

SAMI RUSTHOLLKARHU

Paradigm of Value Cocreation and Artificial Intelligence

Exploring constitutive themes of agency,
resources, and interaction

SAMI RUSTHOLLKARHU

Paradigm of Value Cocreation
and Artificial Intelligence

Exploring constitutive themes of agency,
resources, and interaction

ACADEMIC DISSERTATION

To be presented, with the permission of
the Faculty of Management and Business
of Tampere University,
for public discussion in the auditorium S2
of the Sähköitalo, Korkeakoulunkatu 3, Tampere,
on 18 December 2023, at 12 o'clock.

ACADEMIC DISSERTATION
Tampere University, Faculty of Management and Business
Finland

*Responsible
supervisor
and Custos*

Professor
Leena Aarikka-Stenroos
Tampere University
Finland

Supervisor

Professor
Marko Seppänen
Tampere University
Finland

Pre-examiners

Assistant Professor
Kaisa Koskela-Huotari
Stockholm School of Economics
Sweden

Professor
Karl Breunig
Oslo Metropolitan University
Norway

Opponent

Postdoctoral Researcher
Valtteri Kaartemo
University of Turku
Finland

The originality of this thesis has been checked using the Turnitin OriginalityCheck service.

Copyright ©2023 author

Cover design: Roihu Inc.

ISBN 978-952-03-3199-3 (print)

ISBN 978-952-03-3200-6 (pdf)

ISSN 2489-9860 (print)

ISSN 2490-0028 (pdf)

<http://urn.fi/URN:ISBN:978-952-03-3200-6>



Carbon dioxide emissions from printing Tampere University dissertations have been compensated.

PunaMusta Oy – Yliopistopaino
Joensuu 2023

PREFACE

While the cover of this dissertation carries my name, the academic work is not an individual endeavor. During the time I have spent with research, I have been blessed with the possibility to work with exceptional people whose passion and dedication have inspired me further. While working in academia might not always be easy, I have never felt alone.

I would like to thank my supervisors Professors Leena Aarikka-Stenroos and Marko Seppänen. Thank you, Leena, for welcoming me to the academic community and inspiring me during my first steps as a doctoral researcher. Your dedication to research and unwavering support for your doctoral students have time and time again provided me with the necessary inspiration and gentle push to continue the work materialising in these pages. I'm thankful for the countless learnings you have shared with me during this process and your patience in times when I might not have been the most receptive to those learnings. Marko, your insights and words of encouragement became immensely valuable especially when finalising the synopsis part of the thesis. Sometimes nothing else is needed than encouragement to hold on to the direction. Looking back over these years, I could not have hoped for any other supervisors.

Thank you, Post-Doctoral Researcher Valtteri Kaartemo, for accepting the task of acting as the opponent of the dissertation. I would also like to express my gratitude to Assistant Professor Kaisa Koskela-Huotari from the Stockholm School of Economics and Professor Karl Breunig from Oslo Metropolitan University. Your precise, concrete, and well-argued observations during the pre-examination provided me with the necessary insights to make the final amendments to this dissertation. I would also like to thank Professor Miia Martinsuo, Associate Professor Henri Pirkkalainen, and Senior Research Fellow Jaakko Siltaloppi for your dedication in reviewing my work and providing insightful comments.

The first step, far before starting this dissertation was curiosity. Dr. Kari Lohivesi, your engaging lectures, thought-provoking case exercises, and countless insightful discussions, evoked my curiosity. While this curiosity may not be satisfied in the

pages of this dissertation, I will be ever thankful for the never-ending inspiration to search.

I'm grateful for all the exceptional people I have had the possibility to meet during inspiring work on multiple research projects. My work has been supported by Business Finland through research project ROBINS (document numbers 7885/31/2018 and 7802/31/2018), the European Regional Development Fund through the project '6Aika: ILPO – Climate Positive Business Parks and Value Chains' (grant ID A75909), by the Strategic Research Council, Academy of Finland through projects 'Circular Economy Catalysts: From Innovation to Business Ecosystems (CICAT2025)' (grant IDs 320194 and 346626), and 'Sustainable Industry Ecosystems' (SIE) (grant ID 337722), by the European Union's Horizon 2020 research and innovation program through project 'AI-REGIO' (grant ID 952003), by the Foundation for Economic Education through the project 'TIKKAUS' (grant ID 22-12719) and by Tampere University doctoral school funding. Especially I'm thankful to the ROBINS project for providing me with the possibility to take my first steps as a doctoral researcher. Thank you Dr. Pia Hautamäki and Dr. Malla Mattila for creating an inspiring and, especially energetic environment, and Dr. Sini Jokiniemi, Dr. Tommi Mahlamäki, Dr. Marjukka Mikkonen, Dr. Mika Yrjölä, Miina Kivelä, Minna Heikinheimo, and Sebastian Toukola, for all the inspiring discussions shared during the project.

I also wish to thank my fellow doctoral students and colleagues in the IEM unit, and CITER's team for creating an inspiring work environment. Thank you, Anil, Arttu, Deborah, Emma, Fatemeh, Jenni, Johanna, Jussi, Lauri L., Linnea, Laura, Mari, Matias, Mikko, Mirva, Olumide, Olga, Prabhat, Topi, Ulla, Valteri, Veera, Viivi and all the others I have had the possibility to share ideas with. Especially, I would like to thank "ILPO posse": Eeva, Jarmo, and Lauri A. for the possibility of joining your journey in unraveling the nature of "DNA". Furthermore, rare are those people who can bear my way of "examining the world" multiple hours on end. Thank you, Jarmo for all the reflections, insights, and ideas which we hopefully share many more.

Finally, my heartfelt gratitude extends to my family and friends for all their support. Especially my partner, Jenny, you have witnessed both the moments of inspiration and desperation. Against all odds, you have somehow managed to keep me sane during both. Thank you for being the unsung hero of this dissertation.

Ylöjärvi, 5 November 2023

Sami Rusthollkarhu

ABSTRACT

Understanding value creation, defined as practices through which entities contribute to emergence of positive or negative preference experiences, has remained the central aim for marketing and business scholars for several decades. This pursuit is driven by the continuous emergence and implementation of new technologies affecting practices through which value is created. Among the existing technologies, the development and implementation of those that demonstrate intelligence by mimicking human behaviour or by acting or reasoning rationally (i.e., artificial intelligence [AI]) are suggested to constitute profound transformation in not only how value is created in the marketing and business context but also the paradigmatic ideas behind value and its creation. Thus, this dissertation explores the ramifications of AI on how value creation is understood in the marketing and business literature.

Regarding how value creation is understood, this dissertation refers to paradigmatic preconditions that guide thinking when researchers form theoretical arguments on value creation-related concepts. This dissertation focuses on the paradigm of value cocreation that has gained increasing traction during the last 30 years, reaching a widely acknowledged status within marketing and business thought related to value creation. The value cocreation paradigm posits that value is experiential and emerges through practice rather than being embedded in matter. Thus, the creation of value does not follow the roles of the producer as value creator and the customer as value consumer. Instead, value is created by multiple entities; each introducing their time and other resources to the practice of value creation. While the vast number of preceding studies have recognized the transforming role of AI in the practices of value creation, no examination of ramifications on AI to paradigmatic ideas of value cocreation has been considered.

Although value cocreation can be identified as a distinctive approach in the literature on value creation, affording the label of paradigm, value cocreation perspectives are not unified. Instead, the paradigmatic idea of cocreation is a set of weakly tied ideas among different schools of thought within marketing and strategic business management. Thus, to examine the ramifications of AI to the paradigm of value cocreation, the dissertation first identifies constitutive themes that exhibit cross-field relevance in the literature on value cocreation. Besides identifying

constitutive themes, the dissertation discerns divergent approaches within these themes, thereby revealing areas of disagreement in the literature. Constitutive themes and divergent approaches are identified by relating theoretical statements to one another in the process of problematisation. These theoretical findings are then related to empirical observations on AI in the value creation practices of companies through the abductive process.

The dissertation identified three themes that the literature on value cocreation considers constitutive: agency, resources, and interaction. Within these themes, the dissertation identified three diverging approaches toward agency and two towards resources. The agency was approached either through actor-based, institutional or relational views. Actor-based approaches consider actors as basic abstractions for the emergence of action in value creation. According to this view, actors have dispositions that allow them to act and, thus, participate in value creation. This results in heterogenous relations emerging from actors interacting. Institutional approaches also consider agency through the abstraction of the actor but highlight that actors' actions are enabled and constrained by social institutions. Relational views do not consider actors to precede actions but consider the emergence of action inseparable from heterogeneous relations that constitute the acting entities. The dissertation found resources to be approached either as essentialists or nonessentialist. Essentialist approaches consider resources to have inherent properties that allow them to be used in value creation. Nonessentialist approaches regard resources as practical outcomes of their context. The current dissertation did not identify any diverging approaches towards interaction in the value cocreation literature. Literature implicitly agreed with the conceptualisation that interaction is considered a relation—or the formation of one—in which entities have some effect on each other.

Empirical findings supported relational agency approaches and nonessentialist resource approaches. From the perspective of agency, the dissertation did not observe AI as an identifiable entity. Instead, AI became through the heterogenous relations consisting of data, AI method, as well as human and other than human entities. From the perspective of resources, AI was found to affect the applicability of resources (both material and nonmaterial), already recognized by organizations. Furthermore, AI “created” new resources as data became a resource enabling the AI to act or reason. In terms of interaction, AI was found to guide the content and ways of human actors interacted in value creation. However, this was not considered to have implications on how value cocreation literature conceptualises interaction.

To summarise, the findings emphasise that AI does not exist outside the relations between the AI method, data, and other entities interacting with AI. Instead, the above-mentioned relations became resources that allowed the AI to act or reason as it did in the relations in which AI was used in a value-creating manner. Thus, each relation came to play the role of resource, simultaneously constituting the AI as “an actor”. The dissertation summarises the above findings with a concluding proposition: In value creation, actors emerge as resources become, which can be empirically tested by examining other types of entities/actors than AI.

This dissertation contributes to the discussion on value cocreation. The findings contradict the ontological grounds of actor-based agency approaches and essentialist resource approaches. They question common perception, that entities (human and nonhuman) participating in value creation act based on inherent dispositions. Thus, the concluding proposition of the dissertation offers an ontological option for actor-based approaches towards value creation–related phenomena, allowing future research to structuring hypotheses on phenomena previously unknown.

TIIVISTELMÄ

Uusien teknologioiden kehittäminen ja implementointi yritysten käytänteisiin muuttaa arvonluonnin mekanismeja. Tämä on pitänyt arvon ja arvonluonnin keskeisinä käsitteinä markkinoinnin ja liiketoiminnan tutkimukselle jo useiden vuosikymmenten ajan. Tällä hetkellä, erityisesti tekoälyteknologioiden, jotka kykenevät demonstroimaan älyä joko jäljittelemällä ihmistä tai toimimalla tai ajatteleamalla rationaalisesti, odotetaan mullistavan arvonluonnin käytänteet. Muutokset arvonluonnin käytänteissä muokkaavat myös tapaamme ymmärtää ja lähestyä arvoa ja sen luontia. Tämä väitöskirja keskittyy tarkastelemaan millaisia muutospaineita tekoäly aiheuttaa tavoillemme ymmärtää arvon luontia.

Tavoilla ymmärtää arvonluontia väitöskirja viittaa paradigmaattisiin oletuksiin, jotka ohjaavat tutkijoiden tapaa asettaa teoreettisia argumentteja arvonluonnista. Väitöskirja keskittyy tarkastelemaan arvon yhteisluonnin paradigmaa, joka on viimeisen 30 vuoden aikana noussut merkittävään asemaan markkinoinnin ja liiketoiminnan tutkimuksessa. Arvon yhteisluonnin paradigman mukaan arvo ei sitoudu materiaalsiin tuotteisiin, vaan syntyy käytänteissä. Lisäksi paradigma argumentoi, että näihin käytänteisiin osallistuu aina useampia entiteettejä, joita ei voi ymmärtää perinteisen toimittaja-asiakas-dyadin kautta. Vaikka tekoälyn vaikutukset arvonluonnin käytänteisiin on tunnistettu jo lukuisissa tutkimuksissa, tekoälyä ei ole tarkasteltu arvon yhteisluonnin paradigmaattisten taustaoletusten näkökulmasta.

Vaikka arvon yhteisluonti on tunnistettava paradigma, se ei muodostu yhtenäisesti, vaan sisältää lukuisia, vain osittain yhtenäisiä, äänenpainoja markkinoinnin ja liiketoimintakirjallisuuden sisällä. Siksi, ymmärtääkseen tekoälyn mahdollisia muutospaineita arvon yhteisluonnin taustalla oleville paradigmaattisille ajatuksille, väitöskirjan tulee ensin ymmärtää näitä ajatuksia.

Arvon yhteisluonnin kirjallisuutta problematisoimalla väitöskirja tunnistaa kolme olennaista, kirjallisuutta yhdistävää käsitteellistä teemaa, joiden kautta arvonluontia ymmärretään: toimijuus, resurssit ja vuorovaikutus. Yhdistävien teemojen lisäksi, väitöskirja identifioi teemojen sisäisiä näkemyseroja. Arvon yhteisluonnin kirjallisuus käsittelee toimijuutta joko toimijakeskeisellä, institutionaalisella, tai relationaalisella tavalla. Toimijakeskeinen näkemys korostaa toimijaa toiminnan synnyttämisen käsitteellisenä tasona. Tämän näkemyksen mukaan toiminta syntyy toimijoista, joilla

on ominaisuuksia ja kyvykkyyksiä, jotka sallivat toimijoiden osallistumisen arvonluontiin. Samoin kuin toimijakeskeiset näkemykset, myös institutionaalinen lähestymistapa käsitteellistää toimijuuden toimija-käsitteen kautta. Toimijakeskeisestä näkemyksestä eroten institutionaalinen näkemys kuitenkin korostaa kulttuuriskognitiivisia sääntöjä, normeja, ja uskomuksia toiminnan mahdollistajina ja rajaajina. Relationaaliset näkemykset eivät näe toimijoita toiminnan määrittäjinä, vaan lähestyvät toimintaa vuorovaikutuksessa syntyvien heterogeenisten suhteiden kautta, jotka määrittävät sekä entiteetit, jotka osallistuvat toimintaan, että toiminnan.

Erilaisia resurssinäkemyksiä väitöskirja tunnisti kaksi; essentialistisen ja dynaamisen resurssinäkemyksen. Essentialistisen resurssinäkemyksen mukaan resursseilla on luontainen olemus, joka mahdollistaa niiden käyttämisen arvonluonnissa. Dynaamisen resurssinäkemyksen mukaan resurssit syntyvät kontekstinsa tuotteina, niillä ei ole sisäsyntyisiä ominaisuuksia, vaan resurssit tulevat resursseiksi siinä kontekstissa, joka sallii niiden käyttämisen arvonluonnissa. Vuorovaikutus oli ainoa kolmesta tunnistetusta olennaisesta teemasta, jonka sisältä ei löytynyt eroavia näkemyksiä. Arvon yhteisluonnin kirjallisuus näki vuorovaikutuksen relaationa, tai sellaisen muodostamisena, jonka entiteeteillä on jonkinlainen vaikutus toisiinsa.

Väitöskirja tarkasteli empiirisesti arvonluonnin tilanteita B2B myynnissä ja kiertotaloudessa, joihin tekoäly osallistui, sekä vertasi tehtyjä havaintoja kirjallisuudesta tunnistettuihin käsitteellisiin teemoihin abduktiivisen prosessin kautta. Väitöskirjan empiiriset löydökset tukevat relationaalista toimijuusnäkemystä sekä dynaamista resurssinäkemystä. Toimijuuden näkökulmasta väitöskirja havaitsi tekoälyn muodostuvan datan, algoritmin, dataa varastoivien ja integroivien teknologioiden sekä ihmisten välisistä heterogeenisistä suhteista. Resurssien näkökulmasta tekoälyn havaittiin parantavan jo tunnistettujen resurssien käytettävyyttä vaikuttamalla kontekstiin, jossa resursseja hyödynnetään (esimerkiksi ennustamalla tilannetta, jolloin kyseistä resurssia tarvitaan). Lisäksi väitöskirja havaitsi tekoälyn luovan uusia resursseja. Esimerkiksi datasta tuli resurssi tekoälyn toiminnalle. Väitöskirja havaitsi tekoälyn vaikuttavan vuorovaikutukseen arvonluonnissa ohjaamalla vuorovaikutuksen tapoja ja sisältöä sekä tarjoamalla tapoja vuorovaikutuksen analysointiin.

Väitöskirja summaa löydöksensä esittämällä, että tekoälyä voi arvonluonnissa kuvata verkoston käsitteellä. Tekoäly muodostui heterogeenisistä suhteista data lähteiden, datan, tekoälymenetelmän, rajapintojen, jne. välillä. Suhteet, jotka muodostavat tekoälyn verkostona tulevat samalla resursseiksi, jotka mahdollistavat tekoälyn toiminnan.

Väitöskirja osoittaa kontribuutionsa arvon yhteisluonnin kirjallisuuteen. Tekoälyn pohjalta tehdyt löydökset ehdottavat aiemmin havaitsematonta suhdetta resurssien ja arvonluontiin osallistuvien entiteettien välille. Sen sijaan, että entiteettien joukossa olisi toimijoita, jotka edeltäisivät resursseja omaamalla kykyjä toimia ja synnyttää tai löytää resursseja, sekä entiteetit, jotka toimivat, että resurssit, joita entiteetit käyttävät määrittävät toisensa arvonluonnin prosessissa. Väitöskirjan propositio ilmiöllistää toimijat ja resurssit osaksi arvonluontia avaten aiemmat taustaoletukset empiiriselle tarkastelulle.

CONTENTS

| | | |
|-------|---|----|
| 1 | Introduction | 1 |
| 1.1 | Rationale for studying value creation and AI..... | 1 |
| 1.2 | Defining positioning, concepts and gaps in existing knowledge | 3 |
| 1.3 | Research questions and appended articles..... | 10 |
| 1.4 | Structure of the synopsis | 14 |
| 2 | Value cocreation paradigm and AI in value creation | 16 |
| 2.1 | Paradigm of value cocreation..... | 16 |
| 2.2 | AI in value creation | 19 |
| 2.2.1 | Machine learning as a technological basis for modern AI | 20 |
| 2.2.2 | Applications of AI in value creation | 21 |
| 3 | Methodology | 23 |
| 3.1 | Research design for theory advancement | 23 |
| 3.1.1 | Critical realist worldview in understanding the relation of observation and reality through qualitative data in value creation..... | 26 |
| 3.1.2 | Problematisation..... | 28 |
| 3.1.3 | Abduction..... | 32 |
| 3.2 | Research contexts and data gathering | 33 |
| 3.2.1 | Knowledge-intensive and digital B2B sales as a context for value creation and AI..... | 34 |
| 3.2.2 | Circular economy business as a context for value creation and AI | 35 |
| 3.3 | Empirical data and its analysis | 36 |
| 3.4 | Assessing the quality of the research | 40 |
| 4 | Problematising constitutive themes for value cocreation..... | 43 |
| 4.1 | Identifying the constitutive themes for value cocreation..... | 45 |
| 4.1.1 | Constitutive themes of agency and interaction | 45 |
| 4.1.2 | Resources..... | 47 |
| 4.2 | Reflecting the identified themes back to the literature on value cocreation..... | 48 |
| 4.2.1 | Constitutive theme of agency in value cocreation | 49 |
| 4.2.2 | Constitutive theme of resources in value cocreation | 52 |
| 4.2.3 | Constitutive theme of interaction in value cocreation | 53 |

| | | |
|-------|---|----|
| 5 | Interplay of AI and empirical world counterparts of constitutive themes of value cocreation | 55 |
| 5.1 | AI and agency in value creation..... | 58 |
| 5.1.1 | AI and human entities | 58 |
| 5.1.2 | AI and technologies for data gathering and integration | 60 |
| 5.2 | AI and resources in value creation | 62 |
| 5.3 | AI and interaction in value creation..... | 63 |
| 6 | Discussion..... | 66 |
| 6.1 | Findings from the perspective of the value cocreation paradigm..... | 66 |
| 6.2 | Findings from the perspective of AI in value creation..... | 71 |
| 7 | Conclusions | 74 |
| 7.1 | Theoretical contributions..... | 74 |
| 7.2 | Managerial implications..... | 77 |
| 7.3 | Limitations and avenues for future research | 79 |
| 8 | References..... | 83 |

ORIGINAL PUBLICATIONS

- Article I Rusthollkarhu, S., Hautamäki, P., & Aarikka-Stenroos, L. (2021). Value (co-)creation in B2B sales ecosystems. *Journal of Business and Industrial Marketing*, 36(4), 590–598. <https://doi.org/10.1108/JBIM-03-2020-0130>
- Article II Rusthollkarhu, S., & Uusikartano, J. (2021). Materials to resources – Innovating economic agency in a circular economy. *ISPIM Conference proceedings*.
- Article III Rusthollkarhu, S., Ranta, V., & Aarikka-Stenroos, L. (2021). How digital technologies boost value potential creation and value realisation in CE: Insights from a multiple case study across industries. In S. Jakobsen, T. Lauvås, F. Quatraro, E. Rasmussen, & M. Steinmo (Eds.), *Research handbook of innovation for a circular economy* (pp. 236–250). Edward Elgar.
- Article IV Rusthollkarhu, S., Toukola, S., Aarikka-Stenroos, L., & Mahlamäki, T. (2022). Managing B2B customer journeys in digital era: Four management activities with artificial intelligence-empowered tools. *Industrial Marketing Management*, 104(July 2022), 241–257.
- Article V Rusthollkarhu, S., Mattila, M., Aarikka-Stenroos, L., & Yrjölä, M., (2023). How AI augments value creation: Towards a model of human–AI cooperation in services research. In S. Scupola, A. H. Henten, & L. Fuglsang (Eds.), *Handbook of artificial intelligence and services*. Edward Elgar. [Manuscript accepted for publication]

AUTHOR'S CONTRIBUTION TO THE COAUTHORED PUBLICATIONS

For article I, the thesis author designed the conceptual idea, structured the article, did most of the writing for the original draft and revised version, and acted as a corresponding author during the process. Data for illustrative examples were gathered by the thesis author and Hautamäki, who also assisted by writing examples. Conclusions, practical implications, and future research agendas were jointly discussed with the co-authors before being written by the thesis author with the support of Hautamäki, who also assisted in writing the theory part on Business-to-business (B2B) sales. Aarikka-Stenroos provided comments on the draft, which were then implemented by the thesis author with the support of Hautamäki. Feedback from the reviewers was jointly considered with the co-authors. During the review

process, revisions were developed and implemented primarily by the thesis author with support from the co-authors.

For article II, the initial conceptual idea, and structure for the article was developed by the thesis author. The thesis author was responsible for writing the sections considering the work of institutional economists and marketing scholars and integrated them with the sections on material agency and illustrative case, written by Uusikartano. The theoretical synthesis was discussed together with Uusikartano and written in collaborative manner by both authors. The thesis author acted as the corresponding author and responded to the seminar presentation of the article. Article II may be used in Uusikartano's doctoral thesis.

For article III, the research design and idea for article were developed together with authors. Thesis author developed the theoretical framing, and structure for the article, analyzed the data as well as carried most of the writing for the original draft and revised version. Data gathering and preliminary analysis were conducted by research assistants. The writing was supported by Ranta (the theory section describing value potential in circular economy [CE] and Aarikka-Stenroos [in the methodology]). The results, practical implications, and theoretical contributions were discussed with the coauthors and then written by the thesis author. Based on supervising comments by Aarikka-Stenroos initial draft, as well as the revised version was further developed by the thesis author, with support from Ranta.

For article IV, the thesis author developed the research aim and design, designed the structure for the article, as well as did most of the writing for the original draft and revised version. The thesis author conducted the literature review and analysis, with the help of a research assistant, who contributed by identifying the relevant literature. The thesis author integrated a questionnaire study (conducted by Toukola and Mahlamäki) and an analysis of digital tools (conducted by Toukola with the assistance of the thesis author) into the research design. Discussion section of the paper, practical implications, and theoretical contributions were discussed jointly among coauthors. The first draft was mainly written by the thesis author with the support of the coauthors (Toukola supported in writing methodology, results considering digital tools as well as discussion. Mahlamäki, and Aarikka-Stenroos assisted in writing methodology). The thesis author implemented comments by Aarikka-Stenroos and Mahlamäki with the support of Toukola on the original draft and revised versions. Feedback from the reviewers was jointly considered with the coauthors. During the review process, revisions were developed and implemented primarily by the thesis author with support from the coauthors. Article IV may be used in Toukola's doctoral thesis.

For article V, the thesis author was responsible for developing the research aim and design, as well as the structure for the article, and carried out most of the writing of the initial draft and revised version. Furthermore, the thesis author integrated the capability approach, written by Yrjölä into the theory section of the article, which was otherwise written by the thesis author with Mattila supporting by editing the sections on artificial intelligence and value creation in knowledge-intensive business services. Research data utilized in the article were generated as part of Business Finland funded ROBINS research project (2019–2022), which focused on business-to-business sales in the digital era and was led by Mattila (ROBINS TAU, document number 7885/31/2018) and Hautamäki (ROBINS TAMK, document number 7802/31/2018). 14 interviews were conducted together with Mattila, Hautamäki and other project researchers, three by the thesis author together with one project researcher, and five by Mattila together with other project researchers. Data analysis was conducted by the thesis author with the help of Mattila. Findings were discussed by co-authors, and identified development ideas for the article were implemented by the thesis author with the help of Mattila and Yrjölä. Aarikka-Stenroos provided supervisor comments on both the initial manuscript and the revised version. These comments were then implemented by the thesis author with the help of Mattila. The thesis author acted as the corresponding author of the article during the process.

1 INTRODUCTION

The present dissertation synthesises a theoretically scattered discussion on value cocreation and examines the theoretical ramifications artificial intelligence (AI) has on paradigmatic ideas this literature adopts (i.e., value cocreation paradigm). The dissertation is positioned at the intersection of value cocreation discussion in S-D logic, B2B marketing management and strategic business management, as well as AI discussion in business and marketing management. The dissertation contributes all the above-mentioned streams by proposing constitutive themes shared by cocreation scholars from different fields, examining the interplay of AI with empirical counterparts of the themes, and finally exploring the ramifications of AI to the paradigm of value cocreation. In other words, the aim of the present dissertation is not to examine whether and how AI creates value in particular real-world instances. Instead, the dissertation aims to examine whether we are provided conceptual tools that allow us to properly consider value creation when AI is involved in value creation processes.

1.1 Rationale for studying value creation and AI

Understanding value creation has been a central aim for marketing and business scholars for several decades. Value creation, defined as practices through which entities contribute to emergence of positive or negative preference experiences (adopted from Akaka et al., 2021; Holbrook, 2006), has remained a topical issue for research, particularly because of the changing technological landscape that is shifting the ways organisations and individuals operate in the market (Davenport et al., 2020; Kaartemo & Helkkula, 2018; Syam & Sharma, 2018; Vargo et al., 2015; Wieland et al., 2017). Thus, the emergence and implementation of new technologies have obliged business and marketing managers and scholars alike to stay alert to the ramifications of new technologies to value creation. Among these technologies, the development and implementation of those that demonstrate intelligence by mimicking human behaviour or by acting or reasoning rationally (i.e., artificial intelligence [AI]) are suggested to constitute profound transformation for ways value

is created (Gupta et al., 2017). With its ability to process vast amounts of data, uncover hidden patterns (Louridas & Ebert, 2016) and make intelligent decisions (Russell & Norvig, 2016), AI has already unlocked unprecedented opportunities across various domains. From the convenience of voice assistants like Siri and Alexa to the personalised recommendations of online shopping to the life-saving advancements in healthcare, AI has become an integral part of our daily routines, often without us even realising it. For companies participating in value creation, AI has enabled the robotisation of customer service (Wirtz et al., 2018), improved accuracy of demand forecasting (O'Neil et al., 2016; Yuan et al., 2014), provided applications for pricing (Ferreira, et al., 2018), and ways for gaining customer insights (Prasasti & Ohwada, 2014), as well as assisted individual experts within the organisations to excel in their work (Rusthollkarhu et al., 2022). Although the literature is full of examples on the use and anticipated upcoming use of AI, the ramifications of AI on the way value creation is understood and theorized has not been thoroughly considered.

The current dissertation considers value and its creation through the paradigm of cocreation. Regarding the cocreation paradigm, this dissertation refers to the theoretical understanding of value creation in marketing and strategic business management, which is differentiated from classical value-added thinking, in which value is seen to be embedded in matter, either as an inherent property or as created through manufacturing (Vargo & Lusch, 2004). This paradigmatic turn was articulated in a somewhat parallel manner in the literature of S-D logic, strategic business management and B2B marketing management. Although all the above streams converged towards the idea of departing value and materiality, each of the streams approached the topic from different conceptual lenses. The S-D logic literature argued for the paradigmatic shift from goods to services (e.g., Vargo & Lusch, 2004, 2008), strategic business management the shift from products to experiences (e.g., Prahalad & Ramaswamy, 2004) and B2B marketing management the shift from transactions to practices and processes (Aarikka-Stenroos & Jaakkola, 2012), which is also referred to a transition from value in exchange to value in use (Eggert et al., 2018).

With the divergence of value and materiality also became new approaches to the traditional dichotomy of providers as value creators and customers as value consumers. The divergence of value and materiality first emphasised the customer's role in value creation. When the locus of value creation is transitioned from materials to practices (which, however, can include material elements; Vargo & Lusch, 2004), customers can no longer be seen as passive receivers of value embedded in matter.

Instead, they become active creators participating practices by using products (Vargo & Lusch, 2004) or engaging in shared interactions (Grönroos & Voima, 2013; Prahalad & Ramaswamy, 2004) or processes (Aarikka-Stenroos & Jaakkola, 2012). Furthermore, value creation practices were recognised to include actors other than customers and providers. These included not only third-party organizations or industry experts (Hartmann et al., 2018), but also nonhuman actors, with the emphasis on technologic entities (Kaartemo & Helkkula, 2018; Storbacka et al., 2016; Vargo et al., 2022). Extending the theorisation of focal actors in value creation beyond customer and provider resulted in networked (e.g., Cova & Salle, 2008) and ecosystemic (e.g., Vargo & Lusch, 2016) approaches to actors, as well as, more generally, processual and relational approaches to consider how actions emerge in value creation (e.g., Ramaswamy & Ozcan, 2018).

