moderators to the relationship between environmental and financial performance (see Dixon-Fowler et al. 2013). The importance of moderating factors to the focal relationship was further elaborated in **Article III**. Here, it was argued that firms should take note of the values prevalent

in their institutional environment to be true to stakeholder demands and capitalize on environmentally sustainable practices. To this end, the article addressed the psychological characteristics of individual values and environmental beliefs and their relationship to companies' environmental and financial performance.

It was hypothesized that the individual values and beliefs could be grouped first into latent value profiles, and then into country groups that ultimately moderated the relationship between the performances. Using LPA, four different individual level latent value profiles were found among the sample of 44,387 respondents to the European Social Survey 2016. The profiles were labeled as personal focused, social focused, endorser, and rejecter, depending on how the individuals were positioned in relation to each other on the circumplex model of values described in the theory of basic human values (see Schwartz 1992). The personal focused and social focused were distinguished by their inclination toward openness to change or conservation, whereas the endorsers and rejecters conformed to cultural ideals and values to varying degrees.

Next, the individual level profiles were studied on the level of countries using MLPA. The countries under examination were grouped into three groups based on the relative frequency of the individual level latent profiles within the countries: nondriven, internally driven, and externally driven. The labels reflect differences in motivational emphases within the countries. The relative frequency of rejecters was the highest in the nondriven group, that is, the individuals included here are suggested to not be as likely driven by values in their behavior as the individuals belonging to the other groups. The internally driven, in turn, was populated by the personal focused with high emphasis on values such as self-direction, stimulation, and hedonism. The externally driven group was the most heterogenous by nature, with a relatively high proportion of the social focused with values related to, for example, security, universalism, benevolence, and conformity.

Finally, as per the moderated regression analysis, it was found that the link between the environmental and financial performance of companies was related to the country group to which the companies belonged to. This is illustrated in **Figure 9**. The results of **Article III**, thus, show that environmental performance is more likely to be financially costly in institutional environments where environmentalism-related values such as universalism and benevolence are more likely to be disregarded. Overall, businesses may benefit financially from attaining institutional legitimacy by conforming to the values prevalent in their respective markets.



Nondriven = Czech Republic, Estonia, France, the UK, Ireland, Lithuania, Norway, Portugal, Russia; Internally driven = Belgium, Switzerland, Germany, Finland, Iceland, the Netherlands, Sweden; Externally driven = Austria, Spain, Hungary, Israel, Italy, Poland, Slovenia // Total shareholder return is calculated from change in return index over 2016; Higher environmental performance scores indicate higher relative performance in industry group

Figure 9. The effect of environmental performance on financial performance moderated by country group (Figure 3 in Article III).

The article contributes in a novel way by connecting previous studies on when it costs to be green (Trumpp & Guenther 2017) and the structuration of value profiles on the level of individuals and countries (Nonis & Swift 2001; Magun et al. 2016). The article also offers insights regarding the choice of organizations' institutional environment. The country of origin of the studied companies was determined based on where their headquarters was located, following a view that the institutional environment of a firm is mainly determined by this country (Jackson & Apostolakou 2010). While this view may appear rather reductionist given that firms may, in practice, operate in multiple countries, the results provide organizational decision-makers and stakeholders with information about the ways location decisions can affect organizational performance.

6.5 Article IV: Identity management for supply relationships

Previous research has outlined individual values and identities as reflections of the self that provide consistency to individual behavior and social action (Hitlin 2011). The concept of identity was elaborated on in **Article IV**, where it was argued that supply relationships and management thereof could benefit from ideas developed within research on identity. Identity theories such as SIT and the theory of intergroup leadership help understand how to form, maintain, or dissolve collaborative relationships while taking into account the behavioral complexities involved. The article, thus, puts further emphasis on the relational aspects of SCM and contributes to a line of research concerned with identity management in SCM (see Ireland & Webb 2007; Min et al. 2008; Corsten et al. 2011; Ambrose et al. 2018).