The theoretical standings described above mark a paradigmatic turn in how value is understood in the fields of marketing and strategic business management. The current dissertation labels this paradigm as value cocreations and considers it as weakly tied statements that different schools of thought in the field of marketing and business research have taken over the past 20 years. Weakly tied means that although scholars from different areas of marketing and management partaking in a value cocreation discussion might recognise the work of each other (e.g., Ramaswamy, 2011) and although some explicit efforts to bring together insights from different approaches exist (Storbacka et al., 2016), the different tones of cocreation have dominantly remained inside of each respective domain of the literature. Nevertheless, affected by or totally untethered of the weak ties that cocreation scholars share, cocreation has developed towards the direction of agreeing on two paradigmatic ideas: 1) value is not embedded to matter, but emerges through practice, and 2) agency in value creation transcends the provider–customer actor divide. This vividly developing domain of the literature provides a theoretical landscape against which AI, in this dissertation, is related.

1.2 Defining positioning, concepts and gaps in existing knowledge

The present dissertation is positioned at the intersection of value cocreation discussion in the nexus of S-D logic (Vargo & Lusch, 2016), strategic business management (Prahalad & Ramaswamy, 2004) and B2B marketing management (Eggert et al., 2019) and AI discussion in business and marketing management (Davenport et al., 2020). Literature streams for value cocreation discussion are

selected because they are representative of shared conceptual ideas that mark paradigmatic change in understanding value and its creation. While explicit development of these ideas is dominantly conducted within these streams, during the last 30 years, they have been adopted by multiple schools of thought. Wide adoption of value cocreation (Galvagno & Dalli, 2014) has provided it with paradigmatic properties guiding the conceptualisation of value creation (e.g. in the fields of service science [Maglio et al., 2009], innovation management [Kurtmollaiev & Pedersen, 2022], and marketing management [Storbacka, et al., 2016]). Thus, the present dissertation considers value cocreation as a paradigm in the sense that it provides a set of fundamental ideas, language, and theories that inform value creation focused research inquiries in the field of marketing and management (Kuhn, 1970).

The present dissertation utilises AI discussion in business and marketing management to form an understanding of existing knowledge of AI in marketing and business management from the perspective of value creation. Table 1 elaborates on the concepts used in this dissertation. Table 1 defines the concepts in a manner that makes them compatible with the cocreation paradigm at large and the AI approach of this dissertation. Present dissertation further reflects these concepts in section 4 while proplematising underlying ideas of value cocreation in more detail.

Table 1. Concepts utilised in the dissertation

| Concept | Definition | References, streams of literature and related discussion | Role in this work |
|------------------|--|---|--|
| Value | Interactional, contextual, positive or negative preference experience | Concepts for value cocreation Adopted from consumer research (Holbrook, 2006) and S-D logic (Akaka et al., 2021) to emphasise systemic (interactional), emergent (contextual) and experiential (preference experience) nature of value, making the definition applicable to value cocreation literature at large | To define the phenomenon, advancing the theory of which creation is the aim of the dissertation |
| Value creation | Practices through which entities contribute to emergence of value | Derived from the definition of value in the paradigm of value cocreation (Aarikka-Stenroos & Jaakkola, 2012; Akaka et al., 2021; Eggert et al., 2019; Prahalad & Ramaswamy, 2004; Vargo & Lusch, 2004, 2016) | Umbrella concept for all practices through which entities participate in value creation. Empirically, dissertation focuses on instances in which this participation is intentional |
| Value cocreation | Theoretical approach to value creation that dictates that 1) value is not embedded to matter, but emerges through practice, and 2) agency in value creation transcends the provider–customer actor divide. Value and value creation are defined in a way that aligns with the cocreation approach. | The dissertation focuses on value cocreation discussion in S-D logic (Akaka et al., 2021; Vargo & Lusch, 2004, 2016), strategic business management (Prahalad & Ramaswamy, 2004) and B2B marketing management (Aarikka-Stenroos & Jaakkola, 2012; Eggert et al., 2019) but acknowledges and, on some occasions refers, to ideas aligning with value cocreation that are presented elsewhere (e.g., Holbrook, 2006). | Theoretical domain the dissertation positions itself and aims to develop. The value cocreation approach/literature/paradigm are also used to refer to this particular discussion to emphasise that value cocreation in present dissertation refers to underlying ideas rather than empirical event |

| Concept | Definition | References, streams of literature and related discussion | Role in this work |
|---------------------------------|--|--|--|
| Paradigm | A set of fundamental ideas, language, and theories that academic community knowingly or unknowingly utilizes to guide research inquiries | Adopted from Kuhn (1970) | Conceptualisation for value cocreation. Two guiding ideas 1) value is not embedded to matter, but emerges through practice, and 2) agency in value creation transcends the provider–customer actor divide of value cocreation, are considered to provide value cocreation paradigmatic role within marketing and business research |
| Processes for/of value creation | Essentially the same as value creation | Derived from the definition of value in the paradigm of value cocreation (Aarikka-Stenroos & Jaakkola, 2012; Akaka et al., 2021; Eggert et al., 2019; Prahalad & Ramaswamy, 2004; Vargo & Lusch, 2004, 2016) | Used synonymously with value creation when wanting to emphasise the repetitive or stable nature of practices or pursue their stabilisation or repetitiveness |
| Facilitate value creation | Essentially the same as value creation | Derived from the definition of value in the paradigm of value cocreation (Aarikka-Stenroos & Jaakkola, 2012; Akaka et al., 2021; Eggert et al., 2019; Prahalad & Ramaswamy, 2004; Vargo & Lusch, 2004, 2016) | Used synonymously with value creation when wanted to emphasise the intention to upkeep or stabilise practices or refer to entity that has this intention as facilitator |
| Customer | Actor who participates in value creation practices with the aim of creating value for oneself | Value cocreation literature, by large, resists the idea of defining pre-given roles for actors participating in value creation. Both the S-D | Utilised to refer to entities participating in value creation when referring to empirical observations in |

| | | | |
|--------------------------------------|--|--|--|
| Concept | Definition | References, streams of literature and related discussion | Role in this work |
| Provider | Actor who participates in value creation practices with the aim of creating value for another actor | logic (Vargo & Lusch, 2011), and strategic business management (Ramaswamy, 2011) explicitly argue for the redundancy of notions of customer and provider. Although using these concepts contradicts the theoretical idea of cocreation, they are considered helpful for the reader because of their familiarity with everyday language. Furthermore, the individuals interviewed for this research considered the organisation they represented through these notions. | which the interviewees comprehend the role of their organisation through these notions |
| Concepts for artificial intelligence | | | |
| Artificial intelligence (AI) | Umbrella term for technologies that are equipped with properties that enable them—or the systems they are a part of—to demonstrate intelligence by mimicking human behaviour or by acting or thinking rationally | Adapted from computer science (Russell & Norvig, 2016) and AI discussion in marketing management (Shankar, 2018) | To define a set of technologies that are considered to have ramifications to the present value cocreation literature |
| AI method | Umbrella term for anything that can be identified as a mediator between data and AI's demonstration of intelligence | Includes everything from rule-based algorithms (Davenport et al., 2020), to machine learning (ML; Louridas & Ebert, 2016), and statistical models (cf. Paschen et al., 2019) that can process data in a manner that outputs intelligence demonstrating behaviour of AI. | Term that in this work is used to refer anything that enable AI to demonstrate intelligence |
| Data | Representation of information in such a form, that enable computer programs to operate with it. | Adopted from computer science (Butterfield & Ngondi, 2016) | Utilised to make a distinction between AI method and data used by it |

| Concept | Definition | References, streams of literature and related discussion | Role in this work |
|-----------------------|--|---|--|
| Machine learning (ML) | Umbrella term referring to AI methods that allow the AI, instead of preprogrammed rules, to learn by examining previous examples from data | Adapted from computer science (Louridas & Ebert, 2016) and AI discussion in marketing (Pachen et al., 2019) | Utilised as an umbrella term for certain kind of AI methods |
| Language model | Model that predicts the probability distribution of language expression | Adopted from computer science (Russell & Norvig, 2016) | Utilised as an example of different kinds of ML methods empirically observed in article IV |
| GPT | Specific language model adopting transformer architecture, named by Open AI | Initially transformer architecture was introduced by computer science (Google; Vaswani et al., 2017) | Utilised as an example of specific type of language model, here empirically observed in article IV |

Partly enabled by the above-mentioned streams, since the early 2000s, cocreation has gained increased traction both in terms of conceptual development and empirical frameworks (Galvagno & Dalli, 2014). The participation of multiple schools of thought has no doubt increased the rate at which the value cocreation has been adopted in marketing and management discussions. However, it has also created a furnace in which multiple perspectives are fused together under the notion of value cocreation. As a result, value cocreation offers something for everyone but embeds the danger of confusion and forcing ontologically incompatible perspectives together. Consider, for instance, the notion of value codestruction utilised together with value cocreation ideas (Laud et al., 2019) (Implying that value can exist in some destroyable manner contradicts the idea of value emerging through practice of use). Furthermore, and maybe more dangerously, positive statements are utilised to inform normative recommendations for companies to pursue a deeper engagement with their customers (e.g., Konstantinos et al., 2022). (Mis)understanding of which S-D logic scholars (Vargo & Lusch, 2016) point towards, more practitioner-oriented, business management literature (e.g., Ramaswamy & Ozcan, 2014). Although earlier research efforts have identified the fields where core ideas for value cocreation emerge (Galvagno & Dalli, 2014), no efforts for dissecting and searching for a common ground for these ideas exist. This is the gap in knowledge that the present dissertation aims to contribute to. First, by identifying constitutive themes, that exhibit cross-disciplinary relevance in value cocreation and, second, by discerning divergent approaches within these identified themes, thereby revealing areas of disagreement among the literature.

Considering AI, managerially focused business and marketing literature has already extensively studied AI's effects on organisational processes that relate to value creation. Research has, for instance, considered the transformation of management tasks (Kolbjornsurd et al., 2016), robotisation of customer service (Wirtz et al., 2018), improved accuracy of demand forecasting (O'Neil et al., 2016; Yuan et al., 2014), applications for pricing (Ferreira et al., 2016) and gaining customer insights (Prasasti & Ohwada, 2014; Shimomura et al., 2017), as well as implication to future marketing in general (Davenport et al., 2020). Furthermore, more critical remarks on AI failure and customer dissatisfaction (Castillo et al., 2021) disrupting the effects of AI on human work (Ozkazanc-Pan, 2019) or ethical concerns pertaining to the use of AI (Jobin et al., 2019) have been discussed in AI-focused marketing and management literature. Although studies explicitly focusing on AI and value creation exist (e.g., Kaartemo & Helkkula, 2018; Paschen et al., 2020), their focus has been more on examining how AI affects the processes of value

creation than on considering ramifications of AI to paradigmatic ideas on value cocreation. The criticality of this gap has also been recognised by proposed future research agendas that highlight the need for further research for 1) AI and robots as actors in value creation, 2) effects of AI in mediating interactions (Kaartemo & Helkkula, 2018), 3) actor combinations consisting of humans and machines, 4) platforms through which they engage to create value and 5) capacities of human-machine actor combinations to participate in value creation (Storbacka et al., 2016).

To summaries, the current dissertation has primary contributions aimed at two gaps in knowledge. First, the present dissertation aims to unify theoretically scattered cocreation discussion by identifying shared constitutive themes that the literature utilises when theorising value creation. By doing so and discussing approaches value cocreation scholars take on these constitutive themes, the present dissertation provides future value creation focused research tools to better position their work and avoid the risk of combining contradicting cocreation perspectives. Second, the present dissertation considers how does AI interplay with the empirical world counterparts of these themes. This allows the dissertation to explore the theoretical ramifications of AI to value cocreation. Next, this dissertation explicates the research problem and research questions in more detail.

1.3 Research questions and appended articles

To fill the gaps in the literature, the goal of the present dissertation is to explore the theoretical ramifications of AI on value cocreation. First, to make it possible to contrast AI to the current scattered and fragmented understanding of value cocreation, the present dissertation dissects the current value cocreation discussion by asking *RQ1: What are the constitutive themes of value cocreation?* By constitutive themes, the dissertation refers to the conceptual building blocks that the existing ontologically disperse value cocreation literature agrees to be crucial. Constitutive themes are identified by relating the work of value cocreation scholars with one another with the aim of finding commonalities that exhibit cross-field relevance in value cocreation (cf. Alvesson & Sandberg, 2011). Besides identifying constitutive themes RQ 1 discerns divergent approaches within these identified themes, thereby revealing areas of disagreement among the literature. Based on the identified constitutive themes, the present dissertation considers *RQ2: How does AI interplay with the empirical world counterparts of constitutive themes of value cocreation?* The second research question is answered through an abductive process that relates identified constitutive

themes to their counterparts in the empirical world (cf. Reichertz, 2004), examining how AI interplays within them. Answering these two questions enables the research to contrast theoretical statements to empirical observations, thus fulfilling the aim of exploring the theoretical ramifications of AI to value cocreation. This approach is illustrated in Figure 1.

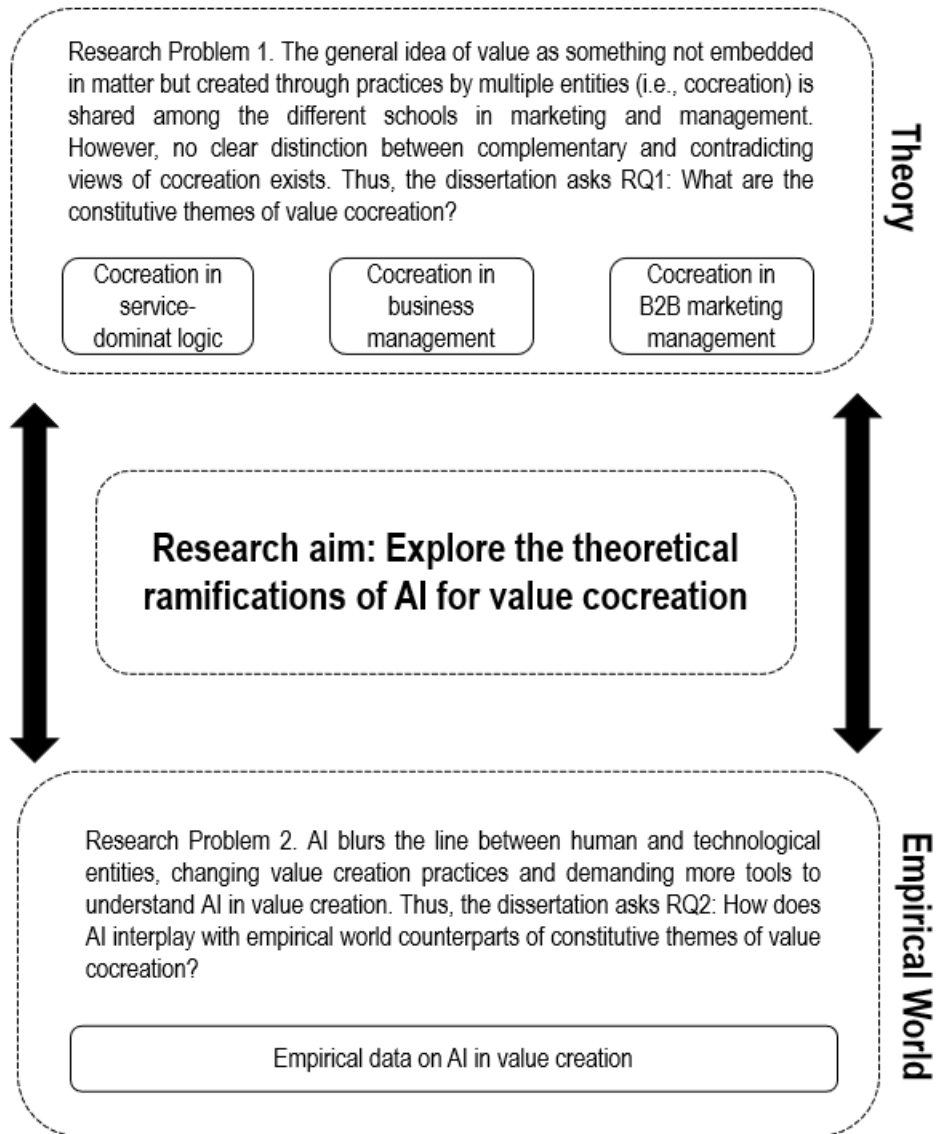


Figure 1. Illustration of the research approach

On a practical level, the present dissertation consists of five original articles and this synopsis. Two conceptual articles (articles I and II) are utilised, together with the literature on value cocreation, to answer the first research question. These articles focus on relating theoretical statements within the cocreation literature to one

another and, by doing so, contribute to the identification of constitutive themes among the cocreation literature. Three articles (articles III, IV and V) that are based on empirical data from different contexts examine value creation instances in which AI was utilised. These articles answer the second research question. Finally, the current dissertation relates theoretical findings to empirical ones. This fulfils the research aim of exploring the theoretical ramifications of AI to value cocreation. The roles of the appended articles in the dissertation are presented in Figure 2, which elaborates on the operationalisation of the research process by introducing the research contexts of each article, links articles to research questions and introduces the section of this synopsis in which an RQ is addressed.

| | RQ1: What are the constitutive themes of value cocreation? | | RQ2: How does AI interplay with empirical world counterparts of the constitutive themes of value cocreation? | | |
|--|---|---|--|---|---|
| Sections of this synopsis addressing the question | Section 4 | | Section 5 | | |
| Article contributing to the question | Article I | Article II | Article III | Article IV | Article V |
| Research context | B2B sales of knowledge-intensive business services | Circular economy material flows | Circular economy business | Digital B2B sales | B2B sales of knowledge-intensive business services |
| Research aim in relation to research context | To conceptualise the connection between B2B sales and value creation in an ecosystemic environment | To conceptualise why materials flow in the market | To examine how digital technologies, including AI, improve the possibilities to create and realise value | To examine how AI-empowered tools enable B2B companies to manage customer journeys | To examine how AI and humans can collaborate for value creation |
| Contribution of the article in relation to value cocreation and AI | To examine the emergent nature of actors in value creation; to identify constitutive themes of agency and interaction | To examine how something becomes relevant for value creation; to identify constitutive theme of resources | To examine how AI affects material resources in value creation | To examine how AI affects the interaction between non-AI entities participating in value creation | To examine AI and humans in value creation |

Figure 2. Operationalisation of the research process

Next, the present dissertation introduces the structure of the synopsis with more detail.

1.4 Structure of the synopsis

The structure of the synopsis follows research approach illustrated in Figure 1. Each section examines and completes a specific part of Figure 1. In Section 2, the synopsis elaborates on the theoretical background of the current dissertation. First, Section 2 introduces how value cocreation paradigm was identified and how S-D logic (Vargo & Lusch, 2004, 2016), strategic business management (Prahalad & Ramaswamy, 2000) and B2B marketing management (Eggert et al., 2018) became representative streams of literature for the paradigm of value cocreation. Second, the section presents the current understanding of AI in value creation by introducing existing research on AI in the fields of marketing and business management.

In section three, the synopsis details the research approach by elaborating on the methodological choices that allowed the dissertation to contrast empirical observations to discussion on value cocreation. The section introduces the research design for the current dissertation, elaborates on the research contexts, explicates the methods for data gathering and analysis and assesses the quality of the research.

Then, in section four, the synopsis focuses on the upper part of Figure 1. The section elaborates and further builds on the conceptual ideas identified in articles I and II and, by doing so, answers the first research question. First, the section introduces three constitutive themes of value cocreation, namely, agency, resources and interaction. Second, the section details divergent approaches within these themes, thereby revealing areas of disagreement within the value cocreation paradigm.

In section five, the synopsis answers the second research question by presenting its findings on how AI interplays with empirical counterparts of the constitutive themes identified in section four. The section observes how AI intertwines with humans and non-AI technologies in value creation. Furthermore, the section details how AI has been observed to affect the use of material resources as well as resources based on human capabilities. Last, the section discusses how AI has been observed to affect interactions taking place in value creation.

Section six fulfils the research aim and explicates the theoretical ramifications of AI to value cocreation by contrasting the findings of section five to the constitutive themes, and divergent approaches within the themes identified in Section four.

Section six proposes that based on empirical observations, AI in value creation should be abstractly viewed as a network. Finally, the synopsis concludes by discussing the main theoretical and managerial contributions, limitations and avenues for future research.

2 VALUE COCREATION PARADIGM AND AI IN VALUE CREATION

This section considers the identification of paradigm of value cocreation and previous literature on AI and value creation. The section starts by introducing how value cocreation has emerged as a recognisable paradigm from earlier thoughts in the fields of marketing and economics and how S-D logic (Vargo & Lusch, 2016), strategic business management (Prahalad & Ramaswamy, 2004) and B2B marketing management (Eggert et al., 2019) has become a representative literature for this paradigm. This section then elaborates on this dissertation's approach to AI and introduces previous literature on AI in value creation.

2.1 Paradigm of value cocreation

The present dissertation defines paradigm of value cocreation with two premises: 1) value is not embedded to matter, but emerges through practice, and 2) agency in value creation transcends the provider–customer actor divide. These two ideas are presented in the nexus of S-D logic (Vargo & Lusch, 2016), strategic business management (Prahalad & Ramaswamy, 2004) and B2B marketing management (Eggert et al., 2019). Although, above value cocreation streams, are representative of paradigmatic ideas, these ideas were not invented or developed solely within these streams. Instead, one could say that they express the current form of ideas developed throughout centuries of economic and marketing thought.

As a paradigm, value cocreation distances itself from the value understanding of early classical and neoclassical economics. These approaches considered value to be exchanged in markets from provider to customer—either as a resource to be further refined or as a product for consumers to use. These early economics-based material-dominant value approaches led the discussions of early marketing scholars from the year 1900 to the late 80s, when marketing distinct itself as a separate discipline from economics. (see Vargo & Lush, 2004, and their interpretation on Copeland, 1923; Kotler, 1967; McCarthy, 1960; Nystrom, 1915; Say, 1821; Shaw, 1912; Smith, 1776/1904; Marshall, 1890/1927).

Initial explicit signs for the cocreation paradigm were indicated by the works of early consumer research (e.g., Holbrook & Hirschman, 1982; Olshavsky & Donald, 1979; Sheth, 1979). Field was heavily influenced by the work of Herbert Simon and the idea of human individuals as rationally bounded actors (Simon, 1957). Consumer research scholars started to consider value as something other than the outcome of rationale decision making resulting from the purchase of the best product for the customer's given need. For instance, Holbrook and Hirschman (1982) regarded the use of a product as a 'subjective state of consciousness with variety of symbolic meanings, hedonic responses, and esthetic criteria' (p. 132). This nonmaterial and phenomenological spirit later became an inseparable part of value cocreation paradigm.

These early views of value cocreation were joined by the emerging field of services marketing. Services marketing aspects highlighted the temporal and nonmaterial nature of service delivery, as well as emphasised customer's involvement in the service process (cf. Grönroos, 1984; Zeithaml et al., 1985). These observations were later brought into service science and initial S-D logic value discussion by emphasising the inseparability of customers and process of value creation. Value was considered to be created in use, not by the provider, but through the actions of the customer (Maglio et al., 2009; Vargo & Lusch, 2004). Approaching value as something that was created in use by customers challenged the traditional roles of producers as value creators and customers as value consumers.

Contributing to paradigmatic ideas on value cocreation, similar observations on the changed customer's role were also presented by the literature on strategic business management (e.g., Normann & Ramírez, 1993; Prahalad & Ramaswamy, 2004). This was not so much from the descriptive perspective to observe what happens in value creation but from the normative perspective that, to gain sustainable competitive advantage, companies should more closely collaborate with customers and invite them to core value creation operations (Normann & Ramírez, 1993; Prahalad & Ramaswamy, 2000, 2004). Changing the locus of the value creation from production to use meant that value creation did not only depend on the provider's resources to create a product or service, but also on the customer's resources to use the product or participate in the service as intended (Grönroos, 2011; Normann & Ramírez, 1993; Prahalad & Ramaswamy, 2004; Vargo & Lusch, 2011). As argued by Vargo and Lusch (2011), this rendered every actor participating in value creation a resource integrator and further distanced value cocreation from the traditional idea of providers as value creators and customers as value consumers.

Taking cocreation further beyond the customer-provider dichotomy, service science highlighted the networked and systemic nature of value creation. For instance, Maglio et al. (2009) proposed a service system as being ‘a dynamic value-cocreation configuration of resources, including people, organisations, shared information and technology, all connected internally and externally to other service systems by value propositions’ (p. 399) to be considered as a new basic unit of analysis in service science. Continuing systemic thought, S-D logic (Vargo & Lusch, 2016) highlighted the role of institutions in establishing systems and networks, the constellation of which they labelled service ecosystems. In this context, institutions do not refer to organisations, but ‘humanly devised rules, norms and beliefs that enable and constrain action and make social life predictable and meaningful’ (Vargo & Lusch, 2016, 11). Systemic views allowed the discussion on value creation to go beyond the dyads of customer and provider. Furthermore, they opened discussion on processual-relational conceptualisations for agency in value creation first explicitly articulated by strategic business management (Ramaswamy & Ozcan, 2018).

Widening the utilisation of value cocreation paradigm, the literature on B2B marketing management has adopted networked approaches (Cova & Salle, 2008; Kohtamäki & Rajala, 2016), as well as explicated customer’s resources and shared practices of value creation in more detail (Aarikka-Stenroos & Jaakkola, 2012; Corsaro & Snehota, 2010). The adoption of these perspectives has led B2B marketing management to argue for a field-wide transition in the conceptualisation of value creation from value in exchange to value in use (Eggert et al., 2018).

The perspectives discussed above constitute a theoretical paradigm that, in the present dissertation, is labelled value cocreation. The current dissertation considers value cocreation to agree on two wide premises: 1) value is not embedded to matter, but emerges through practice, and 2) agency in value creation transcends the provider–customer actor divide. The first refers to the idea that value is not considered as something embedded in matter but that is created in a processual manner through the interaction of entities participating in value creation. The second refers to the idea that entities taking part in value creation cannot be understood through the dyadic relation between static roles of value creator (i.e., provider) and value consumer (i.e., customer). These two paradigmatic ideas are considered to cover the domain of the literature that, in the current dissertation, is labelled as value cocreation. S-D logic (originally introduced by Vargo & Lusch, [2004] and further developed by Vargo & Lusch, 2008, 2011, 2016; Vargo et al., 2022), strategic business management (originally introduced by Normann & Ramírez [1993] and further

developed by Ramaswamy [e.g., Prahalad & Ramaswamy, 2000, 2004; Ramaswamy & Ozcan, 2014, 2018) and B2B marketing management (originally introduced through the adoption of S-D logic [e.g., Cova & Salle, 2008; Aarikka-Stenroos & Jaakkola, 2012] and articulated further by Eggert et al., [2018]), are considered representative streams of the literature because they are the ones most recently to adopt these ideas.

2.2 AI in value creation

Like the ideas behind value cocreation, the ones behind modern AI applications are not particularly new. Although AI is often associated with the most up-to-date technologies, grounding ideas guiding AI development even today can be traced far back. In fact, the aim of creating human-like machines has enticed us at least since the early development of logic traceable to Aristoteles' (384–322 BCE) syllogism (Nilsson, 2009), whereas the model mimicking the biological neurons as computational units was presented in 1943 by McCulloch and Pitts. Vast networks of similar kinds of artificial neurons are also responsible for the functioning of up-to-date AI applications, including large language models (Vaswani et al., 2017) like ChatGPT (Bansal, 2023).

AI is often discussed together with underlying technological concepts (e.g., artificial neural networks, machine learning (ML), deep learning or a particular statistical method; cf. Davenport et al., 2020; Paschen et al., 2019) that describe, in more detail, the method through which intelligence is achieved. Although these technological concepts are an integral part of AI, the marketing and business literature tend to approach AI rather through its managerial applications than precise technological premises (e.g., applications for future marketing; Davenport et al., 2020; transformation of management tasks; Kolbjornsurd et al., 2016; or implications for B2B market knowledge; Paschen et al., 2019). This is understandable because nontechnically oriented business managers are assumably more interested in how AI affects their area of operation than how it technically works.

Because the aim of the present dissertation is to problematise AI from the perspective of value creation, it aligns with the literature on marketing and business management on its AI definition. Thus, the current dissertation refers to AI broadly as technologies that are equipped with properties that enable them—or systems they are part of—to demonstrate intelligence (cf. Russell & Norvig, 2016; Shankar, 2018). Definition is rooted to existing conceptualizations of AI that have considered demonstrations of intelligence along two axes: thinking–acting and human-like–

rationally (Russell & Norvig, 2016). This results in four categories of AI: those that perform either (1) thinking or (2) acting and those that demonstrate intelligence as assessed according to (3) fidelity to human behaviour or (4) rationality as optimal outputs. To elaborate AI, in the present dissertation is everything that can demonstrate intelligence by reasoning or acting rationally, or like human. Furthermore, this dissertation does not exclude AI technologies based on their underlying methods. Thus, current dissertation is not interested in whether the demonstration of intelligence is based, for instance, on rule-based algorithms or a ML model, as long as the behaviour demonstrated falls into one or multiple of categories introduced by Russell and Norvig (2016). Furthermore, this allows the dissertation to consider AI similar to managers utilising it.

2.2.1 Machine learning as a technological basis for modern AI

The present dissertation considers AI from the perspective of its behaviour rather than its technological basis. However, also from this perspective, it is still beneficial to clarify the relation between machine learning (ML) and AI because a vast number of modern AI applications are based on ML models (see, e.g., article IV of this dissertation).

The umbrella term ML is used to describe the functioning of technologies that enable the utilisation of vast data masses (Iansiti & Lakhani, 2020; Paschen et al., 2019). ML allows the machine (instead of preprogrammed rules in rule-based systems) to demonstrate intelligence by examining previous examples (Louridas & Ebert, 2016). The process of examining examples is also referred to as pattern recognition (K. Murphy, 2014). ML methods include, for instance, artificial neural networks, decision trees, regression methods and random forests, among others (Asare-Frempong & Jayabalan, 2017). Different ML methods are also often discussed by referring to the area of application without identifying the exact statistical method. Consider, for instance, natural language processing (NLP), which refers to ML in the context of written texts (Nuruzzaman & Hussain, 2018) and image recognition in the context of picture data (He et al., 2016).

Whereas AI describes the technology demonstrating intelligence (e.g., by learning, adapting or understanding language), ML describes a data-driven way to reach the demonstration. Consider, for instance, the study of Meire et al. (2017), in which the authors used 225 different variables to develop the ML model that would identify the most promising restaurant company leads for Coca-Cola Refreshments Inc. The

authors trained the model to identify restaurants that (based on these variables) would best correspond to the company's current B2B customers. After each training round, the ML model changed the weight for each parameter to correspond to the customer profiles in the training set. After extensive repetitions, the model was able to learn the right weights for the parameters to choose which prospective restaurant would match the customer profile. This demonstrates how, in ML, the identification of potential customers happened based on patterns in provided data, not on given rules. Because of this more thorough way of presenting the thinking process of AI, ML has also been referred to as the brain of AI (Chatterjee et al., 2019). The recognition of the differences between ML and rule-based systems is crucial because the provision of data for ML affects how AI behaves in consecutive interactions with its environment.

2.2.2 Applications of AI in value creation

Although existing research has not considered AI from the perspective of paradigmatic ideas on value cocreation, an increasing body of literature has examined AI in multiple managerial settings that share the link to value creation processes of companies. Consider, for instance, transformation of management tasks (Kolbjornsurd et al., 2016), robotisation of customer service (Wirtz et al., 2018) or applications to future marketing in general (Davenport et al., 2020). Furthermore, more critical remarks on AI failure and customer dissatisfaction (Castillo et al., 2021) disrupting the effects of AI on human work (Ozkazanc-Pan, 2019) or ethical concerns pertaining to the use of AI (Jobin et al., 2019) have been discussed.

The present dissertation considers three streams within the AI discussion in marketing and business management that summarise the current understanding of AI in value creation. First, the literature has considered AI's effects on the value creation processes that organisations and individuals participate in. Second, the literature has identified that the level of 'human likeness' of machines influences how humans participate in value creation processes. Third, the literature has discussed human collaboration with AI and AI replacing humans in value creation processes via automation. Table 2 exemplifies existing knowledge on AI in value creation. The studies presented in Table 2 dominantly consist of broad literature reviews or conceptual articles that aimed to summarise and explicate the existing understanding of AI in value creation.

Table 2. Existing knowledge of artificial intelligence in value creation

| Stream of Literature | Findings | Example Study |
|--|--|--|
| Literature considering AI's effects on value cocreation processes of companies and individuals in service, marketing and business research | AI can support service providers with forecasting abilities by generating customer understanding, supporting product development and marketing decisions and automating tasks. | Literature review on AI in value cocreation (Kaartemo & Helkkula, 2018) |
| | AI can enable resource integration between service providers and beneficiaries by identifying customer needs and preferences, creating human-like service technologies and providing personalised service. | |
| | AI-enhanced robots can support user well-being in particular contexts. | |
| Literature on anthropomorphism in business and marketing management | The level of 'human likeness' of a machine, an individual's sense of power and the presence of other customers mediate individuals' willingness to continue participating in value creation practices in service failure situations. | Experimental study on manipulated voice types (anthropomorphic vs robotic) in service failure instances (Fan et al., 2016) |
| | The level of human likeness of an AI robot affects humans' reactions to robots, acceptance of robots and service loyalty towards brands managing robots. | Literature review on AI-enhanced robots in hospitality and tourism (J. Murphy et al., 2019) |
| Literature considering human–AI collaboration (augmentation) and AI automating human tasks in marketing and business management | The literature tends to associate augmentation with better organisational performance compared with automation. Furthermore, AI is assumed to develop more contextual awareness. | Conceptual articles on AI in marketing and management (Davenport et al., 2020; Raisch & Krakowski, 2021) |
| | Collaboration between humans and AI includes AI tasks for collecting, curating and consuming/utilising information. | Qualitative case study on human–AI collaboration in value creation processes in B2B sales (Paschen et al., 2020) |
| | It is presumed that AI will first automate mechanical and analytical jobs, whereas intuitive and empathetic jobs will be harder to automate. | Conceptual article on AI job replacement in service (Huang & Rust, 2018) |

3 METHODOLOGY

In this section, the present dissertation considers the methodology used. The section begins by elaborating on the research design, here aiming for theory advancement. The research design is based on two iterative processes – problematisation and abduction – and adopts a critical realist view when considering the relationship between reality and observation. This section then introduces the research contexts and empirical data from each context and continues to elaborate on the role of empirical data and methods in each appended article. Furthermore, each appended article discusses its methodological choices in more detail.

3.1 Research design for theory advancement

The current dissertation aims to advance theory on value cocreation by relating existing theoretical premises with empirical observations on AI in value creation. In theory advancement, the aim is not to build something totally new, but rather, it is to recognise what is known before exploring whether something ought to be changed. A theory advancement approach has been selected because value has proven to be one of the timeless notions in marketing and business management, the creation of which has shown increasing traction as an enticing research area over the past 30 years (Eggert et al., 2019; Zeithaml et al., 2020). Furthermore, the history of value creation as a conceptual vehicle in economic and academic thought extends much further (e.g., Smith, 1776/1904). Given the long history of value creation, it is safe to say that the theoretical domain of the present dissertation is not particularly new. Thus, the dissertation pays specific attention to explicating existing value cocreation literature (as indicated by RQ1).

The research design, which aims for theory advancement, draws from problematisation (Alvesson & Sandberg, 2011) and abductive logic (Reichertz, 2004) (see Figure 3). Problematisation allows the present dissertation to understand shared constitutive themes and possible diverging approaches within these themes within the value cocreation literature. Abduction, on the other hand, allows for contrasting the constitutive themes and approaches within the themes with the empirical observations. The research design supports problematisation and abduction with

qualitative methods that enable the present dissertation to draw and understand observations from empirical world. These methods include, for instance, semistructured interviews, case studies and interpretive content analysis. The research design is illustrated in Figure 3. The figure complements the illustration of the research approach first presented in Figure 1.

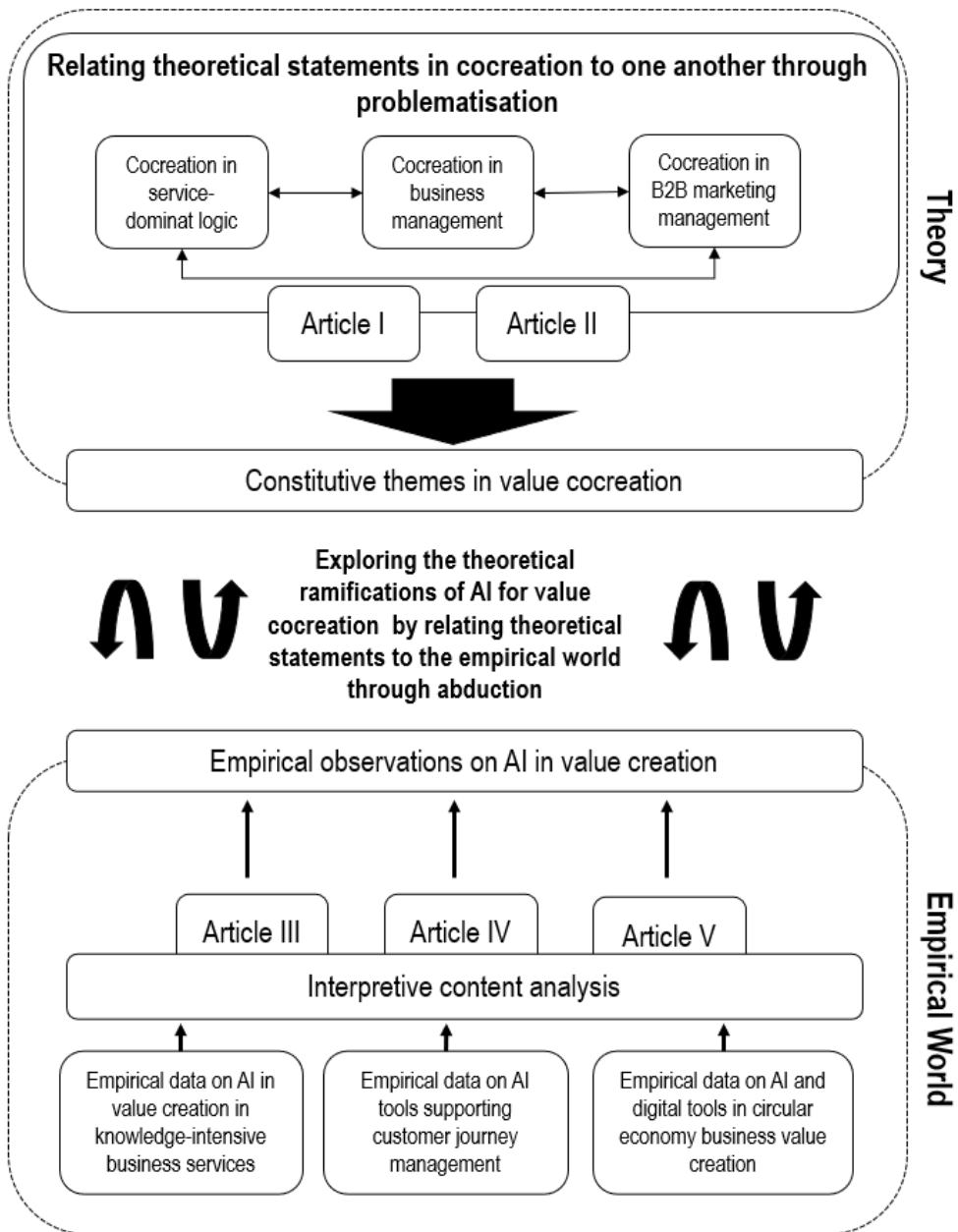


Figure 3. Illustration of the research approach appended with the research design

To further elaborate on the theory advancement approach, theory is broadly defined as any statement of relations among concepts within a boundary set of assumptions and constraints (Bacharach, 1989). This allows the present dissertation

to consider value cocreation covering both the metatheoretical abstractions in S-D logic (cf. Akaka et al., 2021), as well as those concepts closer to the everyday practices of marketing and business professionals utilised in strategic business management (e.g., Prahalad & Ramaswamy, 2004) and B2B marketing management (e.g., Aarikka-Stenroos & Jaakkola, 2012; Eggert et al., 2019). Building on the above definition, the present dissertation considers theory advancement in relation to its research design as follows: problematisation is a tool to identify the shared themes for the types of statements that the cocreation literature considers critical (referred to as constitutive themes). Problematisation also allows for the identification of a different boundary set of assumptions and constraints on which these statements are based (referred to as approaches within constitutive themes). Abduction enables the dialogue between empirical observation and a recognised boundary set of assumptions in theory. Thus, the advancement of theory constitutes any statement that proposes a change to a previous statement or set of assumptions and constraints the statements are based on.

Next, the present dissertation introduces the critical realist worldview as its approach to the relation of empirical (qualitative) observations and reality. The dissertation then continues by describing the processes of problematisation and abduction in more detail.

3.1.1 Critical realist worldview in understanding the relation of observation and reality through qualitative data in value creation

The present dissertation adopts the critical realist worldview when considering the relationship between observations and reality. Critical realism holds that objective reality exists outside of human observation and experience. However, it cannot be directly observed because objects having the real capacity of behaving do not necessarily fully demonstrate that capacity, leaving the observations limited (cf. Easton, 2010; Sayer, 2000). Thus, researchers adopting the critical realist view cannot directly claim to observe reality, but they can approach it through the interpretation of observations and through an accumulated knowledge (cf. Easton, 2010).

Although the critical realist worldview is suitable for understanding the practices of value creation because of their embeddedness in social settings, it does not come without its limitations. When considered from the perspective of cocreation, critical realism emphasises creation (practices through which value is created) over value (value as it is experienced). Although the cocreation literature has agreed that value

emerges in a processual manner, it simultaneously considers value as phenomenologically (through experience) determined by an individual (Eggert et al., 2019; Grönroos & Voima, 2013; Ramaswamy & Ozcan, 2018; Vargo & Lusch, 2016), implying a subjectivistic worldview (cf. Becker & Jaakkola, 2020). Adopting a critical realist worldview, the present dissertation also pays more attention to the practices of value creation than value experiences emerging through the processes. Furthermore, the present dissertation needs to accept that it cannot make solid causal claims between the processes of value creation and value as experienced. Thus, terms like value potential or potential resources are used in the appended articles and in this synopsis to highlight this limitation.

The present dissertation sees AI with other entities as participating in value creation in their social and organisational contexts through qualitative data. The qualitative approach was selected for three reasons. First because of the explorative nature of second research questions to examine how AI interplays with empirical world counterparts of constitutive themes in value cocreation literature (cf. Yin, 2014), second because of the nature of value creation processes that are embedded in social contexts in organisations (cf. Yin, 2014) and, third, because of qualitative approach allows flexibility with philosophical preconditions (Eriksson & Kovalainen, 2008).

RQ2 is a prime example of a question examining business-related phenomena requiring the researcher to understand the behaviour in a certain context rather than to quantitatively measure the behaviour or context. To elaborate, AI gains meaning in value creation through interactions happening in the context of the value creation processes (cf., Aarikka-Stenroos & Jaakkola, 2012; Ramaswamy & Ozcan, 2018; Vargo & Lusch, 2016). Thus, to examine how AI interplays with empirical world counterparts of constitutive themes in the literature on value cocreation, researchers should interpret the meaning of AI within those contexts that the theoretical themes aim to conceptualise.

Philosophical flexibility of qualitative method is necessitated by design aiming for theory advancement. This is because boundary conditions and underlying presumptions, often are ontological in their nature. In case of value cocreation, the literature also makes some ontological claims explicit (e.g., phenomenological nature of value). Thus, studies aiming to theory advancement need to stay open to, given that empirical evidence so implies, to suggest changes that are ontological in their nature. These changes might not only contradict the ontological presumption of advanced domains but the presumptions of the research aiming to advance these domains. Consequently, although the critical realist worldview offers a baseline for

approaching empirical observations, the present dissertation does not aim to force this view when problematising the literature on value cocreation. Instead, the dissertation aims to interpret the proposed theoretical claims as they are read.

3.1.2 Problematisation

In the present dissertation, problematisation is utilised in identifying constitutive themes in the literature on value cocreation, as well as diverging approaches within these themes. Two first steps of problematization 1) identifying a domain of literature and 2) identifying and articulating the assumptions underlying this domain provide direct methodological correspondence to RQ1 of the dissertation to examine what are the constitutive themes of value cocreation. The third step of problematization 3) evaluating the assumption (Alvesson & Sandberg, 2011), is conducted through the abductive process that relates identified constitutive themes to empirical observations on AI in value creation instances. The process of identifying constitutive themes through problematisation is presented in Figure 4, whereas the process of abduction is described in section 3.1.2, and methodology for empirical investigations in section 3.2.

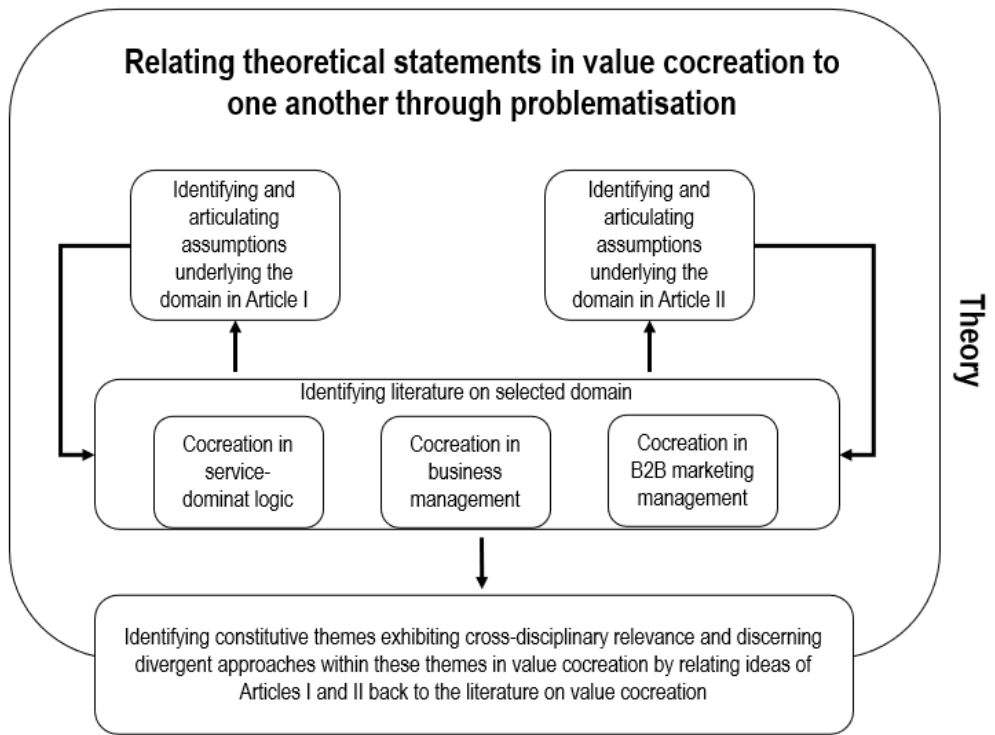


Figure 4. Identifying constitutive themes of value cocreation through problematisation

Although the ‘steps’ of problematisation are, for the sake of clarity, presented in a sequential order, the actual process of problematisation is iterative in its nature (Alvesson & Sandberg, 2011), as figure 4 aims to illustrate. This means that the steps presented above are considered important elements rather than a list of fixed ingredients. Or as Deacon (2000) noted, problematisation ‘is a creation in the sense that, given a certain situation, one cannot infer that precisely this kind of problematisation will follow’ (p. 135). Next, the present dissertation elaborates each of the three ‘steps’ of problematisation in more detail.

Identifying a domain of literature

Motivated by the aim, the domain the dissertation focuses on is the literature on value cocreation, developed in the fields of S-D logic (e.g., Vargo & Lusch, 2016), strategic business management (e.g., Prahalad & Ramaswamy, 2004) and B2B marketing management (e.g., Aarikka-Stenroos & Jaakkola, 2012). In addition to these primary streams, the present dissertation recognises cocreation perspectives,

for instance, from consumer research (e.g., Holbrook & Hirschman, 1982) and services marketing (Grönroos & Voima, 2013). More precisely, the identification of literature within these streams was guided by two broad value-related assumptions that are implicitly (or partly explicitly; e.g., Ramaswamy, 2011) agreed upon: 1) value is not embedded to matter, but emerges through practice, and 2) agency in value creation transcends the provider–customer actor divide.

Because value and value creation have been actively debated in the domain of marketing and business management in recent decades (Galvagno & Dalli, 2014; Zeithaml et al., 2020), identifying the above assumptions is not a particularly difficult task. Often, scholars, who in present dissertation are interpreted to adopt a cocreation approach, explicitly argue the relevance of their work through some level of problematising, or at least contrast it to earlier thought on value and its creation. Thus, two paradigmatic assumptions guiding the selection of the value creation literature in this dissertation are the results of problematisation processes made more or less explicit by previous contributors and interpreted by present. For instance, S-D logic literature has argued for the paradigmatic shift from goods to services (e.g., Vargo & Lusch, 2004), business management the shift from products to experiences (e.g., Prahalad & Ramaswamy, 2004) and B2B marketing management the shift from transactions to practices and processes (e.g., Aarikka-Stenroos & Jaakkola, 2012; Eggert et al., 2018) in value creation. These argued changes in theoretical landscape are interpreted as being connected by two premises, together labelled as paradigm of cocreation: 1) value is not embedded to matter, but emerges through practice, and 2) agency in value creation transcends the provider–customer actor divide. Practically, the dissertation identified the paradigm and described how three literature streams above became its representatives in section 2.1.

Identifying and articulating assumptions underlying the domain

Identifying and articulating the assumptions underlying the cocreation literature was conducted by relating the work of value cocreation scholars with one another to find the commonalities and differences within the field (cf. Alvesson & Sandberg, 2011). In practice, this was done in two articles, I and II, and in the fourth section of this synopsis. In the conceptual articles (I and II), theoretical statements of cocreation literature were brought together with the intention to conceptually explore a given phenomenon: in article I, the role of B2B sales in value creation in ecosystemic environment and, in article II, material flows in society. The act of linking theoretical statements together to explain a given phenomenon necessitated the dissertation to

relate the statement with one another before being able to create a synthesis between the statements. In practice, relating the statements with one another was done through the practice of writing and is thus visible to the reader when examining articles I and II, as well as section 4 of this synopsis. Following section from article II is further used to illustrate the problematization [with further elaboration on the role of each sentence]:

[1. Reminding reader of the established definition of resources] *As defined earlier, resources are not materials themselves but the capabilities to use materials for a given purpose (i.e., capabilities that define functional relationships) (De Gregori, 1987; Zimmermann, 1951).* [2. Relating the established definition of resources with the idea of material flows motivated by value creation] *As resources, by definition, have use, so are they also prone to flow in markets, as economic actors need them to create value.* [3. Further exemplifying the idea in relation to definition of resources] *In other words, economic actors participate to exchange to access resources, that can then be used to the purposes the actors have capabilities to identify.* [4. Relating the established relational nature of resources with the idea of dynamism inherent to relations] *We also emphasize that “resource likeness” (i.e., the existence of a functional relationship) is not an inherent, fixed property of a material but emerges through time in inter-agential processes between humans and materials (Jokinen et al., 2021), in which humans learn how a given material could be used (Zimmermann, 1951).* [5. Establishing conceptualisation for the dynamic nature of material resources structured through relating the above ideas] *In this paper we call this process the material–resource conversion.*

Observations developed through articles I and II were then related back to the literature on value cocreation to ensure that they were also represented beyond the selected narrower focus areas in articles I and II. In Figure 4, this is illustrated with arrows circulating back in the middle of the figure.

This process led to identification of agency, resources and interaction as shared constitutive themes among value cocreation scholars, as well as the identification of approaches within these themes. The constitutive themes and approaches within the themes are discussed in more detail in the next section. Similar to problematisation

processes in general (Alvesson & Sandberg, 2011), the present dissertation did not linearly identify the assumptions underlying the domain after selecting the literature. Instead, this identification occurred iteratively and in parallel with other phases of the research.

Evaluating assumptions

As proposed by Astley (1985) and Kuhn (1970), the dissertation evaluates identified assumptions through empirical data. To do this, the present dissertation first examines how AI interplays with empirical world counterparts of identified constitutive themes (RQ2). This is done by utilising empirical data on value creation instances, in which AI has a significant role in imminent ecosystems supporting value creation. The present dissertation then considers empirical findings against the identified assumptions of cocreation through an abductive process. This approach allowed thesis author to move between theoretical statements and empirical findings, thus drawing conclusions on the possibilities of existing theoretical takes to the cocreation to comprehend AI in value creation and thus examine the theoretical ramifications of AI to value cocreation. The next section addresses abductive logic in more detail.

3.1.3 Abduction

Abduction has been utilised to relate the theoretical assumptions in value cocreation literature with empirical observations. As with problematisation, abduction is iterative and nonlinear by its nature. Thus, in this context, problematisation and abduction are considered parallel, not subsequent, processes.

Abduction is a process in which researchers move back and forth between empirical observations and theoretical concepts with the aim of increasing understanding of both theory and empirical data (Alvesson & Sköldbberg, 2000; Reichertz, 2004). Although abduction typically starts from what is known (i.e., existing theory), it constantly seeks new orders and rules that fit with observations gathered in the empirical world (Reichertz, 2004). As such, abduction goes beyond deductive and inductive logic because it seeks to tests whether theoretical statements rightfully stand (Habermas, 1984). The dialogue between data and theory is especially beneficial for the present dissertation because of its explicit aim of theory development through evaluating theoretical statements or their underlying premises.

Although the processes of problematisation and abduction were parallel, the present dissertation reports its findings in a deductive manner. It starts by

introducing identified constitutive themes and approaches within the themes before proceeding to empirical observations. Although this choice only partially describes the research process, it better serves the research aim, necessitating explicit clarity when relating empirical observations to theory.

3.2 Research contexts and data gathering

Next, the research contexts are discussed. Research contexts are crucial because they guide, together with research aims, the selection of methods for data gathering and analysis for each article. The results developed in each article then provided critical input for problematisation and abduction in the dissertation. Furthermore, research contexts provided a theoretical theme in which value creation in each article was considered. In this dissertation, the abductive process draws empirical insights that examine value creation in three different domains: sales of knowledge-intensive B2B services, digital B2B sales, and circular economy. The characteristics of each of these contexts from the perspective of value creation are summarised in Table 3 and discussed in the following sections.

Table 3. Research contexts and aims of articles in relation to value creation and AI

| | Article I | Article II | Article III | Article IV | Article V |
|-------------------------|---|---|---|--|---|
| Research context | Sales of knowledge-intensive B2B services | Circular economy (CE) material flows | Circular economy business | Digital B2B sales | Sales of knowledge-intensive B2B services |
| Theoretical positioning | B2B sales and value cocreation | Circular economy, material agency and value cocreation | Circular economy value cocreation and digital technologies in CE | Customer journey management and AI in business and marketing management | Human–AI collaboration, and value cocreation in knowledge-intensive business services |
| Research aim | To conceptualise the relation of B2B sales and value creation at the level of ecosystem | To conceptualise the relations of material flows, resources and waste at the societal level | To examine how digital technologies allow producers to propose and customers to realise value in CE | To examine how customer journeys can be managed with the help of AI-enhanced tools | To examine how human experts and AI can collaborate to allocate resources optimally to create value |
| Emphasis of the context | Organisational functions that | The role of material | Facilitation of material | Activities through which | Human–AI collaboration |

| | Article I | Article II | Article III | Article IV | Article V |
|--|---|------------------------------|--|--|---|
| and aim in terms of value creation | facilitate the communication between entities taking part in value creation | resources in value creation | resources in proposing and realising value | organisations manage interaction for value creation | and human resources in value creation |
| Emphasis of the context and aim in terms of artificial intelligence (AI) | No particular emphasis on AI | No particular emphasis on AI | AI as a part of technological solutions | AI-enhanced tools that facilitate/help to facilitate interactions for value creation | Activities and tasks in collaboration between humans and AI |

3.2.1 Knowledge-intensive and digital B2B sales as a context for value creation and AI

The sales of knowledge-intensive B2B services provided a research context for articles I, IV and V. B2B sales particularly emphasise interactions in value creation. Article I conceptualised the relation of B2B sales and value creation at the ecosystem level. Article IV considered the interactions among customer journeys and examined how AI tools can help B2B providers manage customer journeys consisting of not only the purchase, but also prepurchase and postpurchase phases. Article V examined how AI and humans can collaborate to allocate experts with the right capabilities to client cases. This was a task partly conducted by salespeople in organisations who acted informants for article V.

The connection between B2B sales, along with other operations managing customer experience (i.e., through customer journeys), and value creation has been widely acknowledged (Haas et al., 2012). The literature on B2B sales has, for instance, demonstrated how sales processes facilitate and sales personnel participate in the value creation operations of companies. Consider, for instance, the following examples: the role of salespeople in value creation as codiagnosers (Aarikka-Stenroos & Jaakkola, 2012), relationship builders (Arli et al., 2018), knowledge brokers (Rapp et al., 2014; Verbeke et al., 2011) and change architects (Dixon & Tanner, 2012). Furthermore, Storbacka et al. (2009) has acknowledge the role of salespeople as a primary source of customer insight enabling the development of winning value propositions.

Highlighting B2B sales compatibility with value cocreation paradigm, the sales literature has lately transcended the traditional actor roles of buyer and seller. Because of B2B customers' complex needs, sales have also adopted to account for

actors who may not have previously participated to B2B sales processes (e.g., industry experts and third-party consultants; Hartmann et al., 2018). Interactions with these actors have caused sales to exceed the customer–provider dichotomy and consider customer experiences more broadly as consisting of multiple interactions (Steward et al., 2019). This has placed more emphasis on the sales role to coordinate interactions not only between the customer and provider, but all actors participating in value cocreation (Arlı et al., 2018; Marcos Cuevas, 2018; Paesbrugge et al., 2017). Furthermore, this development aligns with the direction that the value cocreation literature has taken with its emphasis on ecosystems and multiactor characteristics (Ramaswamy & Ozcan, 2018; Vargo & Lusch, 2016).

Digital technologies, like AI, have been rendered an inseparable part of modern sales processes (Singh et al., 2019). First, Digital technologies shape how B2B organizations interact in the business environment when they engage to buying or selling processes (Marcos Cuevas, 2018; Moncrief, 2017; Syam & Sharma, 2018). Second, digital technologies, like social media (Agnihotri et al., 2016; Rodriguez et al., 2016) and AI (Syam & Sharma, 2018), affect the interactions within the sales process. Although these advancements present challenges for practitioners to manage value cocreation in B2B sales, they render sales a promising area for value creation-focused research inquiry.

3.2.2 Circular economy business as a context for value creation and AI

Circular economy (CE) was the research context for articles II and III. CE has particular interest in material flows, hence especially emphasising the role of material resources in value creation. Article II conceptually examined the relation between value, material flows, resources and waste. Article III examined how AI, along with other digital technologies, can support providers to propose value and customers to realise it.

From a business perspective, CE is gaining increased traction as a strategic area for value creation to market actors. CE not only considers the value created to customers and other actors through the market, but it also focuses more broadly on environmental and social value. Furthermore, CE especially focuses on understanding the interlinkages of materials and value creation. As such, CE is interested in how materials are used and transformed within business processes over time (Blomsma & Tennant, 2020) in such a way that the highest value of products, components, or material aspects of services can be extracted throughout the life

cycle (Zacho et al., 2018). By careful management of materials, CE aims to secure ecosystem functioning and human well-being (Murray et al., 2017).