Here, based on shared collective identity and relational identity theorizing, it was proposed that supply chain actors identify with the supply relationships they are part of as means for self-definition and self-enhancement. Research has shown how collaborative supply relationships between buyer and supplier firms may face challenges in intergroup behavior, wherefore identity management has been discussed as a plausible solution. In this regard, mainly the SIT has been applied to highlight the importance of factors such as similarity and shared goals between the supply chain partners. The article expands these notions by shifting the focus from collective to relational identity.

Following the theory of intergroup leadership (Hogg et al. 2012), it was argued that supply chain actors subject to identity threats when they embark, maintain, or end supply relationships. The threats are especially feasible when there is a clear power asymmetry between those involved in the relationship because this might reduce the ability of the parties to uphold their distinctiveness from others as individuals and groups. When the parties define themselves in terms of the relationship instead of their similarities, their unique value to the relationship is emphasized in a way that does not threaten their need for distinctiveness. Hence, establishing an intergroup relational identity between the parties is a way to avoid decision-making biases in supply relationships.

7 Discussion and conclusions

7.1 Theoretical contribution

Together the summarizing body of the thesis and the four original publications allow for investigation of multilevel SCM phenomena that could prove cumbersome within a single study due to the need for data from the multiple levels of analysis. With focus on the individual social actor, the thesis, thus, bridges together the calls for more multilevel theorizing and interdisciplinary research as the means for advancing research in SCM (see Carter, Meschnig & Kaufmann 2015; Sanders et al. 2016). Accordingly, the thesis extends the statement by Carter, Meschnig and Kaufmann (2015, 96) that “*individuals form the foundation of multilevel theorization because individual decision-making and behavior become part of the group/team, function, organization, and ultimately, supply chain*”. After the results, the individual may be viewed through a social cognitive lens as an activated actor largely reliant on their mental representations in SCM decision-making.

These findings contribute to answer RQ1 (“*What psychological characteristics of individuals are related to supply chain management decision-making?*”). The social actor derives from the attitudes, values, norms, identities, and other representations of their self and the world around when interpreting, reasoning and deciding in matters related to SCM. In this regard, the individual psychological characteristics provide a basis for understanding the decisions from the individual viewpoint. Furthermore, the scope of analysis in SCM research should not be limited to that of supply chains, as individuals interact with each other also outside the chain and may so form beliefs about issues relevant for their decision-making in supply chains.

From the organizational point of view, SCM decision-making has been labeled biased where the process itself or its outcomes deviate from some specified objective function. While specifying such a target may be a fruitful point of departure for monitoring and improving the processes, achieving the targets can be challenging due to the complexity of supply chains where a decision may be incongruent with the goals of the other units within the firm or companies within the chain (Borgatti & Li 2009). Here, in line with previous research (Wu & Chen 2014), further heterogeneity was observed across individual decision-makers as conveyed in the

variance of the subjectively measured constructs. It is also important to note the organizational individuals surveyed in this research were incumbents of various organizational roles. This way, the roles espoused by the decision-maker or the “boundary spanner” can be numerous, from individual employees to managers responsible for supply chain operations.

What is optimal for the organization, or the supply chain, may not be optimal for the individual decision-maker. Instead, as could be described in terms of subjective rationality (Packard & Bylund 2021), the decision-maker is driven by various individual and group motives (of, e.g., instrumental, relational, moral, and political nature) besides organizational goals (Marshall et al. 2015; Paulraj et al. 2017). Furthermore, the motives may differ between the individual who defines organizational goals and the one who enforces them in action. Hence, due to the fragmented nature of subjective views within organizations and supply chains, it is challenging for SCM decision-making to reach that what is referred to as objective rationality.

The relationship between subjective and objective rationality could be further scrutinized from the viewpoint of the individual social actor. The individual is bounded in their rationality, whereupon it is not all meaningful to anticipate correspondence to the best-evidenced knowledge available from them. However, individual views (and the knowledge they represent) may converge between individuals, on the one hand, and between individuals and organizations, on the other. When representations are shared socially between individuals, the amount of information available to them increases and, thus, helps them be more rational in the objectivist sense. Accordingly, individual decision-making is aligned with organizational aims in the sense that organizational context sets limits to what is decided on and on what grounds. The individual decision-maker is, then, left with the decision to take these aims into consideration, given they have information about them. In this regard, ambidexterity is in order, and one should not content oneself with just exploiting what they already know but also explore new opportunities. Only so the individual may make informed decisions when planning, implementing, or controlling the supply chain.

As to the means for attaining knowledge and imposing conceptual order, the theories of individual behavior applied in the articles (the TPB, the VBN theory, and identity theories) have rarely been seen in previous SCM research. It is shown in the original publications how the theories may be used together with (inter-)organizational theories (TCE, RBV, CCA, DCA, institutional theory) more commonly used to theorize SCM to examine behaviors of interest to the field. Such an endeavor contributes to the sought-after dialogue between SCM and other fields (Halldórsson et al. 2015) as well as to the call for more holistic assessment of

individual decision-making in relation to SCM decision-making (Schorsch et al. 2017).

The explanatory relevance of the theories with different backgrounds could be assessed in a parallel fashion, as was done in **Article I** where logistics outsourcing was described in terms of both behavioral and organizational logics. Alternatively, theories could be considered in a more sequential manner, as was done in **Article III** where the VBN theory was first used to justify the relationship between values and behavior on different levels of analysis, after which institutional theory was used to illustrate the relationship between market legitimacy and organizational performance.

All in all, the theoretical contribution proposed together by this summarizing body and the four original publications may be viewed in terms of a duality of positivist and interpretivist features essential to critical realism. This duality is accentuated in the differences in approach in the more conceptual summarizing part and **Article IV**, on the one hand, and the nomothetic studies **Article I**, **Article II**, and **Article III**, on the other. Following the positivist offset, the social world at large and the individual decision-maker were approached mainly through aggregate patterns identified in quantitative data. Meanwhile, more subjectivist analysis was used to uncover the relevant social structures and plausible mechanisms responsible for individual behavior. The analysis could be characterized as a retroductive process focused at identifying the basic prerequisites that make X possible (Danermark et al. 2002, 97), the X being here the phenomena observed in data. Accordingly, the point of using different methods was not so much to validate results obtained by one with another, as it was to provide complementary views about the phenomena under study (see Zachariadis et al. 2013).

The duality between that what is, and that what is observed, is also relevant in terms of the behavioral outcomes addressed in the thesis. The BSCM meta-theory posits that outcomes of SCM decision-making may be considered through variables investigated in traditional SCM research with particular focus on implications for relations between individuals and groups. While it was theorized that individual level mental representations may become shared and, thus, have influence over multiple levels of analysis, the empirically observed outcomes were related to organizational processes, structure, and performance. Overall, however, the results provide support to the notion of social agency described after the social cognitive perspective and followed in the thesis. Individual decision-makers are influenced by their social environment, whereupon they undertake processes of reasoning and form intentions that when put into practice contribute to supply chain phenomena.

7.2 Practical contribution

The thesis further contributed to the examination of RQ2 (“*How to enhance decision-making within the supply chain management context from a social cognitive perspective?*”). Tokar (2010) argued that the improvement of decision-making in SCM practice is based on finding the sources of deficiency or competence relevant for the decision-making situation. Subsequently, researchers should establish whether the deficiency can be corrected, or if the competence can be used for improving performance elsewhere. In terms of the individual decision-maker, behavior change is amenable by influencing various social cognitive variables such as the attitudes, norms, and perceived behavioral control described in the TPB (Armitage & Conner 2000).

Looking beyond the individual characteristics, it could prove especially worthwhile to increase knowledge about the supply chain partners such as suppliers of the focal company. Here, characteristics to look for are the availability of different services provided by the partner (**Article I**), values espoused by the partner (**Article III**), and how the partner may contribute to the business of the focal company (**Article IV**). Such information search on the relational level could be fostered by promoting an explorative orientation toward organizational matters, as suggested in **Article II**. Specifically, supply chain managers as intergroup leaders should use rhetoric to create organization level perceptions that are apt to foster collaboration in supply relationships, as elaborated on in **Article IV**. At the same time, it was proposed in **Article III** that market level regulative pressures in the form of laws and regulations may sometimes be in place for behavioral support to better the environmental performance of companies.