Digital technologies and technological innovations in general have been identified as important catalysts for managing materials in CE value creation (Bocken et al., 2016; Ranta et al., 2020; Rosa et al., 2020). In particular, the literature has considered instances where technologies change the way material products or resources are used in CE. For instance, the product–service systems (PSS), often dependent to digital solutions, transform product-oriented offerings by supporting development of new services or enabling selling the product as a service (Tukker, 2015). In PSS solutions, digital technologies can, for instance, enable remote monitoring of the product, or allow the optimisation of the maintenance services. Furthermore, as the product reaches the end-of-life stage, digital technologies can enable provider to collect the product and assess the options for reusing, remanufacturing or recycling the product based on the data collected from the product during the use phase (Alcayaga et al., 2019). Increased adoption of data-based technologies in CE value creation, renders it interesting area to consider AI related value creation instances.

3.3 Empirical data and its analysis

Next, the current dissertation presents the empirical data and data analysis methods for each appended article. Data utilised were predominantly primary or secondary interview data, which were gathered with a semistructured interview format and analysed by utilising interpretative content analysis supported by researcher and data triangulation. Besides interview data, the present dissertation relied on secondary data sources, such as web pages and company reports, as well as previous literature. The methodological choices for each article were made based on the research context and aim in each article. The methodological choices for each article are summarised in Table 4 and discussed in more detail in each appended article.

Table 4. Methodological choices in the dissertation articles

| | Article I | Article II | Article III | Article IV | Article V |
|------------------------------|---|---|--|--|--|
| Research design | Conceptual | Conceptual | Multiple case study | Literature review with secondary data analysis | Multiple case study |
| Form of scientific reasoning | Conceptual | Conceptual | Abductive | Abductive | Abductive |
| Unit and level of analysis | The relation of concepts of B2B sales and value creation at the level of ecosystem. | The relations of concepts of material flow, materials, resource and waste at the societal level. | The role of digital technologies, including AI, in value creation practices on organisational and ecosystem level. | Activities recognised in literature for managing B2B customer journeys and AI-enhanced tools examined on activity level. | Collaborative activities between human and AI in value creation at the levels of individual and organisation. |
| Primary data | 4 semistructured interviews and 3 group interviews with the managers responsible for the development of sales and business operations. Notably, article utilised empirical data only to illustrate conceptual ideas structured through article. | No primary data. | No primary data. | No primary data. | 17 semistructured interviews with managers participating in the development of AI tools. Interviews were conducted in collaboration with research team between November 2019 and December 2021. |
| Secondary data | No secondary data. | Semistructured interviews with key experts participating to CE project aiming to find potential ways to utilise by product of cellulose manufacturing. Notably, article utilised empirical data only to illustrate conceptual ideas structured through article. | 14 semistructured interviews with key experts involved in the development of digitalisation and business in the field of CE. Interviews were conducted between July 2019 and January 2020. | 72 research articles on customer journey management-related topics and web pages for 152 digital marketing tools. | 5 semistructured interviews with managers participating in the development of AI tools and documents describing tool development in case companies. Interviews were conducted between November 2019 and December 2021. |

| | | | | | |
|---------------|---|--|---|---|--|
| Data analysis | Article I The purpose of data was to illustrate conceptual ideas developed in the article. | Article II The purpose of data was to illustrate conceptual ideas developed in the article. | Article III Interpretive content analysis first within case, followed by cross-case analysis. Analysis was heavily supported by researcher and data triangulation. | Article IV Delineating integrative literature review and content analysis of web pages, with the particular focus on 58 tools with AI functionalities. Researcher triangulation was conducted during the analysis. | Article V Interpretive content analysis of interview data. Analysis was supported by researcher and data triangulation. |
|---------------|---|--|---|---|--|

The methods for data gathering and analysis are mostly relevant for articles III, IV and V, which utilised empirical data. In articles I and II, data were not utilised to develop results, but empirical examples were used to illustrate developed conceptual ideas. Articles III and V both relied on case study design and interview data, which were gathered in a semistructured manner. A case study approach was selected because it suits the examination of contemporary phenomenon, where boundaries between phenomenon and context can be vague (Yin, 2014). Because both articles focused on technologies in value creation processes taking place in the context of examined organisations, the case study approach was considered suitable. However, the case samplings differed among the articles. Article V utilised homogenous case sampling because variations between cases were not the focal point of analysis, whereas article III used maximum variation as selection criteria because it was more interested in differences and similar patterns among the cases (cf. Patton, 1990).

Semistructured interviews were selected as the primary method for data gathering because they allow researchers to make further inquiries as the studied phenomenon and context become more familiar. Semistructured interviews enable the researcher to investigate issues that emerge during the interview while still offering the possibility to facilitate the discussion and maintain the focus on phenomena under the interest (Eriksson & Kovalainen, 2008). The interviewees were selected based on their anticipated familiarity with the phenomena in focus. Seventeen of the interviews for article V were primary data (Appendix 1 provides a questioner guide utilized in these interviews), whereas five interviews for article V and 14 for article III were secondary data and were not collected by the author of the present dissertation. In addition, company documents and web pages were utilised in both articles to enable data triangulation. The empirical data in article IV focused on secondary data describing the functioning of AI tools analysed in the article. These were predominantly web pages of the tool providers, while other web content (like pages and blogs providing listing of these tools) was utilised while identifying the tools.

The analysis of data, both primary and secondary, was conducted using interpretive content analysis, which was supported by researcher and data triangulation. Interpretive content analysis refers to a process that aims to understand the meaning rather than quantify the phenomena happening in a social context (critical realism; Easton, 2010). In article III, analysis began with within-case analysis because the researchers generated an overview of how AI along with other

digital technologies affected value potential and its realisation in each case. Article III followed with a cross-case analysis that aimed to generate more synthesised patterns by identifying the similarities and differences among the cases. Article V analysed both cases in a unified manner, starting with more general aspects related to AI development in each case company and proceeding to more specific characteristics in collaboration between humans and AI. In article IV, the analysis of tools started by identifying the core functionalities of the tools. Based on these functionalities, the tools were then categorised, and categorisation was validated with an online survey among sales and marketing managers in Finnish B2B companies. After validating the tool categories, the analysis proceeded to AI functionalities of tools and their potential uses in customer journey management. To improve the quality of analysis and trustworthiness of the results, the present dissertation applied a range of tools and tactics. In addition to data triangulation in articles III and V, the present dissertation utilised methods such as a structured coding procedure, as well as researcher triangulation with drafted tables and figures, which encouraged a discussion among all involved researchers (cf. Flick, 2004). Especially in articles III and IV, relying on secondary data researcher triangulation happening through discussions with coauthors more familiar with empirical data became crucial in analysis phase.

3.4 Assessing the quality of the research

The current dissertation assesses the quality of the research by utilising the concepts of validity and reliability. Reliability refers to evaluating whether the same findings and conclusions can be repeated, given the setting remaining similar. Because the current research does not make any causal claims, validity has been considered through construct validity and external validity. Construct validity refers to evaluating whether operational measures responded to the concepts being studied, whereas external validity evaluates the generalisation of findings outside the setting from which they were observed (Yin, 2014).

Evaluating the reliability of this research first concerns the way empirical evidence for this dissertation was gathered and second the processes of problematisation and abduction that related theoretical statements to one another and to empirical observations. Concerning the empirical evidence, careful practices guiding the data gathering were utilised to ensure reliability (cf. Yin, 2014). The gathering of interview data for case studies in articles III and V and for secondary data followed a carefully

planned process of selecting the interviewees or identifying secondary data. All interviews were recorded, transcribed and stored in secure locations. Concerning the secondary data for article IV, the analysed tools were tabled and shared among the researchers.

Processes of problematisation and abduction are both iterative in nature, and one cannot confirm that exactly similar kinds of processes would follow (cf. Deacon, 2000). In practice, this means that two different researchers may not choose exactly the same theoretical statement or empirical observation to which they relate another theoretical statement. Thus, instead of the repeatability of problematisation and abduction, one should focus on the significance of the selected theoretical statements (cf. Tracy, 2010) and credibility regarding the way they are related (cf. Creswell, 2018). The identification of constitutive themes aims to ensure theoretical significance by continuing to relate theoretical statements to one another until identifying the themes for statements importance, of which the literature seems to agree. Empirical observations that are then selected to be related against statements under these themes are those that seem to say something on these themes. The credibility of conclusions is ensured by providing a detailed description of how each conclusion is structured. In practice, the credibility of statements can be evaluated by examining the validity of logic in section 6, Table 10 of the present dissertation.

The construct validity was ensured by utilising multiple data sources. For instance, both case studies utilised secondary document data to complement gathered interviews, allowing for data triangulation. Furthermore, the semistructured interview format allowed the interviewees to reflect on their interpretations of organisational processes, thus ensuring the validity of their conclusions. In article IV, a questionnaire was utilised to ensure that the study identified sufficient tool types for further analysis. The questionnaire also allowed the respondents to report tools that they considered were missing on analysis.

Considering the external validity (i.e., generalisability), the primary aim and selected methodology, does not require generalisable statements. Instead, the dissertation has aimed to find (one or more) observations that can be considered true or true enough, as implied by ontological presumptions of the work. After identifying true enough observations, the current dissertation has considered whether existing theory ‘allows’ the observation to be true. Thus, the claims presented in chapters 6 of this synopsis are considered to fulfil the research aim of theory advancement because they indicate the need for changes in current theoretical presumptions and imply potential directions for making these changes. Thus, the research has reached the intended generalisability. Although research does not

explicitly aim for the generalisability of findings, apart from article IV, one could speculate that case companies studied in articles III and V manifest characteristics similar to other companies operating in the same field of business. However, because other companies are not examined, the present dissertation considers any claims on generalisability to be speculation.

4 PROBLEMATISING CONSTITUTIVE THEMES FOR VALUE COCREATION

In this section, the answer to the first research question—*What are the constitutive themes in value cocreation?*—is structured. The question is answered by relating the learnings from articles I and II with the value cocreation discussion in S-D logic (e.g., Vargo & Lush, 2004, 2016), strategic business management (e.g., Prahalad & Ramaswamy, 2004; Ramaswamy & Ozcan, 2018) and B2B marketing management (e.g., Aarikka-Stenroos & Jaakkola, 2012; Eggert et al., 2019). The constitutive themes and identified approaches within these themes are summarised in Figure 5. Figure 5 complements the theory section of the illustration of research approach first introduced in figure 1.

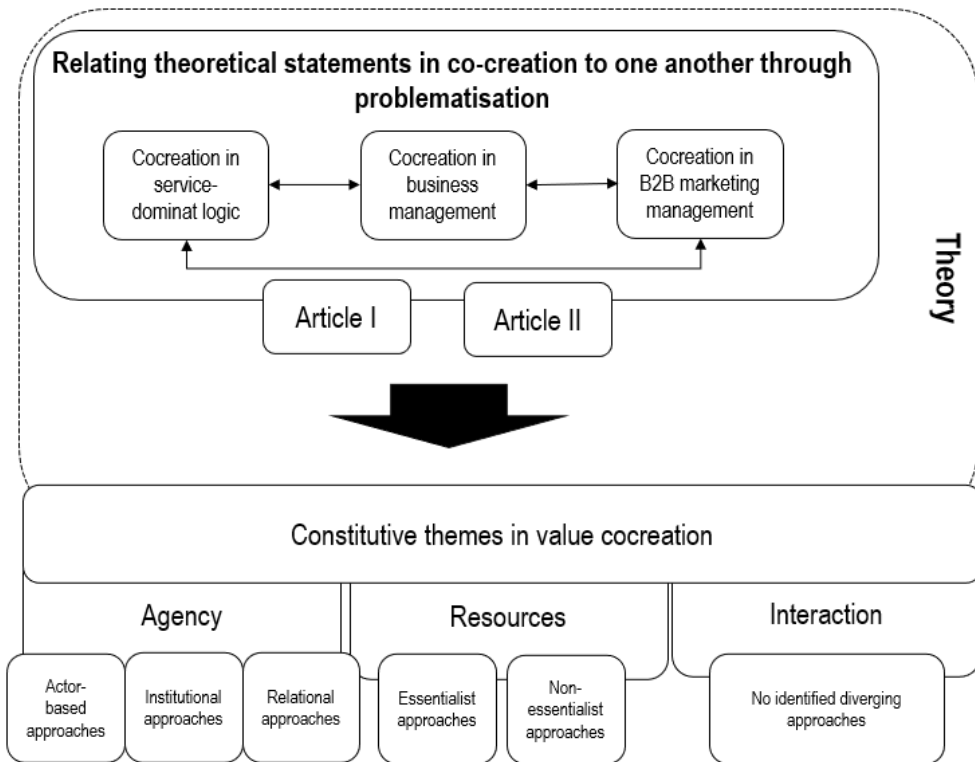


Figure 5. Constitutive themes and the divergent approaches within those themes as identified through problematisation

The current dissertation discusses the identified constitutive themes and divergent approaches within them in more detail by introducing the ideas structured in articles I and II, and elaborating on how these ideas lead to the identification of constitutive themes (see number 1 in Figure 5). Based on these articles, the section proposes that value creation in cocreation paradigm can be understood using three constitutive themes: agency, resources and interaction. The section then considers these themes by relating them with value cocreation literature more broadly (number 2 in Figure 5). By doing so, the section maps how the value cocreation literature in the S-D logic (e.g., Vargo & Lush, 2004, 2016), strategic business management (e.g., Prahalad & Ramaswamy, 2004; Ramaswamy & Ozcan, 2018) and B2B marketing management (e.g., Aarikka-Stenroos & Jaakkola, 2012; Eggert et al., 2019) approaches each (number 3 in Figure 5). Interaction was only of the three constitutive themes to

which the dissertation did not find diverging approaches within the value cocreation discussion.

4.1 Identifying the constitutive themes for value cocreation

Constitutive themes for value cocreation were predominantly identified in articles I and II, which conceptually considered value creation in different contexts by utilizing value cocreation perspectives. Article I examined value creation in the context of B2B sales, whereas article II focused on CE. Through article I, the dissertation identifies agency and interaction as constitutive themes in the cocreation discussion. Through article II, the dissertation identifies resources as constitutive theme in the literature on value cocreation.

4.1.1 Constitutive themes of agency and interaction

The identification of agency and interaction as constitutive themes in value cocreation was largely contributed by article I. The article considered the value creation from the perspective of B2B sales that have recently needed to adapt value creation processes becoming more complex, digital and systemic (Hartmann et al., 2018; Moncrief, 2017). Entities taking part in value creation include not only customers and providers, but multiple stakeholders in the form of organisations, individual experts, teams and departments that come together to propose value in the forms of products, services and solutions as market offerings or that assist customers in determining the wanted solution (Hartmann et al., 2018). The article was motivated by the need to capture this complexity nested in entities participating in value creation that have traditionally been labelled as customers and providers. The article pursued this aim by merging value cocreation perspectives from strategic business management (Ramaswamy & Ozcan, 2018) together with S-D logic (e.g., Vargo & Lusch, 2016).

The article first drew the concept of agential assemblage (cf. DeLanda, 2016; Deleuze & Guattari, 1987), utilised by Ramaswamy and Ozcan (2018) in their conceptualisation of value cocreation as interactional creation. Agential assemblage is ‘an arrangement endowed with the capacity of acting in different ways depending upon its combination of heterogeneous components (persons, objects, etc.), which are interrelated to one another in a way that brings about evolving patterns of

actions' (Ramaswamy & Ozcan, 2018, p. 84). As such, assemblage conceptualises both the emergence of an action, aiming for value creation, as well as the emergence of an entity taking the action. The article then continued in the vein of Ramaswamy and Ozcan (2018) by introducing interactive platforms as instantiations of agential assemblages. Interactive platforms consist of artefacts, processes, people and interfaces. Artefacts include physical and digital things such as data in the form of numbers, text, audio, video or pictures. Processes consist of both digitised and conventional business processes of the interaction with another entity. People are individuals in the role of customers, employees or any other stakeholders. Interfaces include both physical and digitalised means by which an entity interacts with another (Ramaswamy & Ozcan, 2018). According to this conceptualisation, entities participating in value creation emerged throughout the interaction between these components, providing entities with their ability to interact with other entities. Through all these interactions emerged the action aiming for value creation.

The article combined the conceptualisation of Ramaswamy and Ozcan (2018) with the S-D logic notions of value proposing and beneficiary actors (e.g., Vargo & Lusch, 2016). The interaction between these actors is, in S-D logic, considered to emerge from value creation-related actions. Although the approach differs from the conceptualisation of Ramaswamy and Ozcan (2018), its core purpose to explain how actions aiming for value creation emerge is the same. Instead of interaction that constitutes entities, S-D logic focuses on the interaction between entities. In article I, value proposition creation (VPC) was used to refer to the process through which value proposition is developed and communicated to beneficiaries. Value idea emergence (VIE) was instead utilised to conceptualise processes through which beneficiaries become aware of the benefit they pursue. Value cocreation in article I was then conceptualised as the intertwinement of these two processes.

Differing from the aim of article I, that of the present dissertation is not to consider value creation from the perspective of B2B sales, but rather to relate statements in value cocreation discussion with one another. Thus, the dissertation distances itself from the concepts of VIE and VPC, agential assemblage and interactive platform that were selected for article I. However, the current dissertation finds that both the literature on S-D logic (e.g., Vargo & Lusch, 2016) and strategic business management (Ramaswamy & Ozcan, 2018) aim to conceptualise the emergence of value-creating action through interaction, leading to the identification of agency and interaction as constitutive themes in cocreation paradigm.

4.1.2 Resources

The identification of resources as one of constitutive themes in value cocreation was contributed to by article II. The article focused on the domain of CE, with the particular aim of explaining why materials flow in societies. As indicated by the research aim, article II did not directly aim to contribute to the theory of value cocreation. Instead, it used the theory of value cocreation, particularly S-D logic (e.g., Vargo & Lusch, 2016) and services research (Grönroos & Voima, 2013), together with the literature on material agency (e.g., Pickering, 1995) and institutional theory of resources (e.g., Zimmermann, 1951) to explain the emergence of material flows in markets. The identification of resources as constitutive themes is heavily influenced by S-D logic because it explicitly states to build on the dynamic resource understanding of Zimmermann (1951; see also Vargo & Lusch, 2004). Because of this explicit statement, the role of article II was to deepen the understanding of resources rather than to identify their relevance in value cocreation literature. The relevance of resources as a theoretical vehicle outside of S-D logic literature is discussed in section 3.2, which elaborates on different approaches the cocreation literature has taken on identified constitutive themes.

Article II adopted the value cocreation approach by considering value as something to be created through the practice of use for the benefit of entities participating in the practice (Grönroos & Voima, 2013; Vargo & Lusch, 2016). Following the cocreation approach, materials become relevant because they manifest as raw materials to be further refined, tangible products to be used or physical aspects of services when actors interact with them for their specific purposes. The utilisation of materials in value creation makes them, by definition, resources because actors participating value creation draw support on them (cf. Akaka et al., 2021). To then explain the emergence of flows in markets, article II deepens the understanding of resources by considering them as functional relations defined by capabilities (De Gregori, 1987; Zimmermann, 1951). Article II considered that resources are not constituted by their inherent and static properties that allow them to be utilised in a specific manner. Instead, resources arise in relations that allow market actors to utilise them (e.g., relations with technologies, policies, institutions, etc.; see Zimmermann, 1951, p. 7), given that the actors utilising them have capabilities to designate a function for the relations (De Gregori, 1987). Because market actors have different capabilities and goals and are tied to different relations, they perceive materials differently. In article II, these differences in resource potential for materials created the material flows in markets because the actors participating in exchange

either want to acquire potential resources to create value or buy services to dispose of the waste as a way to avoid opportunity costs of dysfunctional materials.

Article II utilised the theory on value cocreation to understand why material flows in societies occur. In doing so, the article identified resources as a constitutive theoretical theme for value cocreation. The aim to identify constitutive themes in the cocreation discussion does not necessitate dissertation to take a particular stance on the nature of resources outside of article II. The dissertation acknowledges the relational take (De Gregori, 1987; Zimmermann, 1951), partly adopted by cocreation discussion in S-D logic (Koskela-Huotari & Vargo, 2016; Vargo & Lush, 2004), as a potential approach to resources. In the next section, the present dissertation discusses the approaches cocreation literature takes to resources and other constitutive themes of value cocreation.

4.2 Reflecting the identified themes back to the literature on value cocreation

Next, the present dissertation further elaborates on the identified constitutive themes by reviewing how they are approached in value cocreation discussion in S-D logic (e.g., Vargo & Lush, 2004, 2016), strategic business management (e.g., Prahalad & Ramaswamy, 2004; Ramaswamy & Ozcan, 2018) and B2B marketing management (e.g., Aarikka-Stenroos & Jaakkola, 2012; Eggert et al., 2019). The purpose of this section is twofold. First, the section aims to validate the ‘constitutiveness’ of the themes identified in articles I and II by observing whether they are given similar relevance in cocreation literature outside the works utilised in those articles. Second, the section elaborates on different approaches the cocreation literature takes on constitutive themes. The literature has been selected based on recognised paradigmatic assumptions that cocreation as a body of literature has: 1) value is not embedded to matter but that emerges through practice and 2) that agency in value creation transcends the provider–customer actor divide. Although these paradigmatic ideas have been lately dominantly put forward by the aforementioned literature, the present dissertation acknowledges that considerations resonating with them are, for instance, presented also in the field of consumer research (Holbrook & Hirschman, 1982), economics (Zimmermann, 1951) and sociology (Lehtonen & Pyyhtinen, 2020). Following the problematisation, the current dissertation aims at in-depth reading rather than wide coverage (Alvesson & Sandberg, 2011), hoping to

reach a thorough analysis on approaches cocreation literature takes to constitutive themes, accepting the risk of missing some viewpoints.

4.2.1 Constitutive theme of agency in value cocreation

Article I identified the thematic area within value cocreation, whose purpose is to explain how actions aiming for value creation emerge. In present dissertation, this area is labelled agency. Agency is a fundamental theme in value creation present in all literature streams of value cocreation considered by the present dissertation. The dominant role of this theme is communicated already within the notion of value cocreation in which co is followed by notion referring to the specific action of creation, while value conceptualising the aimed ends for this action. The cocreation literature in general agrees on the idea that, to understand the emergence of value creation-related action, one needs to transcend the provider–customer actor divide. However, three different approaches to this paradigmatic assumption can be identified. In the current dissertation, these approaches are labelled as actor-based approaches, institutional approaches, and relational approaches. Table 5 summarises these three recognised approaches value cocreation literature has taken when considering agency in value creation.

Table 5. Approaches value cocreation literature takes on agency

| Approach | Elaboration | Respective stream(s) of the literature and related discussion | Quote exemplifying the existence of the approach |
|--------------------------|---|---|--|
| Actor-based approaches | Actor is considered as basic abstraction for emergence of action in value creation. Actors' dispositions allow them to act and, thus, participate in value creation. This results in heterogenous relations emerging from actors interacting to create value. | Approach widely adopted in early S-D logic discussion (e.g., Vargo & Lusch, 2004, 2008), strategic business management (e.g., Ramaswamy, 2009) and B2B marketing management (e.g., Eggert et al., 2019). Notably, actors are often referred to with labels describing their roles. (e.g., customers, providers, individuals, persons, etc.) | Early S-D logic (Vargo & Lush, 2004, 6) description on dispositions allowing people to participate in value creation: 'People have two basic operant resources: physical and mental skills. Both types of skills are distributed unequally in a population.' |
| Institutional approaches | Actor is considered as basic abstraction for emergence of action in value creation. Actors' do have dispositions, but their actions are ultimately enabled and constrained by | Approach adopted by late S-D logic discussion (Vargo & Lusch, 2016; Vargo et al., 2022). | Late S-D logic (Vargo & Lush, 2016, 11) picturing the relation between institutions and human actors: 'In S-D logic, these institutions—humanly devised rules, norms, and beliefs that enable and constrain action |

| Approach | Elaboration | Respective stream(s) of the literature and related discussion | Quote exemplifying the existence of the approach |
|-----------------------|--|--|---|
| | institutions, cultural-cognitive, normative, and regulative elements that provide stability and meaning to social life. | | and make social life predictable and meaningful (Scott 2001; see also North 1990) (...) are the keys to understanding the structure and functioning of service ecosystems.' |
| Relational approaches | Emergence of action is inseparable from heterogenous relations tying entities together. This results in acting entities emerging from heterogeneous relations. | Approach proposed by strategic business management by Ramaswamy & Ozcan (2018). Similar ideas have also been put forward by Maglio et al. (2009) when proposing systems of the heterogeneous configuration of resources (i.e., service systems) as basic abstraction in service science and Kohtamäki and Rajala (2016) in B2B marketing management when implying the applicability of actor network theory when conceptualising value creation. | Strategic business management (Ramaswamy & Ozcan, 2018, 198) on agencial assemblage as a basic abstraction for acting entity: 'An agencial assemblage, thus, has a double emphasis as both an "ensemble" and a "process". It is an "ensemble" as in terms of an arrangement of parts that work together for a certain time, as well as a "process" as in terms of how those parts come together.' |

The cocreation literature has the dominantly considered agency through actor-based views that regard actors as basic abstractions when conceptualising the emergence of value creation-related actions. This is a widely agreed-upon approach in early S-D logic, strategic business management and B2B marketing management. Actor-based approaches share the idea that it is actors who creates value related actions (see Table 5). However, actors can come in many different forms and levels. B2B marketing in particular is characterised by the need to consider both organisational actors, for instance, as buyers and sellers but simultaneously recognise individual humans acting within these organisations (Eggert et al., 2019). Furthermore, the label of an actor is not reserved only for humans. Although the cocreation literature has not explicitly explored the implications of considering nonhumans as actors, it has expressed its openness towards this idea (Kohtamäki & Rajala, 2016; Storbacka, et al., 2016; Vargo et al., 2022).

Institutional views on agency in value cocreation have been developed within S-D logic (Vargo & Lusch, 2016). As in actor-based views, the notion of the actor is considered a basic abstraction for the emergence of value creation-related actions. However, differing from actor-based views, institutional approaches consider actors to be intertwined with their social context, which take the form of regulation, cultural norms and values as well as cognitive frames structuring meaning (Scott, 2008, p.

50). Furthermore, institutional views align with Giddens's (1984) notion of duality of structure, which states that structure is both the outcome and context of actions; actions are bounded by structure (i.e., institutions) while simultaneously maintaining and creating it (Vargo & Lusch, 2016).

Lately, actor-based and institutional views have been complemented with relational approaches to agency in value creation (Ramaswamy & Ozcan, 2018). Relational approaches do not construct agency around actor-labelled entities but consider agency through heterogeneous relations. However, the present dissertation underlines that actor-based, or institutional views do not deny the existence of relations, or the dynamism emerging, when actors interact with each other. On the contrary, exploring and explaining the complexity of heterogeneous relations between actors participating in value creation can be seen as dominant purpose of both actor-based and institutional views (cf. Aarikka-Stenroos & Jaakkola, 2012; Eggert et al., 2019; Vargo & Lusch, 2008). The difference between actor-based and institutional approaches to relational ones can best be described as follows: actor-based views consider the complexity of heterogeneous relations as emerging from interactions between actors (cf. Vargo et al., 2022), whereas relational views consider actors to emerge from the complexity of heterogeneous relations (cf. Ramaswamy & Ozcan, 2018). Although Ramaswamy and Ozcan (2018) first explicitly introduced relationality to value cocreation by adopting the concept of agential assemblage (DeLanda, 2016; Deleuze & Guattari, 1987), the literature on S-D logic has circled around similar ideas multiple times. It has even explicitly stated to have adopted these ideas¹ yet continues to insist that patterns of interactions emerge from actors, not the other way around (Vargo et al., 2022). A similar kind of 'flirting' with relational thinking is indicated through propositions that consider ANT and S-D logic to share ontological similarities (Kohtamäki & Rajala, 2016; Vargo et al., 2022). However, the value cocreation literature is seemingly more focused on terminological similarities portrayed with concepts of actor and network than on considering the relational arguments ANT makes on the nature of actors in relation to networks that constitute them and give them their powers (cf. Latour, 2005).

¹ Vargo and Lusch (2016) stated that service ecosystems and services systems, as conceptualised by Maglio et al. (2009) as heterogeneous configuration of resources, are fundamentally similar concepts.

4.2.2 Constitutive theme of resources in value cocreation

Within the literature on value cocreation, resources constitute the basic abstraction for means for ends (value). Thus, in general, the cocreation literature has considered resources according to their dictionary definition as ‘any factor endowments that can contribute to economic activity’ (Hashimzade et al., 2017), with the activity in focus being creation. The cocreation discussion in strategic business management and B2B marketing management rarely explicitly engages with the notion of resource as a theoretical vehicle. These domains utilize, resource to refer to something seemingly passive, something that is owned, utilised, provided, accessed or acted upon but that is considered critical for value creation. In Table 6, this passive nature is interpreted to imply that resources are considered in an essentialist manner, meaning that resources are considered to have inner properties or characteristics that allow them to be acted upon and contribute to value creation.

Table 6. Approaches towards resources in value creation

| Approach | Elaboration | Respective stream(s) of literature with example citation and related discussion | Quote exemplifying the existence of the approach |
|-----------------|---|---|--|
| Essentialist | Resources are considered resources because of their inherent properties that allow them to be used in value creation. | The literature on business management (e.g., Normann & Ramirez, 1993; Prahalad & Ramaswamy, 2004), and B2B marketing management (Cova & Salle, 2008; Eggert et al., 2018) does not explicitly problematise resources. However, respective streams consider resources something that can be used, accessed, shared, owned, etc., implying that literature considers them an essentialist manner. | Literature on B2B marketing management (Aarikka-Stenroos & Jaakkola, 2012, 23) describing how actors introduce different resources to value creation: ‘suppliers contribute resources such as accumulated specialization and professional integrity, whereas customers typically contribute information about their needs and their business.’ |
| Nonessentialist | Resources are not predetermined properties but become in the context of use with other potential resources. | The literature on S-D logic (Koskela-Huotari & Vargo, 2016). | S-D logic literature (Koskela-Huotari & Vargo, 2016, 164) exemplify the nonessentialist understanding of resources: “resourceness”-i.e. the ability of potential resources to facilitate the accomplishment of something desirable – is determined by the availability of other, complimentary and inhibiting potential resources, (...) Therefore, not only value, but also resources are contextual and “becoming”.’ |

Parting from essentialist resource approach, S-D logic considers resources not as substance or thing, but as ‘an abstraction that describes the function that a substance or an idea contributes to achieve a desired end’ (Koskela-Huotari & Vargo, 2016). In Table 6, this approach is labelled as nonessentialist because it considers resources as an outcome of their context. To exemplify this view, a hammer makes a nail a resource when attaching boards together. Furthermore, S-D logic gives a special role to knowledge-based resources enabling actors to operate other resources (see operant resources [Vargo & Lusch, 2004]) enabled and constrained by institutional setting (Koskela-Huotari & Vargo, 2016). To continue the above example, ultimately, it is the skill to use a hammer that allows above scenario to become.