Furthermore, it is important to note that the paths from the individual level characteristics to organizational outcomes are not always that straightforward, but decision-makers must account for the contingencies that may affect the outcomes of their decisions. For example, it is illustrated in **Article II** how enhancing logistics ambidexterity is positively related to performance outcomes when combined with previous organizational performance; **Article III**, in turn, advocates on behalf of market conformity in terms of values. That is to say, managers should be able to develop different mental representations of the relationships potentially important for their decision-making to help them interpret stimuli relevant in the process (Kiesler & Sproull 1982). Sterman (2010, 37) noted in the context of system dynamics research that “*the great virtue of many protocols and tools for elicitation is their ability to improve our models by encouraging people to identify the elements of dynamic complexity normally absent from mental models.*”

Ultimately, the efficiency of decision-making and improvements thereof are easier to understand when the target behavior is clearly specified. Besides, it is argued that goal setting is an important facilitator of organizational activities (Wood

& Bandura 1989). In this regard, as outlined by Michie et al. (2014), changing behavior begins with understanding the behavior as well as the target toward which behavior change is directed at. Once the target is specified, decision-makers may set to find out whether individual mental representations would constrain behavior change and set realistic expectations about the outcomes to be achieved (Stern 2000). Following the original publications, particularly goals linked to ambidexterity in logistics, logistics outsourcing, environmental performance, or financial performance may be beneficial to consider. As established in **Article I**, supply chain managers should occasionally revisit the strategic reasons for doing things as they might else become locked in the status quo; in the words of Simon (1978b), they become *satisfied* where they opt for the “good enough” alternative that is less-than-optimal for the firm or the supply chain.

An a posteriori model based on the findings is depicted in **Figure 10**. The logic model represents the psychological characteristics, organizational decisions, and techniques to enhance SCM decision-making on a general level, whereas possible feedback loops between the concepts are omitted for clarity. The model represents a social cognition model that accounts for various behavioral factors as determinants of decision-making as well as possible behavioral differences on the levels of individuals and organizations (see Fishbein & Ajzen 2010).

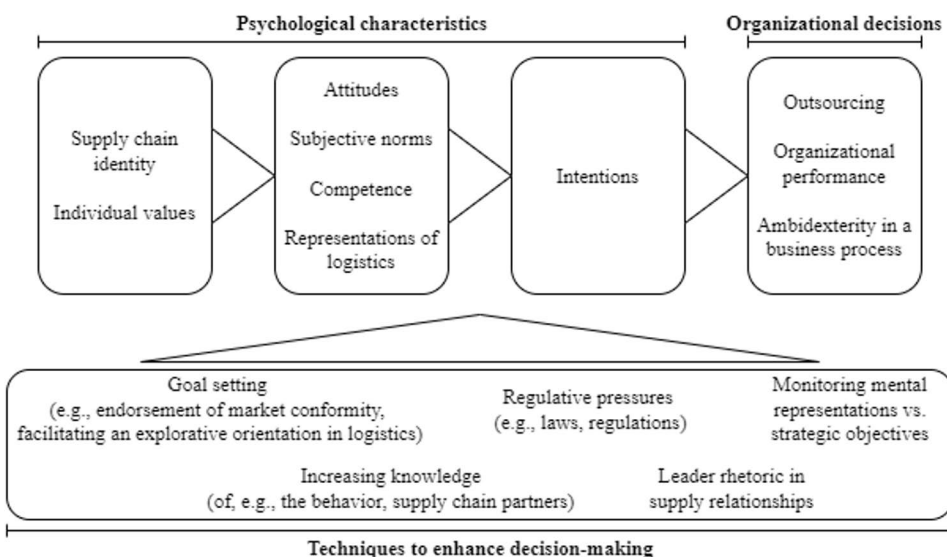


Figure 10. A posteriori model of the research.