Neither of the two resource approaches presents a difference between entities providing, accessing or contributing to becoming of resources. Although different entities can introduce different kinds of resources, all resources are necessary for value creation. In the metatheoretical level of S-D logic, this renders all entities resource integrators, thus making the traditional dichotomy of customer and provider meaningless (Vargo & Lusch, 2011). However, from a managerial perspective, companies still need to identify resources they can introduce themselves and what is needed from other actors. When considering this from the perspective of dyad between the customer and provider, the cocreation literature has recognised, for instance, that provider resources often include materials, specialised skills, means of production and so forth that are required for producing an offering (Aarikka-Stenroos & Jaakkola, 2012; Grönroos & Voima, 2013; Macdonald et al., 2016). Customer resources, on the other hand, include, time and financial assets (Holbrook & Hirschman, 1982), information about needs, goals and context (Aarikka-Stenroos & Jaakkola, 2012) and sometimes also competences to participate in the creation of offering (Prahalad & Ramaswamy, 2000).

4.2.3 Constitutive theme of interaction in value cocreation

The last constitutive theme identified by the present dissertation is interaction, the crucial role of which is captured by the prefix *co* in cocreation. As such, it conceptualises the forming of relations through which *co* materialises. While the crucial status of interaction has been more explicitly visible in strategic business management throughout the years of conceptual development (from Normann & Ramirez, 1993 to Ramaswamy and Ozcan, 2018), S-D logic has considered

interaction in a more implicit manner. Consider, for instance how Vargo & Lusch (2004,11) describe the eighth fundamental premise:

Interactivity, integration, customization, and coproduction are the hallmarks of a service-centered view and its inherent focus on the customer and the relationship(...).It is in this sense of doing things, not just for the customer but also in concert with the customer, that the servicecentered view emerges. It is a model of inseparability of the one who offers (and the offer) and the consumer.

Much similar to resources, while given constitutive status, the nature of interaction is not explicitly considered in value cocreation literature. Although not explicitly defined, S-D logic, strategic business management and B2B marketing management seem to agree that interaction is any relation—or the formation of one—in which entities have some effect on each other. Although the value cocreation literature does not have inherently different views to conceptualise interaction, the literature has considered multiple different settings for interaction.

For instance, dyadic settings are often considered in the field of B2B marketing management (e.g., Aarikka-Stenroos & Jaakkola, 2012; Eggert et al., 2019), where the importance of singular customers to the success of the firm is traditionally higher than in consumer markets (Feste et al., 2020). These dyadic settings include, for instance, relationships (Eggert et al., 2018; Flint et al., 1997; Lindgreen et al., 2012), as well as shared processes, practices and activities (Aarikka-Stenroos & Jaakkola, 2012; Kohtamäki & Rajala, 2016; Macdonald et al., 2016; Normann & Ramírez, 1993). Although the criticality of complex networks around B2B customer relations has been acknowledged, they are often considered from the dyadic perspective of provider and customer networks (e.g., Cova & Salle, 2008; Eggert et al., 2019).

The value cocreation literature, which is nonspecific to the B2B setting, has emphasised, for instance, the interaction in brand communities (Prahalad & Ramaswamy, 2000), and among different stakeholders, such as internal, referral, influence, recruitment and supplier markets (Payne & Holt, 2001). Furthermore, ecosystems, as interactional environments (Vargo & Lusch, 2016), and engagement platforms, as enablers for interaction, are emphasised (Ramaswamy & Ozcan, 2018; Storbacka et al., 2016).

5 INTERPLAY OF AI AND EMPIRICAL WORLD COUNTERPARTS OF CONSTITUTIVE THEMES OF VALUE COCREATION

In this section, the present dissertation answers the second research question: *How does AI interplay with empirical world counterparts of constitutive themes of value cocreation?* Thus, the section complements, the lower, empirical world section, of the research approach, introduced in figure 1. Research question is answered by considering the findings from articles III, IV and V. The findings are interpreted from the perspective of newly identified constitutive themes in value cocreation discussed in previous section: agency, resources and interaction. Table 7 summarises the type of empirical observations in articles III, IV and V, and the subsections that follow discuss the findings in more detail.

Table 7. Summarising the empirical findings of the dissertation

| | Finding | Empirical example from articles | Research context |
|--|--|--|--|
| <p>Agency-related findings observed how AI gains its relevance in practices aiming for value creation</p> | <p>AI's relevance in value creation-related practices was observed to be tightly linked with humans.</p> | <p>In article V, the case study interviewees repeatedly described how humans were needed to provide and/or curate textual data for AI systems. The importance of data quality for AI was highlighted multiple times.</p> <p>In article V, the case study interviewees highlighted how the benefit from AI occurs only if humans chose to use systems with AI functionalities.</p> <p>In article V, the case study interviewees emphasised the role of organisational processes in facilitating the interaction between human and AI, for both the providing data for AI as well as use of the system.</p> | <p>Sales of knowledge-intensive B2B services</p> |
| | <p>AI's relevance in value creation practices was observed to be linked with interfaces acting as mediums for interaction.</p> | <p>Article IV observed instances in which AI depended on data generated on customer's previous actions. For instance, AI-enhanced customer relationship management tools utilised data on customer's behaviour with providers (e.g., click-through rates on web platforms or purchase history) to provide sales personnel recommendations for contacting customers.</p> <p>Article IV observed multiple examples of AI tools that utilised open web interfaces like social media platforms or web pages. For instance, AI-enhanced prospecting tools used textual data accessible through these interfaces could find prospects interested in providers offering and provide information on potential buyers to sales personnel.</p> | <p>Digital B2B sales</p> |
| | <p>AI's relevance in value creation was observed to have potential link with technologies allowing data gathering.</p> | <p>Article III observed how QR tags, mobile interfaces or internet of things technologies (IoT) in machines were used to gather data. For instance, the forest machinery and harvesting company examined in the article utilised IoT technologies to gather data on the use of the machine for optimising fuel consumption. Interviewees did not explicitly mention AI when describing the use of IoT technologies. However, interlinkages between AI and data, as exemplified by other observations, imply for beneficially between AI and technologies allowing data gathering.</p> | <p>Circular economy business</p> |
| | <p>AI's relevance in value creation was observed to have a link with technologies</p> | <p>Article II observed how cloud technologies allow AI to access larger volumes of data. The oil refinery company examined in article utilised cloud technologies to integrate supply chain information utilised by AI.</p> | |

| | Finding | Empirical example from articles | Research context |
|---|--|---|---|
| | allowing data storing and integration. | | |
| Resource-related findings observe how AI affects potential resources in practices aiming for value creation | AI was found to increase the resource potential of human capabilities. | <p>Article V observed how AI standardised the language human experts used when describing their capabilities. The interviewees in the examined cases described how this makes capabilities easier to interpret and makes it easier to find experts with the right set of capabilities for client cases.</p> <p>Article V observed how AI forecasted the availability or need for certain capabilities. This allowed organizations to better plan their activities in a manner that required set of capabilities were available at right time.</p> | Sales of knowledge-intensive B2B services |
| | AI was found to increase the resource potential of materials. | Article III observed how oil refinery company harnessed AI to enable the forecasting for supply of bio-waste materials utilised as raw materials and demand for refined products. This led to less storage and logistics solutions needed to make materials applicable. | Circular economy business |
| | AI was found to create new resources. | All the articles observed the interrelations between AI and data. AI rendered data a resource by acting or reasoning on the basis of it. | Circular economy business, sales of knowledge-intensive B2B services, digital B2B sales |
| Interaction-related findings observe how AI affects the interaction in practices aiming for value creation | AI was found to effect on how humans participating to value creation interacted. | Article IV observed, for instance, how AI-enhanced prospecting tools helped sales professionals to allocate their time to most promising leads. How AI-enhanced tools for content production recommended marketing materials and search engine optimised textual expressions. | Digital B2B sales |

Before analysing the findings in more detail, the present dissertation underlines that, while discussing the observations under different constitutive themes, the themes themselves are tightly interlinked. For instance, while in agency related observations AI doesn't, per say, have effect on interactions, AI becomes relevant for value creation through interactions between AI and other than AI entities.

5.1 AI and agency in value creation

The agency-related findings observe how AI becomes relevant in practices that aim for value creation. Two types of findings regarding the interplay between AI and agency in value creation have been found: 1) findings regarding AI's interrelations to humans and 2) findings related to AI and technologies that allow gathering and integrating the data. These include, for instance, IoT technologies, as well as interfaces, that act as mediums for interaction, enabling data gathering from that interaction. The findings are drawn from articles III, IV and V. Articles III and IV focus predominantly on AI and technologies of data gathering and integration, whereas article V highlights AI in relation to humans.

5.1.1 AI and human entities

The findings concerning AI's interrelations to human entities were predominantly made in article V, which examined how humans could collaborate with AI to allocate human IT professionals to client cases where their individual capabilities would be the most beneficial. Article V observed two IT consulting companies that were developing a platform with AI properties for this purpose for their own use. AI collaboration was observed to include instances in which humans used AI for allocating professionals to client cases and instances in which humans were required to act as data sources for AI. The findings also underlined that the use of an AI can itself be an important source of data. In addition to the findings in article V, article IV implied that AI output can manifest in a way that is fully inseparable from humans using it. Table 8 summarises the findings the present dissertation makes on the roles of human and AI in human–AI collaboration in the tasks related to finding human experts for client cases. The tasks listed in Table 8 are also relevant from the perspective of AI and resources discussed in section 5.2, as human-AI collaboration studied in article V aimed for better utilization of human capabilities as resources in solving clients' cases.

Table 8. The roles of humans and AI in human–AI collaboration for

| Aim for human–AI collaboration | Tasks of human | Tasks of AI |
|---|---|--|
| Increasing the understandability of available capabilities by standardising how capability information is presented | Human experts complete, validate and update information about one’s educational backgrounds, skills and experiences gained from prior projects. | AI searches for and updates information on individual experts’ educational backgrounds, skills and experiences gained from earlier projects. |
| | | AI standardises the way how information on capabilities is presented making capabilities comparable. |
| | Human experts create, validate and update information for personality trait analysis. | AI proposes team compositions of multiple experts based on their personality traits. |
| Allocating experts to client cases | Human experts create, validate and update information about preferred working methods (e.g. Scrum, Agile, waterfall, working remotely or shared office) and information on motivations for one’s expertise development. | AI analyses expert motivations for personal development, preferred working methods and frameworks familiar to experts. |
| | Responsible managers or sales personnel use AI tools to support in finding experts with right set of the capabilities. | AI can automatically match human experts to the ‘right’ client projects based on provided data. |
| Responsible managers or sales personnel need to facilitate organisational processes and human-to-human interactions needed for proceeding with a client’s case when suitable experts have been found. | | |
| Forecasting the availability of human experts | Human experts need to create, validate and update information on their availability or on project(s), which they are currently working. | AI can, based on provided data, forecast the availability or need for certain capabilities. |

Considering human–AI collaboration, as observed in article V, the organisational context was highlighted by multiple interviewees. The importance of organisational processes was brought up as managers described how processes facilitate the engagement with the AI. The product owner of the platform developed by one of the case companies described this as follows:

The processes and the whole organisation need to change. When we produce a minimum viable product (referring to AI-enhanced platform under development) and start to use it, we also need to do the ‘minimum viable

organisational change' to actually gain benefit from the tool. Otherwise, we end up in a situation where we're doing things just like before, but with the tool not supposed to be used in that way. It always starts with the organisation, not the tools.

The interviewees also reflected the interrelations of AI and humans on the individual level in organisations to engage with the tools because the interaction with AI was sometimes perceived as tedious or repetitive. In particular, those tasks related to providing or validating the data were reported to be perceived as such. However, the present dissertation emphasises that based purely on this observation, it cannot make any general claims whether working with AI is perceived as tedious or not.

Second, the current dissertation also observed how AI can manifest in a way that is inseparable from humans using it. Examples of these include, for instance, NLP-based AI tools identified in article IV that assisted human experts in text generation, that is, in writing email responses for clients. Based on the information that the developers of these tools provide, for the receiver of these responses, it is impossible to distinguish which parts of the text were generated by a human expert and which ones were by AI.

5.1.2 AI and technologies for data gathering and integration

The findings considering AI and technologies for data gathering and integration have been drawn from the context of circular business in article III and context of digital B2B sales in article IV. The findings identify technological solutions organisations utilise to gather and integrate data. The identified solutions are summarised in Table 9.

Table 9. Findings on AI and technologies for data gathering and integration

| Purpose | Technology/type of technology | Observation | Article and unit of observation |
|-------------|--|--|---|
| Gather data | Internet of Things (IoT) -technologies | IoT gathered data on machine usage | Value creation processes of forest machinery and harvesting provider in article III |
| | | IoT gathering data on machine health and location | Value creation processes of construction tool service provider in article III |
| | | IoT gathering data from vehicles used in logistics systems | Value creation processes of waste management company in article III |

| Purpose | Technology/type of technology | Observation | Article and unit of observation |
|---|-------------------------------|---|--|
| | | IoT gathering data from supply chain and chemical processes of production | Value creation processes of an oil refinery in article III |
| | Interface technologies | Open web interfaces like web pages and social media platforms provided data for AI-enhanced tools | AI functions in social media platforms, as well as tools for social media analysis, sales analysis and prospecting and mapping in article IV |
| | | Company facilitated interfaces like e-commerce platforms or web pages allowed data gathering on interaction with these interfaces | AI functions of e-commerce tools and web page platforms in article IV |
| | Integrate and store data | Cloud technologies | Cloud technologies integrated large volumes of supply chain data |
| Cloud technologies integrated real-time information on side streams of multiple companies | | | Value creation processes of a pulp refinery in article III |
| Enterprise resource planning system (ERP) | | ERP integrates data for maintenance and product development operations | Value creation processes of forest machinery and harvesting provider in article III |
| Customer relationship management system (CRM) | | CRM allowed the integration of interaction data gathered from multiple interface | AI functionalities in tools for marketing automation in article IV |

Article IV focused purely on ML-based AI, whereas the interviewees of case companies in article III more generally described technologies allowing data gathering and integration. In article III, only interviewees from the oil refinery explicitly mentioned that they utilised AI when operating with data. Although the dissertation cannot confirm the extent to which other case companies in article III utilised AI, it considers observations on technologies for data gathering and integration crucial from the perspective of AI use.

Article IV exemplifies the importance of interfaces as ways for data gathering. The article observed public interfaces like social media and web pages where data was drawn for AI models, as well as company-owned interfaces like e-commerce platforms or brand-facilitated web pages. All these interfaces mediated the interactions between entities participating in value creation, simultaneously enabling data gathering. Article III also observed how AI can influence the design of interfaces. The article observed how AI-empowered content production tools and web page platforms can propose contents and visual elements for web pages, help marketing personnel to create page structures or provide managerial feedback on

how different interfaces are linked together. Furthermore, the article observed that customer relationship management (CRM) and marketing automation systems integrated data from multiple interfaces, allowing for data gathering from interactions not only with one, but with multiple interfaces.

5.2 AI and resources in value creation

The findings regarding the interplay between AI and resources in value creation highlight how AI can affect both 1) the material and 2) capability-based resources. The findings are drawn from articles III and V. Article III considered how AI, along with other digital technologies, can affect the use of material resources, whereas article V focused on the capability-based resources of human experts.

AI and material resources

AI was found to affect the resource potential of material resources, as observed in article III. The article observed how interviewees working as technology managers in an oil refinery company described how AI was utilised in forecasting the supply for waste materials that the company utilised in the production of refined products. Furthermore, the interviewees also described how the company utilised AI for forecasting the demand for refined products. Better predicting supply and demand increased the resource potential of raw materials because fewer resources for warehousing and storing solutions were needed during processing.

AI and capability-based resources

In addition to material resources, AI was found to affect the resource potential of the capability-based resources of human individuals. AI and capability-based resources were dominantly observed in article V. As described by the aims for human–AI collaboration summarised in Table 8, article V identified three ways AI affected the resource potential of capability-based resources. AI was found to improve the understanding of capability-based resources, enhance their utilisation and improve their availability.

Increasing resource understanding relates to the ways AI can be used to allow better understanding of capabilities of human experts. Article V observed three ways in which AI increased understanding of capability based resources. First, AI enabled the standardisation of textual information that the experts used to describe their skills and experience gained in previous projects. The experts described their

capabilities with varying languages, which were found to be a challenge for companies to identify and find the needed capabilities for client projects. Standardising the language when communicating capabilities helped. Second, AI could propose team compositions of multiple experts based on personality trait analysis. Increased understanding of personalities was anticipated to increase the possibilities of how well a given team would work together. Third, AI could analyse experts' motivations for career development and preferred working methods.

Article V observed how AI improved the utilisation of capability-based resources. The interviewees in article V described the search for expert(s) as a time-consuming endeavour that, in addition to requiring constant manual (human) work, was a complex process involving many case companies' workers from different levels and business functions to succeed. The possibilities offered by AI to increase the understanding of capability-based resources was considered to greatly ease the need for manual human labour, as aptly noted by one of interviewed managers:

The biggest bother is the updating of that CV for each client, but I don't need to think of that because it [the company's platform] utilises AI. It searches information from LinkedIn and from elsewhere [...] At some point in the future, the AI will optimise your CV based on a customer need. It may take a while, but then the experts don't need to take care of it themselves. Their CV is always sufficiently up to date in the system.

Furthermore, AI collaboration enables case companies to analyse capability-based resource information across a wider spectrum compared with manual processes, improving the chances of finding the right capabilities in the right projects.

finally, AI was found to improve resource availability. This relates to the ways AI can be used to forecast the need for and utilisation of certain capabilities. This allows both clients and service providers to plan their actions better so that the right capabilities are available at the required time. Furthermore, individual experts can better plan their own work based on forecasted requirements for their skills and knowledge.

5.3 AI and interaction in value creation

The findings regarding the interplay between AI and interaction in value creation have shown how AI affects the interaction of other (than AI) entities participating

to value creation. The topic of interaction is related to interfaces acting as mediums for interaction. Because the interfaces were addressed when considering the findings on AI and agency, this subsection focuses on examining findings that observe how AI affects the interaction of other entities. The findings are drawn from article IV, which explicitly focuses on AI in managing interactions. Article IV took a provider-focused view by considering how B2B providers can manage the brand interaction points between their customers and potential customers. Although article IV focused on provider perspective, the customer journey approach is not limited to interactions between customer/potential customer and provider. Instead, the customer journey includes all interactions relevant to customer experience with the brand. These can be, for instance, interaction in customers' own social sphere, interactions with provider's partner, or customers' reflections on their own needs or desires (cf. Lemon & Verhoef, 2016). Article IV observed how AI could assist providers in analysing the interactions and, for instance forecast upcoming interactions based on previous interactions. Furthermore, AI was found to assist B2B providers in designing interactions with their customers and potential customers and helping providers to better engage customers to interact and guide them further along their customer journeys.

Considering the AI analysing the interactions, AI tools were found to automate the report generation, highlight important data points for managers and enhance the efficiency of survey analyses. This could enable more consistent analysis, in which more human effort could be directed at the interpretation of reports than conducting them. Furthermore, AI tools enabled wider analysis for the general attractiveness of a company, based on the social media interaction individuals participated in. AI tools were also able to predict upcoming interactions based on happened in the interactions, enabling more accurate sales forecasts.

AI was found to assist in the design of interaction in three ways. First, AI tools were observed to be able to dissect customer feedback and, based on it, provide suggestions for improving points of interaction between the company and customer or potential customer. Second, AI tools were found to offer suggestions for web page designs and structures for an optimised browsing experience. Finally, AI assisted companies in search engine optimisation by generating optimised text for better findability.

Article IV also observed how AI tools helped companies engage their customers or potential customers in interaction. AI was found to assist marketing professionals in content production, content personalisation and publishing. For instance, AI tools assisted with text generation, the selection of sufficient marketing materials by

enabling responsive testing of materials and the automation of the publishing schedule to maximise visibility.

Article IV also observed how AI guided customers/potential customers further in their interaction with provider. For instance, AI-enabled chatbots and advanced search functions in e-commerce assisted users in interacting with the content they most likely would benefit from. In addition to automating the publishing schedule of digital content, AI tools were found to provide sales and marketing personnel suggestions on how and what time certain prospects/customer would best be contacted. Furthermore, AI was found to identify the most promising prospects for companies and customers who were most likely to end their relationship with the provider. This allowed sales professionals to allocate their time in a more efficient manner to either secure new customers or save customer relationships that were at risk of being dismantled.

6 DISCUSSION

In this section, the present dissertation discusses its findings. Thus far, the current dissertation has answered its two research questions. Considering RQ1, as discussed in Section 4 of this synopsis, the present dissertation identified constitutive themes in the literature on value cocreation, namely agency, resources and interaction. Within these constitutive themes, the present dissertation has identified divergent approaches. The value cocreation literature was found to approach agency either through actor-based, institutional, or relational approaches. Resources, were found to be considered either essentialist or nonessentialist. Considering the last constitutive theme—interaction—present dissertation has not observed approaches within cocreation literature that would diverge. Considering RQ2, as discussed in the previous section of this synopsis, the present dissertation observed how AI interplays with empirical counterparts of each of the constitutive themes. The present dissertation identified that AI agency in value creation is linked to humans; interfaces that act as mediums for interaction; and technologies allowing for data gathering, storing and integration. The present dissertation observes how AI has increased the potential of resources based on human capabilities as well as those that are material in nature. Lastly, this dissertation identifies how AI has affected interactions in value creation by helping non-AI entities to analyse and design their interactions, create engaging content and guide interactions further.

Next, the present dissertation discusses the findings in two parts. First, the dissertation fulfils its aim of exploring the theoretical ramifications of AI for value cocreation by considering the findings from the perspective of the value cocreation (as a paradigm). Second, the dissertation considers its findings in relation to existing knowledge on AI in value creation (as a phenomenon).

6.1 Findings from the perspective of the value cocreation paradigm

This section considers the findings from the perspective of constitutive themes of agency and resources in value cocreation, as well as identified approaches within

these themes as summarised in Figure 6. From the perspective of interaction, the findings do not indicate the need for developing the existing understanding of cocreation literature that considers interaction as any relation (or formation of one) in which entities have some effect on each other. Naturally, this does not mean that AI would not affect how interaction takes place in empirical world value creation. On the contrary, AI affects interactions in multiple ways. However, these effects do not have ramifications calling the nature of interaction as it is conceptualised in cocreation paradigm under examination. Thus, they are discussed in section 6.2, which considers the findings from the perspective of value creation (as a phenomenon), not from the perspective of cocreation (as a paradigm).

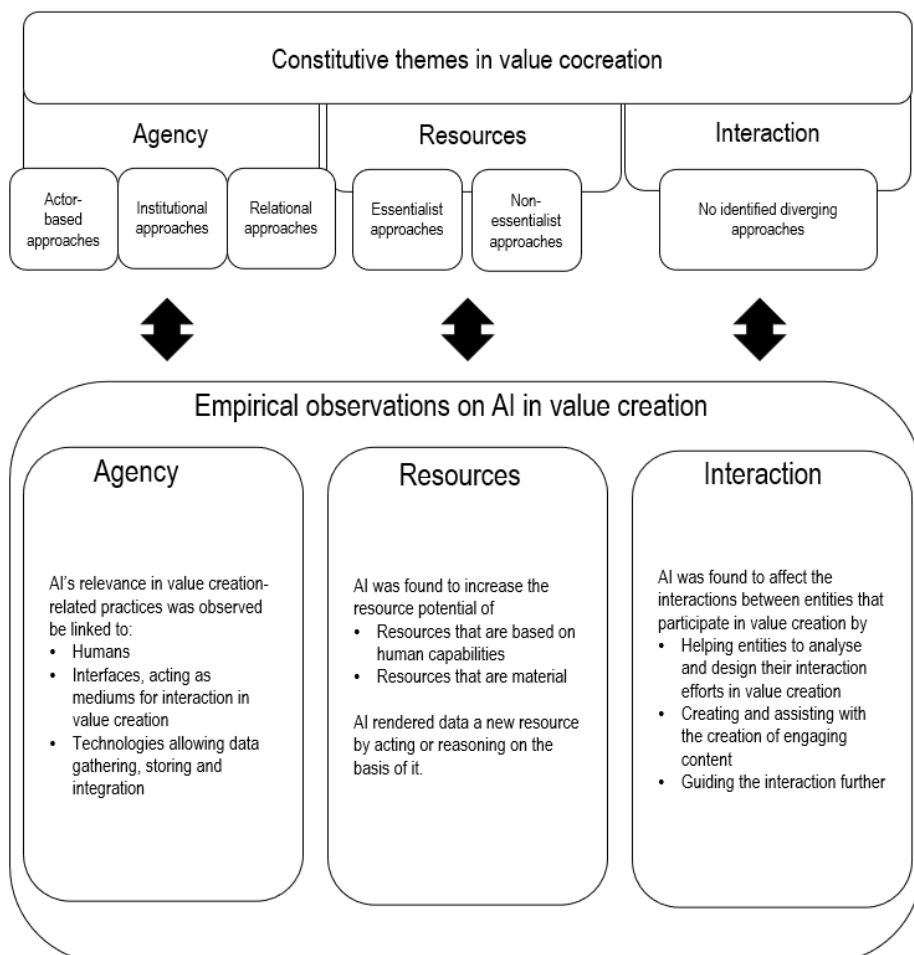


Figure 6. Constitutive themes in value cocreation, together with empirical observations on AI in value creation

Reflecting on the findings from the perspective of agency and resources (Eggert et al., 2019; Koskela-Huotari & Vargo, 2016; Ramaswamy, 2009; Ramaswamy & Ozcan, 2018; Vargo & Lusch, 2004, 2008, 2016), one cannot but highlight the relationality they portray. The interlinkages of AI with its context are twofold. First, how AI works was found to be inseparable from the data, the basis on which the AI has been trained. This interlinks AI directly to the context in which training data are generated and actors that have contributed to generating these data. However, the present dissertation underlines that the utilised AI methods (i.e., neural networks, random forests, etc., that enable data processing) detail how AI at the end ‘interprets’ the data received. For instance, rule-based systems operate only on the premise of preprogrammed rules, thus changing their behaviour on a given input only if the rules are changed.

Second—and more similar to other technologies—AI is inseparable to the context where it is used and, thus, to the entities using it. Because the intelligence of AI becomes from its training data, AI can demonstrate intelligence only if the context of use is identical or similar to the context from which the data for training was gathered. For instance, when developing AI forecasting abilities, the case companies examined in article V utilised data gathered from their own processes, making the contexts of data gathering and use of AI systems highly similar. Furthermore, in the case companies’ situations, data generation depended on the use of the AI tools that were developed. This was because of the AI functionalities of the platform depended on the data specific to the context in which the AI functionalities were used. To elaborate, AI forecasting the availability of experts to solve specific client cases in each time was tightly linked to particular characteristics of examined companies. These characteristics may not accurately represent the conditions and circumstances found in other companies where experts are assigned to handle client cases. Therefore, the effectiveness and applicability of the developed AI tool are limited to the specific companies that were studied and mentioned in the referenced article V. The contexts of teaching data and use of the AI can also be separated, as exemplified by some AI tools examined in article IV. For instance, content-generating tools were based on language models most likely trained with data nonspecific to contexts in which the companies used the tool.

The observed relationality between data, AI and other contextual factors has implications for how agency and the resources are considered in cocreation theory. Table 10 presents the implications of empirical observations to agency and resources to the paradigm of value cocreation.

Table 10. Relating empirical observations to the cocreation paradigm

| | Agency | Resources |
|---|---|--|
| Interpreting empirical observations from the perspective of constitutive themes in cocreation | From the perspective of agency, the dissertation did not find AI as an identifiable entity participating to value creation. Instead, the dissertation observed heterogeneous relations among data, AI method and users of AI. For instance, the interviewees in article V emphasised how AI depended on the provision and curation of data. Thus, if no entities provided data, there would be no AI. | From the perspective of resources, AI was found to enhance resource potential of already recognised resources (materials in article III and human capabilities in article V) by making them appear in a more favourable context. Furthermore, through the utilisation of AI, data became a new resource enabling the AI to function. |
| Approaches towards constitutive themes in cocreation | The value cocreation paradigm considers three approaches to agency. First is actor-based view in which the actor is considered a basic abstraction of agency in value creation. The approach implies that actions emerge from actors interacting. (cf. Eggert et al., 2019; Ramaswamy, 2009; Vargo & Lusch, 2004). Second is the institutional approach, which highlights institutions as enablers and constraints of actions, tying actors and institutions together (Vargo & Lusch, 2016). Third, and last, is relational approach that considers acting entities inseparable from heterogeneous relations tying entities together. The approach implies that actors emerge from heterogeneous relations (cf. Ramaswamy & Ozcan, 2018). | Apart from S-D logic, the cocreation literature considered resources essentialist manner, as something that have inherent properties allowing them to be useful (c.f., Aarikka-Stenroos & Jaakkola, 2012; Grönroos & Voima, 2013; Prahalad & Ramaswamy, 2000). S-D logic approaches resources not as predetermined, but as emergent abstraction describing the function of a given substance or idea that allows it to contribute to a desired end (cf. Koskela-Huotari & Vargo, 2016). |
| Relating empirical observation against literature | Observations support the relational approach to agency and contradict views that portray technologies as an actor with given dispositions allowing certain type behaviour (e.g., Storbacka, et al., 2016). AI was constituted by heterogeneous relations. These included, for instance, relations between data, entities providing data, utilised AI methods and users interacting with AI through a given interface. No such thing as AI as an actor, behaving based on its own powers, was identified. Instead, the abilities of AI to participate in value creation were constituted through the same relations constituting the AI itself. | Observations support nonessentialist approaches to resources and contradict essentialist ones. AI increased the resource potential of observed resources (materials and human capabilities) not by manipulating materials or human capabilities but by affecting the way they appeared in value creation practices. AI's ability to affect known resources was based on relations between data, data provider, AI method and so forth. Thus, all of heterogeneous relations between these components became resources as they enabled the AI to function. Furthermore, these resources, nonessentialist in their nature, constituted AI. |

Table 10 implies that a suitable abstraction to refer AI in value creation seems to, instead of actor (cf. Kohtamäki & Rajala, 2016; Storbacka, et al., 2016) or resource (Akaka & Vargo, 2014), utilized to conceptualise technologies, be a network. To elaborate, this dissertation did not find a clear line between AI and non-AI entities.