Supply chain identity and individual values represent background factors that may influence the beliefs people hold about objects under consideration. The beliefs may

manifest as the attitudes, norms, competence, and representations of logistics seen in the second echelon from the left. These further contribute to intentionality to behave or not to behave in some particular manner, with consequent behavior on the organization level as the outcome. Accordingly, the psychological characteristics represent the psychological factors as behavioral antecedents outlined in the BSCM meta-theory by Schorsch et al. (2017), whereas the organizational decisions represent behavioral outcomes. The four echelons may also be considered in terms of their centrality to the individual's self: Values and identities can be considered relatively more stable than the more focused beliefs or intentions (see Stern et al. 1999). Meanwhile, research has shown the representations of identity and values are positively correlated with, for example, the factors considered in the TPB (e.g., Rise et al. 2010).

The techniques to enhance decision-making are based on the suggestions for enhancing SCM decision-making presented above. The techniques may be used to influence the psychological characteristics and, consequently, organizational decision-making. Regarding the BSCM meta-theory, these techniques could alter the behavioral context or represent moderators that interact with the psychological characteristics of individuals and groups. For those looking for a practical road map to designing behavioral interventions, works such as *Predicting and Changing Behavior: The Reasoned Action Approach* (Fishbein & Ajzen 2010) or *The Behavior Change Wheel: A Guide to Designing Interventions* (Michie et al. 2014) are good references.

The multimethod nature of the thesis further entails several contributions to methodology, or the ways to do research in the SCM field. First, theorizing on the levels of individuals and organizations were combined in a novel way into one analytical model in **Article I**. Second, prior research has seldom studied longitudinal performance data from non-listed firms, as was done in **Article II**. Third, the use of MLPA in **Article III** represents a rarely used method of data analysis in SCM where, nevertheless, phenomena often reside on multiple levels of analysis. Fourth, the conceptual analysis in **Article IV** provides an example of adapting theories developed among other disciplines to theorize SCM.

In addition, contributions to practice and policy could be pointed out from the data analyzed in this research (the descriptive statistics are shown in Appendix 1):

- i) Decision-makers in Finnish manufacturing firms viewed logistics outsourcing in a good light and were likely to feel competent to make related decisions.
- ii) Finnish manufacturing and trading firms employed both exploitative and explorative approaches to logistics to a broad extent. Accordingly,

decision-makers in manufacturing firms often found logistics as strategically important to the organization they represent.

- iii) European individuals represented diverse value types with a considerable weight on values related to self-transcendence. The values were argued to be reflected in the environmental performance of European companies.
- iv) Supply relationship arrangements may have implications for the identities of social actors and should be managed accordingly.

These highlights related to the state of the Finnish and European markets and the behavior within may help decision-makers to see what kind of factors to consider when the aim is to develop organizations and supply chains. First, it was discussed here how such factors are linked to organizational performance that is an essential element in SCM. Second, the individual level implications could be appropriate to transfer to issues of personnel selection in the field. The findings reinforce the view that the attributes of the individual decision-maker contribute to human and social capital in supply chains.

These findings are in line with recently published reports on the state of logistics in international markets. For example, the favorability of logistics outsourcing seems to hold its ground since the vast majority of respondents to the Finland State of Logistics 2020 survey (Solakivi et al. 2021) estimated the demand of logistics outsourcing to yet remain the same or increase in the future. Additionally, the findings on the connection between logistics and environmental practices or performance reflect the internationally growing interest toward sustainability in SCM, as described in the *2022 26th Annual Third-Party Logistics Study: The State of Logistics Outsourcing* report (Langley & NTT DATA 2022).

7.3 Limitations and future research opportunities

The research leaves some room for future research despite the effort to answer the research questions comprehensively. First of all, studying the individual brain in the SCM context would be a worthwhile endeavor for understanding the roots of decision-making previously left rather unexplored. That is, although references have been made and analogies drawn to the neuroscientific background of decision-making (e.g., Sterman & Dogan 2015), the brain itself remains yet to be studied in the context. As for research in social cognition, the neural basis of individual behavior has been addressed as a significant element of decision-making (Fiske & Taylor 2013; Augoustinos et al. 2014).