Instead, as shown in Table 10, it identified individual nodes – like data, AI methods or technologies for storing and integrating data – that are connected and necessary for AI to demonstrate intelligence. However, given the increased interest in ANT in the value cocreation literature (e.g., Kaartemo & Helkkula, 2018; Kohtamäki & Rajala, 2016; Vargo et al., 2022), it is beneficial to portray the network using the notion of an actor. Furthermore, labelling AI as AI makes much more sense than trying to force a new, more network-like term.

Recognising this, from the perspective of concepts of actor(network) and resource, Table 10 can be portrayed as follows: The relations between data, entities providing it, AI method and so forth become resources as they allow the AI to act or reason as it does in those relations in which AI demonstrates intelligence in a value-creating manner. Thus, each relation becomes a resource, while simultaneously, constituting the AI as an actor(network). Following the reasoning above, the concluding ontological proposition, based on examining AI in value creation, is as follows: *in value creation, actors emerge as resources become*. To further elaborate, based on observations on AI, both actors and resources are dynamic in their nature. Neither precedes the other, but both emerge in an intertwined manner. Resources do not wait as passive properties to be found, nor do actors have an inherent form that determines their interactions. The action of the one (actor) demonstrates the ability to draw support from the other (resource) to create value constituting both the one as well as the other. Perhaps ironically, it is the action, seemingly dynamic and complex, that allows both to be seen as stable, thus masking their true nature.

Allowing relationality within the actor concept would necessitate actor-based and institutional views in B2B marketing management, strategic business management and S-D logic and essentialist resource views in B2B marketing management to reconsider their ontological grounds. Although this would constitute a rather heavy workload of redefining midlevel concepts, through which ontological presumptions are transferred to company practices, it would allow redirect the attention between phenomena, and something that before has been considered as precondition.

To provide an example, the present dissertation considers emergence in markets and value creation, for which the need for elaboration has lately been stressed by Vargo et al. (2022). Instead of provoking researchers to find novel outcomes, patterns of resource integration or complex ecosystem dynamics that emerge from the interaction between two (ore more) things that are stable (i.e., actors; Vargo et al., 2022), the present dissertation encourages questioning whether stability can truly be found within actor-labelled entities. From the perspective of emergence, the

findings of the present dissertation guide researchers to empirically identify mechanisms that maintain entities. Utilising the findings of the present dissertation as an example, not approaching AI as a predetermined entity doing something in value creation allows for identification of intricate dynamics that are needed for making AI a seemingly stable entity (or stable enough, that we are able to put label on it). Not only does AI do something in value creation, but it is constituted and maintained through value creation by constant effort.

6.2 Findings from the perspective of AI in value creation

Next, the present dissertation discusses its findings from the perspective of AI and technology-oriented marketing and the business management literature that more often utilise value cocreation theories than focus on developing them. First, the section considers its findings in relation to the literature that focuses to examine how AI affects value creation practices of companies (e.g., Kaartemo & Helkkula, 2018). Second, the section discusses the implications for how AI is commonly defined in the field of marketing and business management. The third and last sections consider the findings from the perspective of automation—augmentation discussion in marketing management (e.g., Brynjolfsson & McAfee, 2014; Davenport et al., 2020; Raisch & Krakowski, 2021).

The empirical observations made by the current dissertation are well aligned with previous research examining how AI affects the value creation processes of companies. The forecasting abilities of AI in different value creation–related processes were observed multiple times (e.g., O’Neil et al., 2016; Yuan et al., 2014). Similarly, AI’s potential to support service providers in their operations and enable and enhance resource integration was identified by several previous studies (cf. Kaartemo & Helkkula, 2018). Adding to previous findings, article IV observed the vast adoption of generative NLP-based systems in marketing tools offered to companies. Generative AI systems producing an output inseparable from humans have not yet been identified by previous studies.

Besides highlighting the role of language-based AI systems in value creation, the identified relational nature of AI highlights that every AI is different. This is because of the possible differences in data utilised in the training of each system. Although this observation might seem irrelevantly obvious for the developers of these systems, its managerial implications remain unexplored. This is presumably even more relevant in the B2B context, in which the importance of few strategic customers for

company success can be crucial and each customer relationship unique (Hallikainen et al., 2020). The adoption of AI can be hindered in above instances if there is insufficient data on the characteristics and contextual factors unique to specific instance. Moreover, AI models trained solely on openly available web data may overlook critical contextual factors that are specific to a particular situation. Therefore, the development of context-aware AI, as anticipated by Davenport et al. (2020), can only occur if the data collected for teaching the AI aligns with the context in which AI should be aware. Recognising that AI systems are different also has ramifications for how AI is defined in the field of marketing and business management. Broad intelligence-based definitions of AI, such as the one by Russell and Norvig (2016) utilised in the present dissertation, which disregard the underlying technological premises, risk overlooking the possible contextual separation of teaching data and using the tool. These kinds of definitions are particularly common in the literature on marketing and business management (e.g., Davenport et al., 2020; Paschen et al., 2019; Shankar, 2018; Syam & Sharma, 2018). Naturally, how to define AI is not an issue of whether a study acknowledges the role of data and addresses it accordingly. However, blindly treating all AI similarly might distort our understanding of what is possible, what is not and why AI might be a solution in one instance but not for the other. That being said, the present dissertation does not want to belittle the power of broad AI definitions in the managerial context. For instance, in the interviews gathered for article V, AI constituted a boundary object (cf. Star & Griesemer, 1989) that allowed the interviewees and researchers to create an understanding of the properties of developed systems and their requirements. Although the interviewees or interviewers did not have explicit knowledge of the exact AI method the developed systems were based on, a broad AI definition allowed the participants to form a shared understanding of technology in an organisational context.

Observations that consider the intertwinement of humans and AI in value creation are particularly interesting from the perspective of marketing and business management literature focusing on augmentation and automation (e.g., Davenport et al., 2020; Iansiti & Lakhani, 2020; Raisch & Krakowski, 2021). Automation refers to AI replacing human workers or, more accurately, tasks previously performed by humans, whereas augmentation refers to collaboration between humans and AI (Raisch & Krakowski, 2021). Besides the intention to emphasise collaboration, the term augmentation is also utilised to describe AI-enabled enhancement of human's intelligence and capabilities without taking a particular stance on whether this is achieved by collaborative interaction with AI or in some other way (Mele et al.,

2021). Although the difference between these two perspectives is irrelevant from the perspective of observing the output created in an augmentative manner, it is crucial for the entities creating it. For instance, for the reader of text, it is invisible which parts of the text were generated by humans and which were created by AI. However, for the writer, the practice of writing is different depending on whether the text is generated through dialogue with AI, through an AI system proofreading and improving ready-made text or through a brain–computer interface where words proposed by AI are mixed with the ideas of the writer, resulting in a seamless flow of thought. Although it is arguable we may never witness the latter of the scenarios, it is worth highlighting that the literature on automation and augmentation in value creation should recognise the difference because it has implications on facilitating organizational processes for writing the text.

The importance of this was exemplified in article V, which observed how the managers in both case companies seemingly needed to motivate their employees to collaborate with AI. The emphasis for motivation indicates that collaboration with AI was not only greeted with pure joy and enthusiasm but was considered tedious and repetitive. However, article V did not provide evidence that would suggest tediousness or repetitiveness to be some kind of inherent property characteristic to collaborating with AI in general. In article V, the experienced tediousness could have been related to the repetitive nature of tasks collaborating with AI. Another possible explaining factor might have been the aim of AI collaboration (AI assisting experts to find more suitable client cases for their particular capabilities). Although the experts recognised the aim beneficial, it might have been that they were not engaged in finding new client cases when curating the data for AI.

7 CONCLUSIONS

The present dissertation concludes by elaborating on its theoretical contributions, managerial implications, limitations and avenues for future research. Theoretical contributions are considered from the perspective of the value cocreation paradigm represented in the literature on S-D logic (Vargo & Lush, 2004, 2016), strategic business management (Norman & Ramirez, 1993; Ramaswamy & Ozcan, 2018) and B2B marketing management (Aarikka-Stenroos & Jaakkola, 2012; Eggert et al., 2018) as well as from the perspective of the marketing and business management literature examining AI in value creation processes (Fan et al., 2016; Kaartemo & Helkkula, 2018; Paschen et al., 2020).

Managerial implications are dominantly directed at business and marketing managers responsible for implementing or developing AI systems within an organisation and/or facilitating value creation processes. The current dissertation also offers implications for C-level managers responsible for the development of organisational processes and resource allocation for AI implementation.

The present dissertation identifies three types of limitations and propositions of addressing them in future research. First, the dissertation considers the limitations arising from its theoretical positioning, the selected literature and problematisation approach. Second, the dissertation discusses the limitations arising from the phenomenological nature of value and the selected method. Finally, this dissertation considers limitations caused by its broad and inclusive definition of AI.

7.1 Theoretical contributions

Table 11 presents the contributions of this dissertation. The table introduces existing knowledge within a particular field of literature, summarises the findings of the dissertation and elaborates on its contributions in relation to existing knowledge. Table 11 first lists the dissertation's contributions to the value cocreation paradigm, after which it presents the contributions to the literature on AI in value creation.

Table 11. Theoretical contributions of the dissertation

| Existing Knowledge and Streams of Literature | Observation | Contribution |
|---|--|---|
| <p>Contributions to the value cocreation paradigm</p> <p>There is no previous knowledge on commonalities that exhibit cross-field relevance or differences revealing areas of disagreement among the literature on value cocreation in S-D logic (Vargo & Lusch, 2004, 2016), strategic business management (Ramaswamy & Ozcan, 2018) or B2B marketing management (Eggert et al., 2018).</p> | <p>Constitutive themes of agency, resources and interaction in value cocreation exhibit cross-field relevance. The dissertation identifies actor-based, institutional and relational approaches to agency and essentialist and non-essentialist approaches to resources.</p> | <p>The findings structure the value cocreation discussion developed in multiple fields. As such, the findings allow for future research that aims to adopt the value cocreation perspective to better utilise existing literature and avoid forcing noncompatible perspectives together.</p> |
| <p>Agency in value creation is considered actor based because value creation-related actions are believed to emerge from actors interacting with one another based on their own powers in early S-D logic (Vargo & Lusch, 2004), B2B marketing management (Aarikka-Stenroos & Jaakkola, 2012; Eggert et al., 2019, 2018) and early strategic business management (Pralhad & Ramaswamy, 2000).</p> | <p>AI constitutes heterogeneous relations between data, AI method, users and technologies for data gathering and storing. This implies that a suitable abstraction for AI in value creation is that of a network. AI demonstrating intelligent behaviour renders each relation a resource as it allows the AI to function as it does. The dissertation summarises the observed relation between AI (network) and resources via an ontological proposition: actors (networks) emerge as resources become.</p> | <p>The findings contribute to the existing knowledge by proposing an alternative ontological proposition when considering actors and resources in value creation. Instead of taking actors or resources as given preconditions, both should be explicitly viewed as dynamic, evolving phenomena. This view has an influence on conceptualising both the agency and resources in value cocreation.</p> |
| <p>Agency in value creation is considered institutional because it emphasises cultural-cognitive, normative and regulative elements that provide stability and meaning to social life, enabling and constraining value creation-related actions in later literature on S-D logic (Vargo & Lusch, 2016).</p> | | |
| <p>Agency in value creation is considered relational because value creation-related activities emerge from heterogeneous relations constituting entities that act to create value in later literature on strategic business management (Ramaswamy & Ozcan, 2018).</p> | | |
| <p>Resources are considered essentialist in B2B marketing management (Aarikka-Stenroos & Jaakkola, 2012) and strategic business management (Pralhad & Ramaswamy, 2000).</p> | | |
| <p>Resources are considered dynamic in S-D logic (Koskela-Huotari & Vargo, 2016).</p> | | |

| | | |
|---|---|--|
| Technologies are considered actors in B2B marketing management (Kohtamäki & Rajala, 2016) and strategic business management (Storbacka et al., 2016). | | |
| Technologies are considered resources in S-D logic (Akaka & Vargo, 2014). | | |
| Contributions to the literature on AI in value creation processes | | |
| The literature on AI in value creation processes has recognised AI as supporting service providers with forecasting abilities, generating customer understanding, supporting product development and marketing decisions and automating tasks. AI can also enable resource integration between service providers and beneficiaries by identifying needs and preferences, creating human-like service technologies and providing personalised service. Furthermore, AI-enhanced robots were observed to support well-being in the context of healthcare (Kaartemo & Helkkula, 2018). | AI increases the potential of material resources and resources based on human capabilities by making them appear more favourable in context. Furthermore, AI renders data a new resource as it allows AI to demonstrate intelligence. | The findings contribute to the existing knowledge by highlighting that AI not only affects resources by enabling their integration but also affects the potential of resources that are already known for entities participating in value creation. |
| The literature on marketing, business and service management considers AI dominantly through its managerial implications without explicit attention given to how AI is constituted in a particular setting (Paschen et al., 2019; Shankar, 2018; Syam & Sharma, 2018). The literature on marketing management also anticipates AI becoming more context aware (Davenport et al., 2020). | The behaviour of AI is highly contextual depending on data utilised, AI method and context of use. | The findings contribute to the existing knowledge by showcasing that AI systems are constituted differently in different contexts, implying that the managerial implications of AI should not be generalised without carefully considering context-specific factors. Furthermore, the findings imply that anticipated, more context-aware AI can develop only if training data account for the context-specific characteristics in which AI is used. |
| Collaboration between humans and AI includes AI tasks for collecting, curating and consuming/utilising information (Paschen et al., 2020). It is presumed that AI will first automate jobs dominantly consisting of mechanical and analytical tasks, whereas jobs consisting of more intuitive and empathetic tasks will be harder to automate (Huang & Rust, 2018). | Collaborating with AI necessitates humans to actively create information. Facilitating information creation and curating also requires managerial attention and changes to organisational processes. | The findings contribute to existing knowledge by identifying that humans might need to actively create information for AI. The findings imply that before making predictions about job automation based on task structure, new human tasks that are necessary for AI to work should be accounted for. |

While the constitutive themes presented here are the first identified to exhibit cross-field relevance among the three literature streams that are representative of the cocreation paradigm, they are not the first themes argued to hold significant relevance. For instance, literature on S-D logic and strategic business management have both proposed axioms (Vargo & Lusch, 2016) and premises (Ramaswamy, 2011) that summarise ontological building blocks within a particular stream of literature. Thus, the constitutive themes identified in the present dissertation provide a practical tool for scholars who wish to apply the paradigmatic ideas of value cocreation but do not yet consider any particular literature stream as their 'home'. The presented themes can help researchers to navigate the existing value cocreation literature. Similarly, the identified divergent approaches within the themes provide guidelines for selecting and utilising value cocreation literature in a way that avoids ontological contradictions.

Relating the identified approaches with empirical findings on AI in value creation allows the present dissertation to conclude with an ontological proposition: in value creation, actors emerge as resources become. Proposition establishes the relation between actors and resources from a relational perspective in which neither actors nor resources precede the other, but both emerge in an intertwined manner. Resources do not wait as passive properties to be found, nor do actors have an inherent form that determines their interactions. The action of the one (actor) demonstrates the ability to draw support from the other (resource) to create value constituting both the one as well as the other. The proposition informs institutional and actor-based approaches to re-evaluate their ontological basis.

7.2 Managerial implications

Besides providing a theoretical contribution to the value cocreation literature, the current dissertation provides managerial implications for marketing and business practitioners. The implications are directed at business and marketing managers responsible for implementing or developing AI systems within an organisation and/or facilitating value creation processes. The current dissertation also offers implications for C-level managers responsible for the development of organisational processes and resource allocation for AI implementation.

Findings imply that for managers implementing or developing AI solutions, it is critical to view AI not as a standalone entity, but as a set of interconnected relations.

This perspective directs managerial attention to fundamental aspects required for the successful implementation of AI in each context. For example, understanding AI's interdependent relationship with its training data can help managers implementing or developing AI systems better anticipate potential disparities between the contexts in which data is generated and where the system will be implemented. Recognizing potential conflicts between these contexts is essential for implementing AI systems, as AI behaviour is guided by the data used to train the AI. Furthermore, and as observed in article V, integrating human input into AI can necessitate changes to organisational processes. This awareness aids managers responsible for purchasing or developing AI systems in understanding the need for dedicating managerial resource for facilitating the relations between human and AI, when AI is implemented.

In addition to supporting managers implementing or developing AI, the dissertation also explores how AI can enhance companies' value creation processes. The resource-related findings elaborate on possibilities of AI in facilitating resources for value creation. For instance, the dissertation examines how AI's predictive capabilities can optimize the use of material resources, which is particularly useful for managers responsible for supply chain development. Additionally, insights regarding AI and the potential of capability-based resources can assist managers in charge of human resource allocation. While the study primarily observed AI's role in human resource allocations conducted by sales personnel and managers, the findings can also inform HR managers responsible for internal HR operations on the possibilities opened by AI.

Beyond enhancing the utilization of already recognized resources, AI renders data a new resource with its ability to act or reason based on it. For tap into this potential, article III provides insights on different data gathering and storing technologies. Article informs organizations to build solutions and processes for gathering data that can be utilized to understand how value in each context realises. Data describing value realisation allow companies to improve their offering or provide new services that allow customers to utilize their potential resources more efficiently. To successfully harness the resource potential of data using AI, managers should focus on identifying the interfaces that are most accessible to customers and other actors involved in value creation processes. These interfaces can take the form of online and mobile platforms, as well as physical products, machines, and tools, as illustrated in Article III. By structuring data gathering practices around these interfaces, managers can effectively leverage the power of AI and data. This becomes especially crucial for all managers who are adapting to the evolving customer experience.

Adding to implications for customer experience managers, Article IV suggest ways in which readily available AI tools can aid marketing managers in planning their customer interactions. Namely, article IV provided insights on how AI can help to analyse and design points of interactions, as well as engage customers or prospective customers into interaction and guide them forward. The findings are especially beneficial for sales and marketing managers responsible for developing customer experience through digital channels.

Last, relational thinking, the significance of which is emphasized by the findings of this study, has managerial implications that extend beyond AI-related findings. It encompasses a general mindset that can inform and impact various aspects of management. Recognizing the relational nature of not only AI but also employees' work and interactions is crucial for leadership and management. Rather than solely focusing on individuals and things, this mindset emphasizes the fostering and guidance of relations. For C-level managers, adopting a relational mindset involves recognizing the interconnectedness between the organization and its stakeholders. This opens up possibilities for identifying strategic partnerships, not only with subcontractors and customers but also with a broader range of stakeholders. By understanding and leveraging these relationships, C-level managers can enhance the organization's overall strategic position. For department and team leaders who aim to promote effective teamwork, the relational aspects are particularly relevant. It highlights the importance of fostering communication channels, encouraging cooperation, and facilitating the development of social bonds within the organizational setting. By prioritizing these relational dynamics, leaders can create a more collaborative and cohesive team environment, ultimately leading to improved performance and outcomes.

7.3 Limitations and avenues for future research

The current dissertation concludes by discussing the limitations and avenues for future research. This dissertation considers three types of limitations with potential future research directions. First, the present dissertation considers the limitations arising from its theoretical positioning, the selected literature and problematisation approach. Second, the present dissertation discusses the limitations arising from the phenomenological nature of value and the selected method. Finally, this dissertation considers limitations caused by its broad and inclusive definition of AI.

First, positioning of the work and problematisation approach to theory development limits the generalisability of the identified constitutive themes in the broader context of value creation theory. This dissertation has considered value creation through the cocreation literature in S-D logic (e.g., Vargo & Lusch, 2016), strategic business management (e.g., Prahalad & Ramaswamy, 2004) and B2B marketing management (e.g., Eggert et al., 2019), limiting the applicability of theoretical observations to those streams of the literature. Furthermore, because problematisation puts an emphasis on deep reading instead of wide coverage of literature and allows for an iteration along the process (Alvesson & Sköldbberg, 2000), the present dissertation cannot conclude that the identified constitutive themes or approaches to these themes would be definitive. However, by selecting highly cited literature in their domain (e.g., Aarikka-Stenroos & Jaakkola, 2012; Prahalad & Ramaswamy, 2004; Vargo & Lusch, 2004) that have been recognised as conceptual foundations also in value creation discussion outside of particular streams (cf. Zeithaml et al., 2020), this dissertation has aimed at high relevance, rather than the coverage of identified constitutive themes and approaches under these themes.

The identified approaches that the cocreation literature has taken to constitutive themes open promising areas for future research. The approaches identified underline the transitions towards processual-relational views. Views that consider the formation of value creating practices inseparable from the formation of individual elements contributing to the practice. The empirical findings on AI support this direction. Furthermore, the continuing adoption of digital technologies in the everyday lives of individuals is anticipated to broaden the systems where value creation takes place and diversifying the type of entities participating to value creation. Guided by its findings, the present dissertation encourages future research to implement processual-relational views originating in the field of sociology to advance the theoretical development of value creation in the domain of marketing and business management.

Obvious limitations also arise from the phenomenological nature of value. Although the present dissertation acknowledges the experiential nature of value, the qualitative case studies focused on examining the practices through which entities participate in value creation rather than the value experienced throughout these practices. This was underlined by utilising, for instance, the notions of value potential (instead of value) in article III and potential resources (instead of resources) in article V. Neither of the articles aimed at drawing a direct correlation between organisational processes facilitating value creation and preferences experienced by

entities taking part in value creation. Thus, the conclusions drawn in this dissertation also emphasise more the practices of creation than value as experienced.

Acknowledging this limitation and recognised need to further understand value, as it is experienced (Becker & Jaakkola, 2020; Kaartemo & Helkkula, 2018), suggesting deeper engagement with the topic in future research seems a natural choice. The recommendation is supported by the fact that cocreation literature—particularly S-D logic—is not an unheard-of methodology based on interpretive epistemology and subjectivistic worldviews (Becker & Jaakkola, 2020). However, the present dissertation proposes that research on value creation, especially when considered as an intentional aim of entities participating in market exchange, should, instead of emphasising either processes or experiences, focus on the dynamics of the two. Given the complexity related to studying value experiences, yet alone contrasting them with associated practices, the present dissertation encourages future research to examine methodological choices with open mind. Even if this would necessitate stepping beyond ethnography and phenomenological interviews, which are traditionally favoured by scholars examining subjective experiences in marketing (Becker & Jaakkola, 2020). For instance, a survey method called the day reconstruction method, in which participants systematically reconstruct their activities and experiences (Kahneman et al., 2004), would offer a promising tool to examine the relation of practices and value experiences.

A broad approach to AI definition introduces limitations for the conclusions made from observations, particularly in articles III and V. The current dissertation has broadly defined AI as an umbrella term for technologies that are equipped with properties that enable them, or the systems they are part of, to demonstrate intelligence by mimicking human behaviour or thought or by acting or thinking rationally. This enabled the present dissertation to consider AI as it was understood by managers interviewed for case studies in articles III and V and without the access to information on utilised AI methods ‘under the hood’. In article IV, the connection was established between the AI tools and the data they utilize, while also providing a broad description of the specific AI methods employed, such as machine learning (ML) or natural language processing (NLP) as referenced in Article IV. However, the present dissertation did not have access to exact technical details and so was not able to verify the information provided by tool developers. Because this dissertation cannot observe the relation of AI method and its effect on value creation practices, it refrains from making generalizable conclusions on why dynamics of AI manifest in value creation in particular manner. However, by relating the findings in articles III, IV and V, the present dissertation can characterise interfaces as mediums for

data gathering (articles III and IV) or individual humans as data sources (article V). While present dissertation it is not able to definitively answer, for instance, why the dynamics between AI and humans played out as observed in article V, it can generally claim that humans can act as data sources and interplay between humans and AI can manifest differently.

As discussed in section 4, the literature on marketing and business management in general has the tendency to examine AI through its managerial implications, without paying much attention to how AI tools are developed. This is a natural choice because managers using the tools are understandably more interested in how the given tools affect their everyday practices than in how they are developed. However, as demonstrated in articles III, IV and, especially, V, as well as discussed in sections 2 and 6 of this synopsis, data are a crucial factor in determining the behaviour of AI. This leaves research designs focusing on potential use of AI tools one sided when aiming to create a comprehensive view of AI in value creation. Thus, the current dissertation suggests future research, in addition to examining the use or potential use of AI, to also acknowledge the practices of generating and integrating data. Furthermore, the practices of testing or simulating are dominant ways of ensuring that the data gathered in one context turn into intelligence demonstrating behaviour in another (or the same) context. As facilitating testing practices has managerial implications for technologies in value creation, this dissertation considers them fruitful possibilities for future empirical inquiry.

8 REFERENCES

- Aarikka-Stenroos, L., & Jaakkola, E. (2012). Value co-creation in knowledge intensive business services: A dyadic perspective on the joint problem solving process. *Industrial Marketing Management*, 41(1), 15–26.
- Agnihotri, R., Dingus, R., Hu, M. Y., & Krush, M. T. (2016). Social media: Influencing customer satisfaction in B2B sales. *Industrial Marketing Management*, 53(February 2016), 172–180.
- Akaka, M. A., Koskela-Huotari, K., & Vargo, S. L. (2021). Formalizing service-dominant logic as a general theory of markets: Taking stock and moving forward. *AMS Review*, 11(3/4), 375–389.
- Akaka, M. A., & Vargo, S. L. (2014). Technology as an operant resource in service (eco)systems. *Information Systems and e-Business Management*, 12(3), 367–384.
- Alcayaga, A., Wiener, M., & Hansen, E. G. (2019). Towards a framework of smart-circular systems: An integrative literature review. *Journal of Cleaner Production*, 221(June 2019), 622–634.
- Alvesson, M. & Sköldböck, K. (2000). *Reflexive methodology. New vistas for qualitative research*. Sage Publications, London.
- Alvesson, M., & Sandberg, J. (2011). Generating research questions through problematization. *Academy of Management Review*, 36(2), 247–271.
- Arli, D., Bauer, C., & Palmatier, R. W. (2018). Relational selling: Past, present and future. *Industrial Marketing Management*, 69(February 2018), 169–184.
- Asare-Frempong, J., & Jayabalan, M. (2017). Predicting customer response to bank direct telemarketing campaign. *2017 International Conference on Engineering Technology and Technopreneurship (ICE2T)*, Kuala Lumpur, Malaysia, 2017 (pp. 1–4), doi: 10.1109/ICE2T.2017.8215961.
- Astley, W. G. (1985). Administrative science as socially constructed truth. *Administrative Science Quarterly*, 30(4), 497–513.
- Bacharach, S. B. (1989). Organizational theories: Some criteria for evaluation. *Academy of Management Review*, 14(4) 496–515.
- Bansal, Y. (2023). *A deep dive into Chat GPT's neural network architecture*. Medium. <https://medium.com/@yashbansal42/a-deep-dive-into-chat-gpts-neural-network-architecture-d2ac8e5f8fe7>
- Becker, L., & Jaakkola, E. (2020). Customer experience: Fundamental premises and implications for research. *Journal of the Academy of Marketing Science*, 48(4), 630–648.

- Blomsma, F., & Tennant, M. (2020). Circular economy: Preserving materials or products? Introducing the resource states framework. *Resources, Conservation and Recycling*, 156(May 2020). <https://doi.org/10.1016/j.resconrec.2020.104698>
- Bocken, N. M. P., de Pauw, I., Bakker, C., & van der Grinten, B. (2016). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, 33(5), 308–320.
- Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. W.W. Norton.
- Butterfield, A., & Ngondi, G. E. (Eds.). (2016). *A dictionary of computer science* (7th ed.). Oxford University Press.
- Castillo, D., Canhoto, A. I., & Said, E. (2021). The dark side of AI-powered service interactions: Exploring the process of co-destruction from the customer perspective. *Service Industries Journal*, 41(13/14), 900–925.
- Chatterjee, S., Ghosh, S. K., Chaudhuri, R., & Nguyen, B. (2019). Are CRM systems ready for AI integration? *The Bottom Line*, 32(2), 144–157.
- Copeland, M. T. (1923). *Marketing problems*. A.W. Shaw.
- Corsaro, D., & Snehota, I. (2010). Searching for relationship value in business markets: Are we missing something? *Industrial Marketing Management*, 39(6), 986–995.
- Cova, B., & Salle, R. (2008). Marketing solutions in accordance with the S-D logic: Co-creating value with customer network actors. *Industrial Marketing Management*, 37(3), 270–277.
- Creswell, J. W. (2018). *Research design: Qualitative, quantitative & mixed methods approaches* (5th ed.). Sage.
- Davenport, T., Guha, A., Grewal, D., & Bressgott, T. (2020). How artificial intelligence will change the future of marketing. *Journal of the Academy of Marketing Science*, 48(1), 24–42. <https://doi.org/10.1007/s11747-019-00696-0>
- Deacon, R. (2000). Theory as practice: Foucault's concept of problematization. *Telos*, 2000(118), 127–139.
- De Gregori, T. (1987). Resources are not; they become: An institutional theory. *Journal of Economic Issues*, 21(3), 1241–1263.
- DeLanda, M. (2016). *Assemblage theory*. Edinburgh University Press.
- Deleuze, G., & Guattari, F. (1987). *A thousand plateaus: Capitalism and schizophrenia*. University of Minnesota Press.
- Dixon, A. L., & Tanner, J. F. (2012). Transforming selling: Why it is time to think differently about sales research. *Journal of Personal Selling and Sales Management*, 32(1), 9–13. <https://doi.org/10.2753/PSS0885-3134320102>
- Easton, G. (2010). Critical realism in case study research. *Industrial Marketing Management*, 39(1), 118–128.