Several psychological characteristics of individuals related to SCM decision-making were identified to answer RQ1. The answer, naturally, is not all-

encompassing as the scope of empirical inquiry was limited by the scope of the original publications. In this regard, social psychological approaches in general and the social cognitive perspective in particular could be applied to deepen the understanding related to other psychological characteristics here left outside explicit consideration. Research efforts could still be directed at topics such as the significance of implicit social cognition and intuition as drivers of managerial decision-making (see Marquardt & Hoeger 2009; Carter et al. 2017) as well as the role of emotion besides cognition (see Urda & Loch 2013). Regarding RQ2, researchers could look at ways to use digital technology to augment the human decision-maker as suggested by Hoberg et al. (2020) while considering the techniques to enhance decision-making proposed here.

The role of the social agent in SCM could be also examined with approaches concerned with the subjective end of the objective–subjective dimension proposed by Burrell and Morgan (1979). For example, Touboulic et al. (2020) recommend the use of critical engaged research for theory building and testing in the field. Hardy et al. (2020), in turn, proposed the use of discourse analysis to study the meaning embedded in organizational decision-making and to render visible the role of individual agents throughout the supply chain.

The focus could then be steered from the individual to the behavior of group actors. Schorsch et al. (2017) noted a relative negligence of the group level in BSCM research, although decision-making in groups of social actors is common in the business context. It should be examined in future research, in more detail, how the identified psychological characteristics of individuals contribute to group dynamics and behavior. Furthermore, researchers should address the psychological characteristics with regard to different topics, as the requirements and the organizational capacity to meet them may differ between tasks (e.g., Manuj & Sahin 2011; Jia et al. 2020).

Some further limitations of the research are related to the data employed. Although the data from the European companies and individuals in general—and Finnish companies in particular—provides comprehensive insight into SCM decision-making, the findings of the research are based on limited samples and choices regarding the operationalization of the studied constructs. Accordingly, future research could focus on broadening the scope besides, for example, the industries focused on in this research (i.e., Finnish trading and manufacturing); the types of companies studied (publicly listed vs. private); and the outcomes of decision-making addressed (e.g., to other types of organizational performance). The generalizability of the findings of this research to a broader population is, however, supported by the fact that the psychological characteristics and mechanisms assessed here are assumed to be closely related to human nature and are, thus, arguably of a quite universal nature.

Finally, research designs could be adapted for further empirical tests of causal relationships among the variables studied in this thesis. Particularly, behavioral laboratory experiments have been proposed to be valuable to BSCM for verifying theories together with other research methods (Siemsen 2011). The logic model in **Figure 10**, for instance, could inspire researchers to look around for relationships of interest for further empirical assessment.

Abbreviations

AVE	Average variance extracted
BSCM	Behavioral supply chain management
CCA	Core competence approach
CFA	Confirmatory factor analysis
CR	Construct reliability
DCA	Dynamic capabilities approach
EFA	Exploratory factor analysis
ESS	European Social Survey
FSoL	Finland State of Logistics (survey)
HTMT	Heterotrait-monotrait
LPA	Latent profile analysis
MLPA	Multilevel latent profile analysis
OLS	Ordinary least squares
PLS-SEM	Partial least squares structural equation modelling
SCM	Supply chain management
SEM	Structural equation modeling
SIT	Social identity theory
TBL	Triple bottom line
TCE	Transaction cost economics
TPB	Theory of planned behavior
TRA	Theory of reasoned action
TSR	Total shareholder return
VBN	Value-belief-norm

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Appendices

Appendix 1. The empirically addressed measurement items in the original publications