- Eggert, A., Kleinaltenkamp, M., & Kashyap, V. (2019). Mapping value in business markets: An integrative framework. *Industrial Marketing Management*, 79(May 2019), 13–20.
- Eggert, A., Ulaga, W., Frow, P., & Payne, A. (2018). Conceptualizing and communicating value in business markets: From value in exchange to value in use. *Industrial Marketing Management*, 69(February 2018), 80–90.
- Eriksson, P., & Kovalainen, A. (2008). *Qualitative methods in business research*. Sage.
- Fan, A., Wu, L., & Mattila, A. S. (2016). Does anthropomorphism influence customers' switching intentions in the self-service technology failure context? *Journal of Services Marketing*, 30(7), 713–723.
- Feste, J., Ivens, B. S., & Pardo, C. (2020). Key account selection as a political process: Conceptual foundation and exploratory investigation. *Industrial Marketing Management*, 90(October 2020), 417–434.
- Ferreira, K. J., Simchi-Levi, D., & Wang, H. (2018). Online network revenue management using Thompson sampling. *Operations Research*, 66(6), 1457–1759.
- Flick, U. (2004). Triangulation in qualitative research. In Flick, U., Kardoff, E. & Steinke, I. *A companion to qualitative research* (pp. 178–183). Sage.
- Flint, D. J., Woodruff, R. B., & Gardial, S. F. (1997). Customer value change in industrial marketing relationships: A call for new strategies and research. *Industrial Marketing Management*, 26(2), 163–175.
- Galvagno, M., & Dalli, D. (2014). Theory of value co-creation: A systematic literature review *Managing Service Quality*, 24(6), 643–683.
- Grönroos, C. (1984). A service quality model and its marketing implications. *European Journal of Marketing*, 18(4), 36–44.
- Grönroos, C. (2011). Value co-creation in service logic: A critical analysis. *Marketing Theory* 11(3). 279–301.
- Grönroos, C., & Voima, P. (2013). Critical service logic: Making sense of value creation and co-creation. *Journal of the Academy of Marketing Science*, 41(2), 133–150. <https://doi.org/10.1007/s11747-012-0308-3>
- Giddens, A. (1984). *The constitution of society*. Berkeley: University of California Press
- Gupta, S., Keen, M., Shah, A., & Verdier, G. (2017). *Digital revolutions in public finance*. International Monetary Fund.
- Haas, A., Snehota, I., & Corsaro, D. (2012). Creating value in business relationships: The role of sales. *Industrial Marketing Management*, 41(1), 94–105. <https://doi.org/10.1016/j.indmarman.2011.11.004>
- Habermas, J. (1984). *The theory of communicative action*. Beacon Press.
- Hallikainen, H., Savimäki, E., & Laukkanen, T. (2020). Fostering B2B sales with customer big data analytics. *Industrial Marketing Management*, 86(April 2020), 90–98.

- Hartmann, N. N., Wieland, H., & Vargo, S. L. (2018). Converging on a new theoretical foundation for selling. *Journal of Marketing*, 82(2), 1–18. <https://doi.org/10.1509/jm.16.0268>
- Hashimzade, N., Myles, G., & Black, J. (2017). Resources. In *A dictionary of economics*. Oxford University Press.
- He, K., Zhang, X., Ren, S., & Sun, J. (2016). Deep residual learning for image recognition. *Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition* (pp. 770–778). IEEE. <https://doi.org/10.48550/arXiv.1512.03385>
- Holbrook, M. B. (2006). Consumption experience, customer value, and subjective personal introspection: An illustrative photographic essay. *Journal of Business Research*, 59(6), 714–725.
- Holbrook, M. B., & Hirschman, E. C. (1982). The experiential aspects of consumption: Consumer fantasies, feelings, and fun. *Journal of Consumer Research* 9(2), 132–140.
- Huang, M.-H., & Rust, R. T. (2018). Artificial intelligence in service. *Journal of Service Research*, 21(2), 155–172.
- Iansiti, M., & Lakhani, K. (2020). Competing in the age of AI. *Harvard Business Review*. (January-February 2020), <https://hbr.org/2020/01/competing-in-the-age-of-ai>
- Jobin, A., Ienca, M., & Vayena, E. (2019). The global landscape of AI ethics guidelines. *Nature Machine Intelligence*, 1(9), 389–399. <https://doi.org/10.1038/s42256-019-0088-2>
- Kaartemo, V., & Helkkula, A. (2018). A systematic review of artificial intelligence and robots in value co-creation: Current status and future research avenues. *Journal of Creating Value*, 4(2), 211–228.
- Kahneman, D., Krueger A. B., Schkade, D. A., Schwarz, N. & Stone, A. A. (2004). A survey method for characterizing daily life experience: the day reconstruction method. *Science* 306(5702). doi: 10.1126/science.1103572. PMID: 15576620.
- Kohtamäki, M., & Rajala, R. (2016). Theory and practice of value co-creation in B2B systems. *Industrial Marketing Management*, 56(July 2016), 4–13.
- Kolbjornsurd, V., Amico, R., & Thomas, R. J. (2016). How artificial intelligence will redefine management. *Harvard Business Review*, (6). <https://hbr.org/2016/11/how-artificial-intelligence-will-redefine-management>
- Koskela-Huotari, K., & Vargo, S. L. (2016). Institutions as resource context. *Journal of Service Theory and Practice*, 26(2), 163–178. <https://doi.org/10.1108/JSTP-09-2014-0190>
- Kotler, P. (1967). *Marketing management analysis, planning, and control*. Prentice Hall.
- Kuhn, T. S. (1970). *The structure of scientific revolutions*. University of Chicago Press.
- Kurtmollaiev, S. & Pedersen, P., E. (2022). Bringing together the whats and hows in the service innovation literature: An integrative framework. *International Journal of Management Reviews* 24(4), 625–653.

- Latour, B. (2005). *Reassembling the social: An introduction to actor-network-theory*. Oxford University Press.
- Laud, G., Bove, L., Ranaweere, C., Cheryl, W.W., Sweeney, L. J., & Smith, S. (2019). Value co-destruction: A typology of resource misintegration manifestations. *Journal of Services Marketing, 33*(7), 866–889.
- Lehtonen, T. K., & Pyyhtinen, O. (2020). From trash to treasure: Valuing waste in dumpster diving. *Valuation Studies, 7*(2), 197–220.
- Lemon, K. N., & Verhoef, P. C. (2016). Understanding customer experience throughout the customer journey. *Journal of Marketing, 80*(6), 69–96. <https://doi.org/10.1509/jm.15.0420>
- Lindgreen, A., Hingley, M. K., Grant, D. B., & Morgan, R. E. (2012). Value in business and industrial marketing: Past, present, and future. *Industrial Marketing Management, 41*(1), 207–214. <https://doi.org/10.1016/J.INDMARMAN.2011.11.025>
- Louridas, P., & Ebert, C. (2016). Machine learning. *IEEE Software, 33*(5), 110–115.
- Macdonald, E. K., Kleinaltenkamp, M., & Wilson, H. N. (2016). How business customers judge solutions: Solution quality and value in use. *Journal of Marketing, 80*(3), 96–120.
- Maglio, P., Vargo, S. L., Caswell, N., & Spohrer, J. (2009). The service system is the basic abstraction of service science. *Information Systems and e-Business Management, 7*(January 2009), 395–406.
- Marcos Cuevas, J. (2018). The transformation of professional selling: Implications for leading the modern sales organization. *Industrial Marketing Management, 69*(February 2018), 198–208.
- Marshall, A. (1927). *Principles of economics*. Macmillan. (Original work published 1890)
- McCarthy, E. J. (1960). *Basic marketing: A managerial approach*. Richard D. Irwin.
- McCulloch, W., & Pitts, W. (1943). A logical calculus of ideas immanent in nervous activity. *The bulletin of mathematical biophysics, 5*, 115–133.
- Meire, M., Ballings, M., & Van den Poel, D. (2017). The added value of social media data in B2B customer acquisition systems: A real-life experiment. *Decision Support Systems, 104*(December 2017), 26–37.
- Mele, C., Spena, T. R., Kaartemo, V., & Marzullo, M. L. (2021). Smart nudging: How cognitive technologies enable choice architectures for value co-creation. *Journal of Business Research, 129*(1), 949–960.
- Moncrief, W. C. (2017). Are sales as we know it dying ... or merely transforming? *Journal of Personal Selling and Sales Management, 37*(4), 271–279.
- Murphy, J., Gretzel, U., & Pesonen, J. (2019). Marketing robot services in hospitality and tourism: The role of anthropomorphism, future of tourism marketing. *Journal of Travel & Tourism Marketing, 36*(7), 784–795.
- Murphy, K. (2014). *Machine learning: A probabilistic perspective*. MIT.

- Murray, A., Skene, K., & Haynes, K. (2017). The circular economy: An interdisciplinary exploration of the concept and application in a global context. *Journal of Business Ethics*, 140(3), 369–380. <https://doi.org/10.1007/S10551-015-2693-2/METRICS>
- Nilsson, N. J. (2009). *The quest for artificial intelligence: A history of ideas and achievements*. Cambridge University Press.
- Normann, R., & Ramírez, R. (1993). Designing interactive strategy. *Harvard Business Review*, (July-August 1993). <https://hbr.org/1993/07/designing-interactive-strategy>
- North, D. C. (1990). *Institutions, institutional change, and economic performance*. Cambridge University Press.
- Nuruzzaman, M., & Hussain, O. K. (2018). A survey on Chatbot implementation in customer service industry through deep neural networks. In *Proceedings of the 2018 IEEE 15th International Conference on e-Business Engineering*, Xi'an, China, (pp. 54–61). IEEE.
- Nystrom, P. (1915). *The economics of retailing* (vols. 1/2). Ronald.
- Olshavsky, R. W., & Donald, H. G. (1979). Consumer decision making: Fact or fiction? *Journal of Consumer Research*, 6(September), 93–100.
- O'Neil, S., Zhao, X., Sun, D., & Wey, J. (2016). Newsvendor problems with demand shocks and unknown demand distributions. *Decision Sciences*, 44(1), 125–156.
- Ozkazanc-Pan, B. (2019). Diversity and future of work: Inequality abound or opportunities for all? *Management Decision*, 59(11), 2645–2659.
- Paesbrugge, B., Rangarajan, D., Sharma, A., Syam, N., & Jha, S. (2017). Purchasing-driven sales: Matching sales strategies to the evolution of the purchasing function. *Industrial Marketing Management*, 62(April 2017), 171–184.
- Paschen, J., Kietzmann, J., & Kietzmann, T. (2019). Artificial intelligence (AI) and its implications for market knowledge in B2B marketing. *Journal of Business & Industrial Marketing*, 34(7), 1410–1419.
- Paschen, J., Wilson, M., & Ferreira, J. J. (2020). Collaborative intelligence: How human and artificial intelligence create value along the B2B sales funnel. *Business Horizons*, 63(3), 403–414.
- Patton, M. (1990). Designing qualitative studies. In *Qualitative evaluation and research methods* (2nd ed., pp. 169–186). Sage.
- Payne, A., & Holt, S. (2001). Diagnosing customer value: Integrating the value process and relationship marketing. *British Journal of Management*, 12(2), 159–182.
- Pickering, A. (1995). The mangle of practice. In *The mangle of practice: Time, agency and science* (pp. 1–34). University of Chicago Press.
- Prahalad, C., & Ramaswamy, V. (2000). Co-opting customer competence. *Harvard Business Review*, (January-February 2000), 79–87.
- Prahalad, C. K., & Ramaswamy, V. (2004). Co-creation experiences: The next practice in value creation. *Journal of Interactive Marketing*, 18(3), 5–14.

- Prasasti, N., & Ohwada, H. (2014). Applicability of machine-learning techniques in predicting customer defection. *Proceedings of the 1st International Symposium on Technology Management and Emerging Technologies*, Bandung, Indonesia, (pp. 157–162).
- Raisch, S., & Krakowski, S. (2021). Artificial intelligence and management: The automation–augmentation paradox. *Academy of Management Review*, 46(1), 192–210.
- Ramaswamy, V. (2009). Co-creation of Value – Towards an Expanded Paradigm of Value Creation. *Marketing Review St. Gallen* 26(4), 11–17.
- Ramaswamy, V. (2011). It's about human experiences... and beyond, to co-creation. *Industrial Marketing Management*, 40(2), 195–196.
- Ramaswamy, V., & Ozcan, K. (2014). *The co-creation paradigm*. Redwood City: Stanford University Press.
- Ramaswamy, V., & Ozcan, K. (2018). What is co-creation? An interactional creation framework and its implications for value creation. *Journal of Business Research*, 84(March 2018), 196–205.
- Ranta, V., Keränen, J., & Aarikka-Stenroos, L. (2020). How B2B suppliers articulate customer value propositions in the circular economy: Four innovation-driven value creation logics. *Industrial Marketing Management*, 87(May 2020), 291–305.
- Rapp, A., Bachrach, D. G., Panagopoulos, N., & Ogilvie, J. (2014). Salespeople as knowledge brokers: A review and critique of the challenger sales model. *Journal of Personal Selling and Sales Management*, 34(4), 245–259.
- Reichertz, J. (2004). Abduction, deduction and induction in qualitative research. In U. Flick, E. von Kardoff, & I. Steinke (Eds.), *Companion to qualitative research* (pp. 159–164). Sage.
- Rodriguez, M., Ajjan, H., & Peterson, R. M. (2016). Social media in large sales forces: An empirical study of the impact of sales process capability and relationship performance. *Journal of Marketing Theory and Practice*, 24(3), 365–379. <https://doi.org/10.1080/10696679.2016.1170538>
- Rosa, P., Sassanelli, C., Urbinati, A., Chiaroni, D., & Terzi, S. (2020). Assessing relations between circular economy and Industry 4.0: A systematic literature review. *International Journal of Production Research*, 58(6), 1662–1687. <https://doi.org/10.1080/00207543.2019.1680896>
- Russell, S., & Norvig, P. (2016). *Artificial intelligence: A modern approach* (3rd ed.). Pearson Education.
- Rusthollkarhu, S., Toukola, S., Aarikka-Stenroos, L., & Mahlamäki, T. (2022). Managing B2B customer journeys in digital era: Four management activities with artificial intelligence-empowered tools. *Industrial Marketing Management*, 104(July 2022), 241–257.
- Say, J. (1821). *A treatise on the political economy*. Wells and Lilly.
- Sayer, A. (2000). *Realism and social science*. Sage.
- Scott, W. R. (2001). *Institutions and organizations*. Sage.

- Scott, W. R. (2008). *Institutions and organizations: Ideas and interests*. Sage.
- Shankar, V. (2018). How artificial intelligence (AI) is reshaping retailing. *Journal of Retailing*, 94(4), vi–xi.
- Shaw, A. (1912). Some problems in market distribution. *Quarterly Journal of Economics*, 26(4), 703–765.
- Sheth, J. N. (1979). The surpluses and shortages in consumer behavior theory and research. *Journal of the Academy of Marketing Science*, 7(4), 414–427.
- Shimomura, Y., Nemoto, Y., Ishii, T., & Toshiyuki, N. (2017). A method for identifying customer orientations and requirements for product-service systems design. *International Journal of Production Research*, 56(7), 2585–2595.
- Simon, H. (1957). *A behavioral model of rational choice, models of man, social and rational: Mathematical essays on rational human behavior in a social setting*. Wiley.
- Singh, J., Flaherty, K., Sohi, R. S., Deeter-Schmelz, D., Habel, J., le Meunier-FitzHugh, K., Malshe, A., Mullins, R., & Onyemah, V. (2019). Sales profession and professionals in the age of digitization and artificial intelligence technologies: Concepts, priorities, and questions. *Journal of Personal Selling and Sales Management*, 39(1), 2–22.
- Smith, A. (1904). *An inquiry into the nature and causes of the wealth of nations*. W. Strahan and T. Cadell. (Original work published 1776)
- Star, S. L., & Griesemer, J. R. (1989). Institutional ecology, ‘translations’ and boundary objects: Amateurs and professionals in Berkeley’s Museum of Vertebrate Zoology. *Social Studies of Science*, 19(3), 387–420.
- Steward, M. D., Narus, J. A., Roehm, M. L., & Ritz, W. (2019). From transactions to journeys and beyond: The evolution of B2B buying process modeling. *Industrial Marketing Management*, 83(November 2019), 288–300.
- Storbacka, K., Brodie, R. J., Böhmman, T., Maglio, P. P., & Nenonen, S. (2016). Actor engagement as a microfoundation for value co-creation. *Journal of Business Research*, 69(8), 3008–3017. <https://doi.org/10.1016/J.JBUSRES.2016.02.034>
- Storbacka, K., Ryals, L., Davies, I. A., & Nenonen, S. (2009). The changing role of sales: Viewing sales as a strategic, cross-functional process. *European Journal of Marketing*, 43(7), 890–906. <https://doi.org/10.1108/03090560910961443>
- Syam, N., & Sharma, A. (2018). Waiting for a sales renaissance in the fourth industrial revolution: Machine learning and artificial intelligence in sales research and practice. *Industrial Marketing Management*, 69(February 2018), 135–146.
- Tukker, A. (2015). Product services for a resource-efficient and circular economy: A review. *Journal of Cleaner Production*, 97(June 2015), 76–91.
- Tracy, S. J. (2010). Qualitative quality: Eight “big-tent” criteria for excellent qualitative research. *Qualitative Inquiry*, 16(10), 837–851.
- Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68(1), 1–17.

- Vargo, S. L., & Lusch, R. F. (2008). Service-dominant logic: Continuing the evolution, *Journal of the Academy of Marketing Science*, 36(1), 1–10.
- Vargo, S. L., & Lusch, R. F. (2011). It's all B2B...and beyond: Toward a systems perspective of the market. *Industrial Marketing Management*, 40(2), 181–187. <https://doi.org/10.1016/j.indmarman.2010.06.026>
- Vargo, S. L., & Lusch, R. F. (2016). Institutions and axioms: An extension and update of service-dominant logic. *Journal of the Academy of Marketing Science*, 44(1), 5–23. <https://doi.org/10.1007/s11747-015-0456-3>
- Vargo, S. L., Peters, L., Kjellberg, H., Koskela-Huotari, K., Nenonen, S., Polese, F., Sarno, D., & Vaughan, C. (2022). Emergence in marketing: An institutional and ecosystem framework. *Journal of the Academy of Marketing Science*, 51(April 2022), 1–21.
- Vargo, S. L., Wieland, H., & Akaka, M. A. (2015). Innovation through institutionalization: A service ecosystems perspective. *Industrial Marketing Management*, 44(January 2015), 63–72.
- Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A. N., Kaiser, L., & Polosukhin, I. (2017). Attention is all you need. *31st Conference on Neural Information Processing Systems*.
- Verbeke, W., Dietz, B., & Verwaal, E. (2011). Drivers of sales performance: A contemporary meta-analysis. Have salespeople become knowledge brokers? *Journal of the Academy of Marketing Science*, 39(3), 407–428. <https://doi.org/10.1007/s11747-010-0211-8>
- Wieland, H., Hartmann, N. N., & Vargo, S. L. (2017). Business models as service strategy. *Journal of the Academy of Marketing Science*, 45(April 2017), 925–943.
- Wirtz, J., Patterson, P. G., Kunz, W. H., Gruber, T., Lu, V. N., Paluch, S., & Martins, A. (2018). Brave new world: Service robots in the frontline. *Journal of Service Management*, 29(5), 907–931.
- Yin, R. K. (2014). *Case study research: Design and methods* (5th ed.). Sage.
- Yuan, H., Xu, W., & Yang, C. (2014). A user behavior-based ticket sales prediction using data mining tools: An empirical study in an OTA company. *Proceedings of the 11th International Conference on Service Systems and Service Management*, Beijing, China, pp. 1–6.
- Zacho, K. O., Mosgaard, M., & Riisgaard, H. (2018). Capturing uncaptured values: A Danish case study on municipal preparation for reuse and recycling of waste. *Resources, Conservation and Recycling*, 136(September 2018), 297–305.
- Zeithaml, V. A., Parasuraman, A. & Berry L. L. (1985). Problems and strategies in services marketing. *Journal of Marketing*, 49(2). 33–46.
- Zeithaml, V. A., Verleye, K., Hatak, I., Koller, M., & Zauner, A. (2020). Three decades of customer value research: Paradigmatic roots and future research avenues. *Journal of Service Research*, 23(4), 409–432.
- Zimmermann, E. W. (1951). *World resources and industries*. Harper and Row.

APPENDIX

QUESTIONER GUIDE

Background knowledge

- Age
- Career history and current occupation
- Occupational interests

Digital transformation within the organization

- Own experiences in organizational digital development projects
- How would you describe the role of digital development within your organization and in your occupation
- What kind of learnings on successes and failures have you encountered
- What kind of capabilities your organization recruits for, does they have a connection to digital development projects
- What kind of digital tools do you/your organization currently utilizes
- Why those tools were selected/developed

Digital transformation from the perspective of the customer and business environment

- How your customer/other stakeholders interact with your company, have digital environments changed these processes and if so how
- What kind of technological transformations you currently consider crucial in your field.
- What kind of organizations you consider most potential customers to your company
- What are the most crucial interaction points between your company and customer, and why
 - What kind of changes do you anticipate to happen in these
 - Are there differences in between your current and potential customers

Platforms

- What kind of platform solutions do you currently utilize/develop
- What kind of partners participate to development, with what kind of resources, Who should participate but does not yet, and why etc...
- What are the partner roles in platforms you develop/utilize

- What kind of barriers/drivers for development your organization encounters, why, how to overcome them, etc..
- Benefits/risks related to platforms and their development to your company, customers, and other stakeholders à Value propositions and their development

Growth and sales

- How sales and marketing organizes within your organizations
 - Who, what, how, when, why, processes, KPIs
- How sales strategies are developed in relation to customer segments
 - do you consider this a functioning method, what could be developed
- What kind of customer expectations do you/your organization encounter
- What kind of tools do sales utilize in your organization
- What kind of development goals have been set, why, and what has been learned during the process

At end

- What kind of issues are on your “table” in the next six months?
- If you could decide, what would ideal situation within your organization look like in one year
- Did we forget to ask anything crucial?

PUBLICATIONS

- I Rusthollkarhu, S., Hautamäki, P., & Aarikka-Stenroos, L. (2021). Value (co-)creation in B2B sales ecosystems. *Journal of Business and Industrial Marketing*, 36(4), 590–598. <https://doi.org/10.1108/JBIM-03-2020-0130>
- II Rusthollkarhu, S., & Uusikartano, J. (2021). Materials to resources – Innovating economic agency in a circular economy. *ISPIM Conference proceedings*.
- III Rusthollkarhu, S., Ranta, V., & Aarikka-Stenroos, L. (2021). How digital technologies boost value potential creation and value realisation in CE: Insights from a multiple case study across industries. In S. Jakobsen, T. Lauvås, F. Quatraro, E. Rasmussen, & M. Steinmo (Eds.), *Research handbook of innovation for a circular economy* (pp. 236–250). Edward Elgar.
- IV Rusthollkarhu, S., Toukola, S., Aarikka-Stenroos, L., & Mahlamäki, T. (2022). Managing B2B customer journeys in digital era: Four management activities with artificial intelligence-empowered tools. *Industrial Marketing Management*, 104(July 2022), 241–257.
- V Rusthollkarhu, S., Mattila, M., Aarikka-Stenroos, L., & Yrjölä, M., (2023). How AI augments value creation: Towards a model of human–AI cooperation in services research. In S. Scupola, A. H. Henten, & L. Fuglsang (Eds.), *Handbook of artificial intelligence and services*. Edward Elgar. [Manuscript accepted for publication]

PUBLICATION

|

Value (co-)creation in B2B sales ecosystems

Rustholkkarhu, S., Hautamäki, P., & Aarikka-Stenroos, L.

Journal of Business and Industrial Marketing, 36(4), 590–598.
<https://doi.org/10.1108/JBIM-03-2020-0130>

**Publication is licensed under a Creative Commons Attribution 4.0
International License CC-BY**

Value (co-)creation in B2B sales ecosystems

Sami Rusthollkarhu

Unit of Industrial Engineering and Management, Tampere University, Tampere, Finland

Pia Hautamaki

Unit of Business, Tampere University of Applied Sciences, Tampere, Finland, and

Leena Aarikka-Stenroos

Unit of Industrial Engineering and Management, Tampere University, Tampere, Finland

Abstract

Purpose – Digital ecosystemic business environments challenge dyadic approaches to value creation and particularly to business-to-business (B2B) sales. This paper aims to offer a novel conceptualization of the connection between value creation and B2B sales, which indicates practical implications and builds an agenda for future research.

Design/methodology/approach – This conceptual paper integrates theoretical insights on service-dominant logic, service ecosystems, interactional value co-creation and B2B sales. This paper uses anecdotal evidence from the field of B2B sales to illustrate theoretical concepts developed in the paper.

Findings – The paper develops the concept of value idea emergence (VIE), the process through which B2B entities become aware of a pursuable benefit. The paper further proposes that value (co-)creation in ecosystems happens through VIE's intertwining with the process of value proposition creation, a process, which includes all activities needed to bring a value proposition to a customer. The paper then discusses the role of B2B in these processes and proposes an agenda for future research.

Practical implications – The novel conceptualizations of value (co-)creation can help B2B sales managers to understand the ecosystemic nature of the interactions that affect sales and value creation in the current business environment.

Originality/value – The paper contributes to the literature on B2B sales and value creation by proposing a novel concept of VIE, introducing a conceptual model of interactive value (co-)creation in ecosystems and reformulating the role of B2B sales in value creation. These theory-developing insights can be used to guide both academic and managerial attention to interactions happening in the ecosystem outside of the buyer-seller dyad.

Keywords Interaction, Co-creation, Value creation, Digitalization, Ecosystem, B2B sales

Paper type Conceptual paper

1. Introduction

Value creation in business-to-business (B2B) situations and particularly in B2B sales, has recently undergone rapid changes, becoming more complex, digital and systemic (Akaka and Vargo, 2014; Hartmann *et al.*, 2018; Moncrief, 2017). This has challenged the conventional perception that value is created through dyadic interactions between B2B buyers and sellers (Grönroos and Voima, 2013; Haas *et al.*, 2012; Hohenschwert and Geiger, 2015). The scope of value-creating interactions has widened as digitalization has enabled global competition (Marcos Cuevas, 2018) and helped to introduce non-traditional actors (e.g. outside consultants and industry experts) to both B2B value creation and sales processes (Hartmann *et al.*, 2018). This shift towards the partly digital and ecosystemic environment of B2B sales has been acknowledged, but not yet fully explored. Hence, this paper aims to build a novel conceptual understanding of the connection between B2B sales and value creation in

ecosystemic settings, to provide practical implications and to propose an agenda for future research.

Due to changes in the business environment introduced by digitalization, value-creating interactions do not only occur in sales processes shared by the customer and the provider. In fact, most of the interactions within B2B customers' buying process take place through digital means outside of the buyer-seller dyad (Steward *et al.*, 2019; Lemon and Verhoef, 2016). This paper proposes a conceptualization of value creation in an ecosystemic setting and how this is reflected in B2B sales. It builds on a recent ecosystemic conceptualization, which defines sales as:

The interaction between actors aimed at creating and maintaining thin crossing points – the locations at which service can be efficiently exchanged

© Sami Rusthollkarhu, Pia Hautamaki and Leena Aarikka-Stenroos. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>

This study is part of the ROBINS research project funded by Business Finland 2019-2022 (document numbers 7885/31/2018 and 7802/31/2018).

Received 2 March 2020

Revised 9 July 2020

Accepted 20 August 2020

The current issue and full text archive of this journal is available on Emerald Insight at: <https://www.emerald.com/insight/0885-8624.htm>



Journal of Business & Industrial Marketing
36/4 (2021) 590–598
Emerald Publishing Limited [ISSN 0885-8624]
[DOI 10.1108/JBIM-03-2020-0130]

for service – through the ongoing alignment of institutional arrangements and the optimization of relationships (Hartmann *et al.*, 2018, p. 9).

This definition sees value as being created in thin crossing points, where service exchange between customer and provider is possible. The thinness or thickness of crossing points refers to the simplicity of the interaction required for the exchange (Hartmann *et al.*, 2018). Thin crossing points permit an exchange through shallow and simple interactions, whereas thick crossing points require the development of complex interactions for the exchange to occur (Baldwin, 2008). It is also worth highlighting that, in addition to the sales personnel of the provider, actors from multiple organizations can participate in selling activities, including actors working for the buying organization (Hartmann *et al.*, 2018; Paesbrugge *et al.*, 2018).

Hartmann *et al.* (2018) emphasize sales that happen through dialogic interactions. However, from the perspective of value creation, focussing purely on dialogical interactions only partially captures the complexity within ecosystemic environments. Buyers' expectations and actions are greatly affected by unidirectional interactions, where the level of trust between actors is not sufficient to engage in dialogue (Ballantyne and Varey, 2006) or engagement does not happen for other reasons. For example, web pages (D'Haen *et al.*, 2016) or blog posts by industry experts (Zanette *et al.*, 2013) are not always dialogical by nature but might include information or other stimuli that affect buyers' expectations. The expectations formed by previous dialogical and unidirectional interactions greatly affect consecutive dialogical interactions, as well as the outcomes of those interactions (Eggert *et al.*, 2019).