<u>ARTICLE 1</u>	<u>Mean</u>	<u>Std. dev.</u>
<u>Assess the following statements regarding the decision to outsource logistics (0-5):</u>		
POSITIVE ATTITUDE TOWARD OUTSOURCING LOGISTICS FUNCTIONS		
Outsourcing provides an attractive alternative to in-house logistics	3.42	1.10
Logistics outsourcing is in general a good idea	3.50	1.05
The benefits of outsourcing logistics functions provides our organization with added value	3.32	1.07
Overall, the outsourcing of logistics functions provides our organization with added value	3.20	1.18
ENCOURAGING SUBJECTIVE NORM IN OUTSOURCING LOGISTICS FUNCTIONS		
Those who influence my decisions think that I should outsource logistics further	2.85	0.96
Those who are important to me think that I should outsource logistics further	2.77	1.00
Most people like me would outsource logistics functions	3.41	1.01
Most people whose opinions I value would approve of me deciding to outsource logistics	3.16	1.05
COMPETENCE IN OUTSOURCING LOGISTICS FUNCTIONS		
I have the needed abilities to outsource logistics	3.74	0.95
I have control over the decision to outsource logistics functions in my company	4.35	0.92
I can identify the needed abilities to outsource logistics	3.75	1.09
I am able to detect supplier alternatives for logistics outsourcing	4.35	0.98
THE PERCEIVED SPECIFICITY OF LOGISTICS		
Our company has a logistics infrastructure, which is very specific compared to other companies	2.74	1.10
Our company has logistics activities that are tailored and very characteristic to it	3.62	1.17
Our company has invested a lot into logistics	2.76	1.16
The way we do logistics in our company would be challenging to implement into responding the needs of some other company	2.90	1.07
THE STRATEGIC IMPORTANCE OF LOGISTICS		
Logistics has major impact on our profitability	4.28	0.95
Logistics has a major impact on our customer-service level	4.65	0.79
Logistics is a key source of competitive advantage for our firm	3.79	1.07
Logistics know-how is important for our firm	4.38	0.85

INTENTION TO OUTSOURCE LOGISTICS

Given that I have access to an outsourcing service provider for logistics I predict that I would use them increasingly	3.34	1.03
Assuming I have an outsourcing service provider for logistics, I intend to use them increasingly in the future	3.52	0.95
I intend to increase my usage of logistics outsourcing in the future	3.13	1.06
I support further outsourcing of logistics functions	3.21	1.09

Estimate how many percent of the following logistics activities is handled by an external service provider in your company right now (0-100%, converted into 0-5 scale):

THE LEVEL OF OUTSOURCED LOGISTICS

Domestic transportation	4.68	0.83
International transportation		
Storing and storage handling	1.52	0.97
Forwarding		
Order handling	2.53	0.94
Invoicing		
Logistics data systems		
Reverse logistics	2.84	1.13
Value-added services such as finishing or tailoring products		

ARTICLE II

Average of responses on items below on a scale from 1 to 5:

CORPORATE ENVIRONMENTAL PERFORMANCE

Carbon dioxide emissions considering the volume of production have decreased	3.88	0.79
Waste considering the volume of production/sales ²⁾ has decreased	3.89	0.73
Energy consumption considering the volume of production/sales has decreased	4.00	0.83
Water consumption considering the volume of production has decreased	3.69	0.74
Consumption for hazardous materials considering the volume of production has decreased	3.96	0.76
Compared to our competitors, we have been a forerunner in environmental issues	3.43	0.77

EXPLOITATIVE ORIENTATION IN LOGISTICS

Continuous increasing of performance is the foundation of our logistics performance	3.82	0.96
We continuously better the technologies and systems already in use in our logistics	3.42	0.99
We actively develop the processes and practices in use to achieve increased logistics performance	3.84	0.88
Identifying and removing inefficient practices is an essential function of developing our logistics	3.83	0.96

EXPLORATIVE ORIENTATION IN LOGISTICS

Utilizing new and innovative practices is the foundation of our logistics performance	3.38	0.96
We continuously explore new ideas and practices to better our logistics performance	3.36	1.00

We often produce creative ideas that challenge the customary practices in our logistics	3.15	0.94
We actively utilize new technologies and systems in our logistics	3.03	0.94

Average of industry percentile ranks in sample in t₁ (2014–2015) or t₃ (2017–2018).

scale from 0 to 1:

RETURN ON ASSETS

Return on assets, t1	0.59	0.19
Return on assets, t3	0.59	0.17

GEARING

Gearing, t1	0.66	0.18
Gearing, t3	0.63	0.19

QUICK RATIO

Quick ratio, t1	0.47	0.18
Quick ratio, t3	0.44	0.18

ARTICLE III

Respondents evaluate their similarity to a person described with attributes below. A six-point scale from 'very much like me'(=1) to 'not like me at all'(=6) is used:

BENEVOLENCE + UNIVERSALISM

Important to help people and care for others' well-being	2.20	1.01
Important to be loyal to friends and devote to people close	1.96	0.95
Important that people are treated equally and have equal opportunities	2.18	1.08
Important to understand different people	2.38	1.08
Important to care for nature and environment	2.18	1.05

SELF-DIRECTION

Important to think new ideas and being creative	2.59	1.26
Important to make own decisions and be free	2.18	1.10

STIMULATION

Important to try new and different things in life	3.01	1.36
Important to seek adventures and have an exciting life	3.85	1.45

HEDONISM

Important to have a good time	2.92	1.33
Important to seek fun and things that give pleasure	3.00	1.34

ACHIEVEMENT + POWER

Important to show abilities and be admired	3.23	1.40
Important to be successful and that people recognize achievements	3.19	1.37
Important to be rich, have money and expensive things	4.11	1.34
Important to get respect from others	3.17	1.37

SECURITY

Important to live in secure and safe surroundings	2.37	1.23
Important that government is strong and ensures safety	2.34	1.20

CONFORMITY + TRADITION

Important to do what is told and follow rules	3.23	1.40
Important to behave properly	2.71	1.25
Important to follow traditions and customs	2.76	1.36
Important to be humble and modest, not draw attention	2.65	1.22

Respondents evaluate the validity of claims related to themes below:

CLIMATE CHANGE BELIEFS

Do you think world's climate is changing (scale 1–4; 1='Definitely changing')		
Climate change caused by natural processes, human activity, or both (1–5; 1='Entirely by natural processes')	1.52	0.69
	3.84	4.74
Climate change good or bad impact across world (0–10; 0='Extremely bad')		
How worried about climate change (1–5; 1='Not at all worried')	3.26	2.20
To what extent feel personal responsibility to reduce climate change (0–10; 0='Not at all')	3.01	0.94
	5.58	2.73
How much thought about climate change before today (1–5; 1='Not at all')	2.10	1.25

Percentile rank from 1 to 99 as compared to industry group per Thomson Reuters Industry Classification:

RESOURCE USE SCORE (ENVIRONMENTAL PERFORMANCE)

"The Resource Use Score reflects a company's performance and capacity to reduce the use of materials, energy or water, and to find more eco-efficient solutions by improving supply chain management."	67.10	24.83
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EMISSIONS REDUCTION SCORE (ENVIRONMENTAL PERFORMANCE)

"The Emission Reduction Score measures a company's commitment and effectiveness towards reducing environmental emissions in the production and operational processes."	66.39	25.44
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INNOVATION SCORE (ENVIRONMENTAL PERFORMANCE)

"The Innovation Score reflects a company's capacity to reduce the environmental costs and burdens for its customers, thereby creating new market opportunities through new environmental technologies and processes or eco-designed products."	60.02	25.75
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TOTAL ENVIRONMENTAL SCORE (ENVIRONMENTAL PERFORMANCE)

Sum of resource use, emissions reduction and innovation scores, each weighted by the category's industry group specific value	64.56	20.58
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TOTAL SHAREHOLDER RETURN (FINANCIAL PERFORMANCE)

(Capital Gains + Dividends) / Purchase Price	0.09	0.46
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SHARE OF FOREIGN SALES

International Sales / Net Sales or Revenues * 100	49.31	38.82
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FIRM SIZE

ln(Total Assets)	15.56	1.84
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COUNTRY-LEVEL ENVIRONMENTAL PERFORMANCE INDEX

0 for worse performance than economic peers, 1 for better performance than peers	0.76	0.43
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ISBN 978-951-29-9104-4 (PRINT)
ISBN 978-951-29-9105-1 (PDF)
ISSN 2343-3159 (Print)
ISSN 2343-3167 (Online)