In this paper, we elaborate on the concept of value creation in an ecosystemic setting by considering both dialogical and unidirectional interactions. This paper also proposes that the complexity involved in B2B value creation is not fully captured, when companies participating in B2B transactions are labelled conventionally as “buyers” and “sellers”. This paper highlights the fact that B2B buyers and sellers are not individual actors. This topic is broadly acknowledged in the field of B2B sales, where multiple roles within buying organizations and their effect on organizational decision-making are widely discussed (Chandler and Johnston, 2012; Paesbrugge *et al.*, 2018; Paesbrugge *et al.*, 2017). Thus, it is beneficial to conceptualize the formation of agency within B2B value creation in more detail, as is the aim of this paper.

This conceptual paper aims to develop B2B sales and value creation theory. It, therefore, follows an envisioning approach that facilitates the discovery-phase of the discovery-justification continuum (Yadav, 2010), which characterizes the development process of new knowledge (Hanson, 1958). Envisioning encompasses contributions that identify something new and extend our deep understanding of the phenomena under study (MacInnis, 2011). In this paper, we develop a theory by combining two theoretical streams – value creation and B2B sales – with anecdotal evidence from contemporary B2B sales settings. The paper aims to reveal unexplored areas in the field of value creation in B2B sales. By doing this the paper inspires empirical work to advance the knowledge development process to the phase of justification, thereby enabling further discovery (Yadav, 2010). To achieve this, this paper extends the literature on B2B sales (Grönroos and Voima, 2013; Haas *et al.*, 2012; Hartmann *et al.*, 2018),

service-dominant logic (Vargo and Lusch, 2004, 2016) and the conceptualization of interactive value (co-)creation (Ramaswamy and Ozcan, 2018). The anecdotal evidence stemming from ethnographic follow-up in B2B sales within sales research projects is used to illustrate developed theoretical concepts.

The purpose of this paper is to conceptualize interactive value (co-)creation processes in an ecosystemic setting and to rethink the role of B2B sales through practical implications of our conceptualization. The paper contributes to the literature on B2B sales and value creation by introducing a conceptual model of interactive value (co-)creation in ecosystems, discussing the changing role of B2B sales and proposing an agenda for future research. In our conceptualization, the value in an ecosystemic environment is (co-)created when the processes of value proposition creation (VPC) – which includes all activities needed for a provider to bring a value proposition to a customer (Grönroos, 2011) – and the process of value idea emergence (VIE) – which involves the customer becoming aware of pursuable benefit – intertwine. Using this model, this paper broadens the discussion on B2B sales and value creation outside of the buyer-seller dyad where salespeople create value with customers, for example, as relationship builders (Weitz and Bradford, 1999), co-diagnosers (Aarikka-Stenroos and Jaakkola, 2012), change architects (Dixon and Tanner, 2012) and knowledge brokers (Verbeke *et al.*, 2011). We propose that in an ecosystemic setting, the role of sales is to coordinate the intertwining of VPC and VIE processes. With this paper, we hope to provoke further discussion by guiding both academic and managerial attention to interactions happening in the ecosystem outside of the buyer-seller dyad.

We begin by presenting the background on value creation in B2B sales. Next, we elaborate on key elements in our conceptualization, and then introduce the conceptual model of interactive value (co-)creation. We conclude by discussing how this novel approach to value (co-)creation is reflected in B2B sales, introducing practical implications of our conceptualization, presenting an agenda for future research and providing examples of possible research questions for future efforts.

2. Value creation in business-to-business sales

The role of B2B sales in creating and facilitating value has been widely acknowledged (Haas *et al.*, 2012; Håkansson *et al.*, 2009; Geiger *et al.*, 2009). The important role of salespeople in value creation as relationship builders (Arli *et al.*, 2018; Weitz and Bradford, 1999), co-diagnosers (Aarikka-Stenroos and Jaakkola, 2012), change architects (Dixon and Tanner, 2012) and knowledge brokers (Rapp *et al.*, 2014; Verbeke *et al.*, 2011) has been highlighted. Also, the strategic role of salespeople as a primary source of valuable customer insight, enabling the development of winning value propositions, has been acknowledged (Geiger *et al.*, 2009). The topic of value creation has been mainly approached from the perspective of the dyadic relationship between customer and seller (for more discussion, see Grönroos and Voima, 2013; Homburg *et al.*, 2009; Kowalkowski, 2011; Vargo and Lusch, 2008). However, besides dyadic approaches, more ecosystemic views of sales (Hartmann *et al.*, 2018) and value creation (Vargo and Lusch, 2016) have started to emerge.

An ecosystemic setting indicates that value creation and sales are the responsibility of all participants (Akaka and Vargo, 2014; Marcos Cuevas, 2018). Customers' complex needs introduce actors who may not have previously attended the traditional sales meetings (e.g. experts) in the B2B sales and value creation processes (Hartmann *et al.*, 2018). To manage these more complex customer experiences, consisting of multiple interactions (Lemon and Verhoef, 2016), companies need to use all the internal (Hughes *et al.*, 2012; Thaichon *et al.*, 2018) and possibly external (Prahalad and Ramaswamy, 2004; Trainor, 2012) resources and capabilities they have access to. This places more emphasis on organizing not only the collaboration between sales and marketing (Malshe *et al.*, 2017) but also within the organization as a whole, and between customers and other stakeholders (Arli *et al.*, 2018; Marcos Cuevas, 2018; Paesbrugge *et al.*, 2017).

As the field of sales has become digitalized over the past decades (Singh *et al.*, 2019), digital tools and new technologies have come to play a pivotal role in today's ecosystemic sales processes. Firstly, advanced technologies shape how B2B customers interact in the business environment in which buying and selling processes take place (Marcos Cuevas, 2018; Moncrief, 2017; Singh *et al.*, 2019; Syam and Sharma, 2018.) Secondly, technologies, like social media (Agnihotri *et al.*, 2016; Rodriguez *et al.*, 2016) and artificial intelligence (Syam and Sharma, 2018), affect interactions within the sales process. This presents challenges to understanding value creation in B2B sales because buying processes are not limited to the dyadic relationship between buyer and seller but instead include different interactions with multiple entities (Lemon and Verhoef, 2016).

The following section elaborates on the topic of value creation in an ecosystemic environment by combining insights from the literature on value creation with illustrative examples from the field of B2B sales.

3. Value (co-)creation in ecosystems – reflections from business-to-business sales

As discussed above, several changes in the B2B landscape – such as digitalization, increased number of interaction touchpoints, changes in customer behaviour and global competition – have

pushed B2B sales to an ecosystemic environment and transformed its role in value (co-)creation. Such an ecosystemic transition has also taken place in the wider spectrum of B2B sales and value creation (Aarikka-Stenroos and Ritala, 2017). Based on the literature on value creation and anecdotal evidence from practical B2B sales examples, this section develops a conceptual model of interactive value (co-)creation in ecosystems (Figure 1).

Our conceptualization constitutes four key concepts:

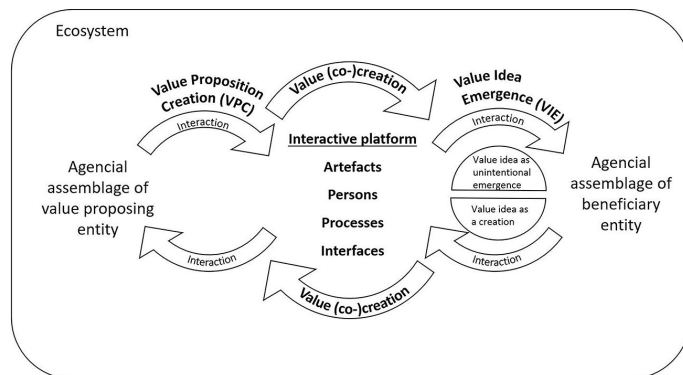
- 1 **agencial assemblage**, referring to actors in the B2B context;
- 2 **interactive platforms**, which describes elements that facilitate the interaction between agencial assemblages in the B2B environment;
- 3 **VPC**, which occurs through the interaction of agencial assemblages with interactive platforms and refers to all activities needed for a producer to bring a proposition to a customer; and
- 4 **VIE**, which refers to the process in which the agencial assemblage acknowledges and clarifies the pursuable benefit.

The following section starts by introducing each of these key concepts in more detail. Anecdotal evidence is used to illustrate each element. At the end of the section, the conceptual model of interactive value (co-)creation in ecosystems (Figure 1) is presented, bringing each of these elements together.

3.1 Agencial assemblage

The paper uses the concept of an agencial assemblage when discussing entities that take part in selling, buying and value-creating actions. Organizational buyers are not individual actors. Different, possibly even conflicting roles within buying organizations and their effects on decision-making at the organizational level are widely discussed in the field of B2B sales (Chandler and Johnston, 2012; Paesbrugge *et al.*, 2018; Paesbrugge *et al.*, 2017). This complexity embedded within the interplay of agency and structure is relevant in B2B environments in general as multiple “agenting” entities are embedded in the wider organizational context in the form of individuals, teams and departments (March, 1988). To capture this complexity, this paper uses the concept of agencial assemblage, defined as:

Figure 1 Conceptual model of interactive value (co-)creation in an ecosystem



An arrangement endowed with the capacity of acting in different ways depending upon its combination of heterogeneous components [...] which are interrelated to one another in a way that brings about evolving patterns of actions [...] It is an “ensemble” as in terms of an arrangement of parts that work together for a certain time and a “process” as in terms of how those parts come together (Ramaswamy and Ozcan, 2018, p. 203).

The dualistic essence of the concept, which simultaneously describes an ensemble and a process, allows this paper to work with a more realistic conception of the B2B buyer and seller. Both are more precisely described as entities consisting of multiple parts and processes bringing those parts together, than merely as actors who buy or sell. Thus, we use this concept within our conceptualization of the role of B2B selling in value creation in ecosystems.

We draw a real-life example from a company in the field of business intelligence modelling in the construction industry that participated in our research project. The company provides a digital platform for a self-service ecosystem where the constructor and user of the facility, consultants and the owner can co-develop spaces. The use of this platform makes it part of the value creation between different actors. The platform also enables new processes for other parts of the organization to come together to co-develop the space. The digital platform is, thus, simultaneously a part of the organization and a part of the process bringing the organizational parts together.

3.2 Interactive platforms

Interactive platforms mediate all socio-material practices of interactions (Ramaswamy and Ozcan, 2018). The paper uses interactive platforms as a tool to understand value-creating interactions in ecosystems. Interactive platforms are also instantiations of agencial assemblages (Ramaswamy and Ozcan, 2018), and they form a second key element in our conceptualization.

Interactive platforms consist of APPI components, namely, artefacts, processes, people and interfaces. Artefacts include physical and digital things such as data in the form of numbers, text, audio, video or pictures. Processes consist of both the digitized and conventional business processes of interaction with another entity. People are individuals in the role of customers, employees or any other stakeholders. Interfaces include both physical and digitalized means by which an entity interacts with another entity (Ramaswamy and Ozcan, 2018).

Interactive platforms are not just intermediaries between different types of customers (Rochet and Tirole, 2006), nor are they modularizations of products (Gawer, 2014). Interactive platforms mediate all socio-material practices of interaction (Callon, 2016; Ramaswamy and Ozcan, 2018). It is also worth highlighting that the concept of the interactive platform should not be confused with conceptualizations of platforms as purely technological infrastructure. Different technological solutions may indeed be present within the different APPI components, but the concept is not defined by the involvement of technology.

APPI components define the ability of an entity to interact with other entities, thus forming both the “ensembles” in which different parts work together and the “processes” of different parts coming together. Each APPI component of the interactive platform can also comprise other APPI components. Ramaswamy and Ozcan (2018) use Facebook as an example and describe how digital artefacts, like newsfeeds and the “like button”, form an entanglement of platform components

together with the non-visible part data processes of the platform. The APPI components of interactive platforms are, thus, heterogeneous and can be part of multiple instantiations of agencial assemblages (Ramaswamy and Ozcan, 2018).

We further illustrate this concept by using an example from a company in the IT sector that helps companies find IT experts in their network to solve complex digital challenges in the B2B industry. This company used to recommend IT, experts, based on manual work between salespeople and buyers, relying on interactive platforms consisting mostly of people and company processes. The process of finding the right candidate was time-consuming and demanded the identification of several suitable candidates for customer organizations’ needs. The company understood that it needed to develop this process to make it more effective. It introduced digital interfaces for the use of its entire business network, including customers, employees, future employees, subcontractors and stakeholders.

Today, this process – which previously created value for salespeople and buyers mainly after the sale was made – is a valuable process for several different entities. For example, an IT expert is now able to share a video about himself, his work experience and his knowledge and can add information about his desired future working opportunities. The buying organizations and decision-makers are able to log into the ecosystem to find and select the right candidate with just one click. The future talents are able to market their knowledge and promote their skills to the more experienced teams. Based on all of the data, an IT company can, for example, forecast the future based on the movements of the actors in the ecosystem. This real-life business case example illustrates that different APPI components can enable value-creating interactions, even without the provider company’s knowledge or formal activities.

3.3 Value proposition creation

This paper uses VPC to conceptualize the process of bringing value propositions to possible customers. This stems from service-dominant logic, whereby companies can merely propose a value to the market, which is then (co-)created by customers when they interact with the value propositions available to them (Kowalkowski, 2011; Vargo and Lusch, 2008). The process of proposing value or VPC, as labelled in this paper, includes all activities needed for a provider to bring a value proposition to a customer (e.g. design, development, manufacturing and delivery) (Grönroos, 2011). In this paper, we aim not to change this reasoning but to add that when following the logic of ecosystems, not just the actions of entity proposing value to potential customers should be considered. Thus, the statement is broadened to include the activities of all actors involved in creating value propositions or other ways of participating in value creation (Vargo and Lusch, 2011, 2016).

However, as previously stated, the term “actor” is too simplistic to describe the entities who buy and sell in a B2B environment accurately. Thus, we instead use the concept of “agencial assemblage” when describing the entity proposing value to potential customers. This paper proposes that VPC happens through the interaction of an agencial assemblage with interactive platforms, where the goal of the action guides interactions. To illustrate this concept, consider a copywriter engaged in the process of writing and publishing a text describing the features of a new product on the company’s

website. In this rather simple example of the process of communicating product information, the copywriter's interactions with his or her personal computer and its software artefacts form an agencial assemblage capable of writing and publishing a digital artefact (a product description) for potential customers to interact with. Naturally, the entire process of proposing value also consists of much more complex agencial assemblages and interactions than the one described above. However, the logic of agencial assemblages formed through the intended aim (in the above example, the need to fulfil a given task to publish a text) and interactions with APPI components remain similar.

Another example is a B2B medical technology company that operates globally. The company offers technology-based medical solutions to improve the quality of human life. Its product, a medical device that models brains, supports health-care professionals in their work with the help of technology that operates based on algorithms and mathematics. It has already been successful in its business, and the best surgeons want to share their insights about this medical device and how they have used advanced technology to be more successful in their own work as surgeons. This medical technology company uses its customers' knowledge as part of its customer-centric operations. For example, it organizes events where many of the most respected surgeons in the world are invited to share their knowledge. Recently, it has started to share short videos on social media platforms (e.g. LinkedIn) in which health-care experts search for new information and best practices for their works. This anecdotal example illustrates shared VPC through interaction with APPI components. In this example, VPC occurs through interaction with customers as the company is able to improve value propositions based on feedback gathered from events and discussions on social media platforms.

3.4 Value idea emergence

In this section, we propose the concept of VIE: the process in which a B2B customer becomes aware of a benefit worth pursuing (i.e. the emergence of an idea of value) and sharpens his or her expectations towards this benefit. By introducing this concept, we are then able to conceptualize value (co-)creation in ecosystems in a way that accounts for interactions preceding the ones involved in value propositions. Through the concept of VIE, it is possible to understand B2B sales in ecosystems through the lens of value creation.

The concept of VIE includes a heterogeneous set of interactions with different actors playing different roles in the emergence and sharpening of an idea of a pursued value. We emphasize that VIE is a process that not only takes place before but also during, interactions with the value proposition. We suggest that the valuable experience of the customer is better described as a process consisting of multiple interactions, given that:

- the relational context of interactions is shaped by the interaction between actors, rather than given (Snehota, 2004); and
- the interpretation of an actor determines both the amount of value created through interactions (Vargo and Lusch, 2004) and the expectations of the value created through consecutive interactions (Eggert *et al.*, 2019).

We propose that in an ecosystemic setting, it is trivial whether the interaction through which these expectations are formed occurs between value proposers or any other actor (e.g. media, blog post, conference presentation, personal social network).

Hartmann *et al.* (2018) describe similar observations using the example of cloud services. The probability of a customer buying a particular cloud service partly depends on the customer's perception of cloud services in general (Hartmann *et al.*, 2018). In other words, customers might have formed expectations of the value of a particular cloud service before even acknowledging the existence of this specific service.

We propose that, like VPC, the process of VIE happens through interactions with APPI components of the interactive platform. As an illustration, we use an anecdotal example that emerged during an interview with a customer segment manager of a company that provides certification services. The company operates in multiple countries and industries, so its purchase needs are, in most cases, related to expertise in specific industries or the legislation of a specific country. A customer segment manager at the company described how their buying process usually starts with the needs of their own customers. Consultants working on customers' projects inform the company of any possible buying needs, which then are advanced in a more formal buying process led by specific managers. In the case of this company, value ideas emerge through the interaction between customers and consultants and are further sharpened in a more formal process of deciding what will be bought and how. Like all socio-material interactions, these interactions are mediated by interactive platforms.

It is important to highlight the mechanisms between interactions and the process within an agencial assemblage. In the above example, consultants who first developed a value idea pursued it further by informing the organization about the possible purchases needed to complete the project. In other words, the value idea led consultants to interact with the managers responsible for the later parts of the purchase process. This interaction describes how parts of an organizational entity can be brought together, forming an ensemble capable of advancing the purchase process. Considering both the mechanism for emergence and sharpening of the value idea, as well as the mechanisms for the process within agencial assemblage, the paper defines VIE as follows:

Value idea emergence is a process entailing the value idea as an emerging outcome without the embodied experience of engagement and creation embedding the intention, guiding the agencial assemblage of the beneficiary entity in service exchange.

Value ideas can emerge through interaction unintentionally and without engaging with them, but they can also be intentionally created and sharpened. In the above example, consultants' interactions with the customer were not motivated by the desire to find a need for purchase. Rather, the value idea emerged through interactions that occurred while working on the customer's problem. After it emerged, the sharpening of value idea became a more intended process, focussed on forming more precise expectations towards the concrete ways of satisfying the need identified by the consultant. Value ideas also guide the agencial assemblage. In the example, consultants alone were not able to finish the purchase process by themselves. However, the value idea drove them to interact with the managers responsible for purchases (i.e. it guided the agencial assemblage) and share their idea, allowing it to be pursued further.

3.5 Conceptual model of interactive value (co-)creation in ecosystems

Finally, we conclude this section by proposing a conceptual model of interactive value (co-)creation. This model synthesizes four previously described key elements to explain how to value ideas emerge and co-create value in ecosystemic settings. The VPC and VIE processes are motivated by Hartmann *et al.* (2018) and Ramaswamy and Ozcan's (2018) theories and are furthermore fuelled by anecdotal evidence from B2B sales. In Figure 1, the individual processes of VPC and VIE are modelled with arrows demonstrating interactions between the APPI components of an interactive platform. Value (co-)creation is thought to happen when the processes of VIE and VPC occur in a shared APPI component of an interactive platform, allowing two processes to intertwine.

In Figure 1, the arrows between VPC and VIE illustrate value (co-)creation through the intertwining of the two processes. In this intertwining, the agencial assemblages of the value proposer and beneficiary entity interact through the shared APPI components of the interactive platform – such as a salesperson (people), company website (artefacts and possible interface) or social media platform (interface). Value is simultaneously evaluated with regard to expectations (Kim and Stoel, 2005), and the idea of future value is further elaborated on the basis of experienced value in interactions (Eggert *et al.*, 2019). The process within the agencial assemblage also continues to happen through value (co-)creation. New actors can still be introduced to both processes regardless of their intertwining.

In the next section, contributions of the model, implications of the model for B2B sales and practical implications are discussed. An agenda for future research intended to prompt further discussion is presented.

4. Conclusions, practical implications and future research agenda

This paper contributes to the literature on value creation (Grönroos and Voima, 2013; Haas *et al.*, 2012; Prahalad and Ramaswamy, 2004; Ramaswamy and Ozcan, 2018; Vargo and Lusch, 2008, 2011) by conceptualizing VPC and VIE. Additionally, this paper contributes to the discussion by broadening the role of B2B sales to include not only interactions that salespeople participate in but also those they do not participate in. In this way, it highlights interactions not shared by value-proposing and beneficiary entities, but that takes place in a larger ecosystem. The literature has mainly focussed on the perspective of the dyadic B2B buyer-seller relationship, where salespeople create value with customers as relationship builders, co-diagnosers of value and change architects (Aarikka-Stenroos and Jaakkola, 2012; Grönroos and Voima, 2013; Dixon and Tanner, 2012; Weitz and Bradford, 1999). Next, we elaborate on this approach to the relationship between B2B sales and value creation.

4.1 Business-to-business sales coordinating the intertwining of value proposition creation and value idea emergence

The model presented in Figure 1 builds on the ecosystemic understanding of value creation by conceptualizing the set of

heterogeneous interactions that take place in VPC and VIE before the two processes are intertwined. These interactions are as crucial as those that happen during (co-)creation as they set expectations and the starting point for (co-)creation. We consider this addition relevant, as technological advancements have already brought some of these interactions within reach of sales and marketing professionals. For example, marketing automation software and advanced customer resource management system (e.g. HubSpot, Salesforce, Marketo, Pipedrive) can, to some extent, track interactions that a beneficiary entity has participated in within an online environment, both before and after interacting with the landing page of the value-proposing entity.

In addition to constantly developing sales tools, Internet of Things solutions and smart devices have opened different ways for value-proposing entities to access the VIE processes of beneficiary entities. Consider, for example, sophisticated elevators or cranes, which are constantly transmitting data regarding their operation and thereby enabling the response to service needs before the current customers of the company become aware of such needs. Technological advancements have also enabled sales and marketing professionals better tools to track VPC processes. Managers in IT consulting companies who participate in sales research projects have described how their enterprise resource planning systems offer salespeople tools to view which experts are available for customer projects, and thus better plan what solutions can be offered to a customer at any given time.

We propose that the role of B2B sales in an ecosystemic setting is to coordinate the intertwining of the VPC and VIE processes. In an ecosystemic setting, this coordination requires organizations to have not only advanced tools but also the mindset to see VIE and VPC as something happening outside of an organization. On a practical level, this constitutes two questions:

- Q1. How well does our organization understand VIE and VPC interactions in which we are not involved?
- Q2. When (or if) our organization participates in VPC and VIE interactions, how well do the actions of our organization align with previous interactions that our organization did not participate in?

In the next section, we discuss the practical implications of our approach in more detail.

4.2 Practical implications

Our conceptual model of interactive value (co-)creation in ecosystems (Figure 1) proposes that VIE and VPC processes may emerge in different kinds of interactions between several actors in an ecosystem. To coordinate the intertwining of these two processes, the interactions within these processes should be known to the greatest extent possible, regardless of whether or not the organization has participated in them. In the process of VPC, information on interactions cuts across all parts of the organization. For sales organizations to understand the full potential of a value proposition, it must have access to information on the interactions that constitute the VPC. This requires the commitment of the whole organization to ensuring knowledge flows between entities participating in VPC to the greatest extent possible. This is also crucial for using valuable

customer knowledge carried by sales and marketing in other parts of the VPC process.

Formulating and communicating a value proposition so that it aligns with the ongoing process of VIE requires information on interactions that have taken place in VIE before the interactions with salespeople. In most cases, following the actions of prospects in an online environment is the responsibility of the marketing department. To ensure that this valuable information does not get lost, the collaboration between sales and marketing person needs to be improved and the organizational silos need to be collapsed for customer-centric operations. In the worst cases, disconnects between sales and marketing may be experienced from the customers' side, ending what began as a promising buying path. Sales organizations need to understand both online and offline interactions as a part of a singular process of VIE, not as two separate entities. These changes in collaboration and organization structures require managerial activities. It is also beneficial to be aware that many VIE interactions are totally out of reach for both sales and marketing. These may include interactions between different employees of the B2B buyer and their private interactions outside of work.

Understanding the interactions happening in both VPC and VIE requires digitized customer-centric activities. This involves enhancing advanced digital tools, social media, marketing and sales automation for the entire customer journey. As a practical implication, it is crucial that salespeople become familiar with the sales technologies and start to use them (in the best cases, eventually feeling unable to work without them) (Singh *et al.*, 2019). Moreover, investments into new sales technologies, like sales automation and customer resource management systems are the cornerstones for developing VPC and VIE processes.

In addition to technological investments, this change needs strong leadership to activate the whole organization

and management to change structures to better fit the needs of today's ecosystemic business environments (Marcos Cuevas, 2018; Corsaro, 2019; Hartmann *et al.*, 2018). For both the managerial and salespeople level, development programmes are essential parts of this digital transformation and widespread collaboration with companies. Without collaboration and a common understanding of the customer journey, the utilization of technological tools may be useless. Moreover, the digitalization and opportunities to create value on different social media platforms call for utilization in companies (Ammirato *et al.*, 2019.) This indicates that there may still be several challenges to building value propositions and co-creating value with customers, not only in customer-centric functions but also with value-creating entities.

4.3 Future research agenda

To manage and coordinate the intertwinement of VPC and VIE in sales ecosystems and to study the identified research topics more extensively, we suggest that the topics mentioned in Table 1 be elaborated on. The research agenda presented in Table 1 is motivated by the conceptual model of interactive value (co-)creation in ecosystems and considers five major research areas to improve our understanding of the intertwinement of VPC and VIE:

- 1 agencial assemblage of the value-proposing entity;
- 2 VPC;
- 3 agencial assemblage of the beneficiary entity;
- 4 VIE; and
- 5 value (co-)creation process intertwinement.

To advance this work, the next step in future research would be to study the suggested conceptual framework in different real-world settings. This would also include empirical research on

Table 1 Research agenda for value creation and B2B sales in an ecosystemic setting

| Research theme | Research questions/topic |
|---|--|
| Agencial assemblage of the value-proposing entity | <ul style="list-style-type: none"> • How can companies identify and create the most valuable parts and processes within agencial assemblages? • How can these most valuable parts and processes be used in companies? |
| Value proposition creation | <ul style="list-style-type: none"> • How can the different phases in *VPC be conceptualized? • What kind of interactions can be included in the VPC processes? • To what extent are organizations able to manage VPC processes consisting of multiple actors? To what extent is managing beneficial for organizations? |
| Agencial assemblage of the beneficiary entity | <ul style="list-style-type: none"> • How can we conceptualize the beneficiary entities in sales ecosystems? • What kind of processes support beneficiary entities' value creation? |
| Value idea emergence | <ul style="list-style-type: none"> • How can the APPI components of an interactive platform support information flow and data gathering? • What technologies could be harnessed for data gathering in each component of the interactive platform to gain access to **VIE? • What kind of actions are needed to coordinate the VIE processes? • What is the exact role of sales in VIE? How can VIE be facilitated? |
| Value (co-)creation process intertwinement | <ul style="list-style-type: none"> • How can organizations gain access to their prospective customers' VIE processes? • How can intertwinement needs to be managed in sales organizations? |

Notes: *Value proposition creation – the process, which includes all activities needed for bringing value proposition to a customer. **Value idea emergence – the process through which B2B entities become aware of a pursuable benefit

how actors such as sales-centric people in supplier organizations, coordinate the intertwining of VPC and VIE to (co-)create value. Further research is also needed to explore the development of VIE and the VPC model in service ecosystem settings.

References

- Aarikka-Stenroos, L. and Jaakkola, E. (2012), "Value co-creation in knowledge intensive business services: a dyadic perspective on the joint problem solving process", *Industrial Marketing Management*, Vol. 41 No. 1, pp. 15–26.
- Aarikka-Stenroos, L. and Ritala, P. (2017), "Network management in the era of ecosystems: systematic review and management framework", *Industrial Marketing Management*, Vol. 67, pp. 23–36.
- Agnihotri, R., Dingus, R., Hu, M.Y. and Krush, M.T. (2016), "Social media: influencing customer satisfaction in B2B sales", *Industrial Marketing Management*, Vol. 53, pp. 172–180.
- Akaka, M.A. and Vargo, S.L. (2014), "Technology as an operant resource in service (eco)systems", *Information Systems and e-Business Management*, Vol. 12 No. 3, pp. 367–384, doi: 10.1007/s10257-013-0220-5.
- Ammirato, S., Felicetti, A.M., Della Gala, M., Aramo-Immonen, H., Jussila, J.J. and Kärkkäinen, H. (2019), "The use of social media for knowledge acquisition and dissemination in B2B companies: an empirical study of Finnish technology industries", *Knowledge Management Research & Practice*, Vol. 17 No. 1, pp. 52–69.
- Arlı, D., Bauer, C. and Palmatier, R.W. (2018), "Relational selling: past, present and future", *Industrial Marketing Management*, Vol. 69, pp. 169–184.
- Baldwin, C.Y. (2008), "Where do transactions come from? Modularity, transactions, and the boundaries of firms", *Industrial and Corporate Change*, Vol. 17 No. 1, pp. 155–195.
- Ballantyne, D. and Varey, R.J. (2006), "Creating value-in-use through marketing interaction: the exchange logic of relating, communicating and knowing", *Marketing Theory*, Vol. 6 No. 3, pp. 335–348, doi: 10.1177/1470593106066795.
- Callon, M. (2016), "Revisiting marketization: from interface-markets to market-agencements", *Consumption Markets & Culture*, Vol. 19 No. 1, pp. 17–37.
- Chandler, J. and Johnston, W. (2012), "The organizational buying center as a framework for emergent topics in business-to-business marketing", *Advances in Business Marketing and Purchasing*, Vol. 18, pp. 41–87.
- Corsaro, D. (2019), "Capturing the broader picture of value co-creation management", *European Management Journal*, Vol. 37 No. 1, pp. 99–116, doi: 10.1016/j.emj.2018.07.007.
- D'Haen, J., Van Den Poel, D., Thorleuchter, D. and Benoit, D.F. (2016), "Integrating expert knowledge and multilingual web crawling data in a lead qualification system", *Decision Support Systems*, Vol. 82 No. 2, pp. 69–78.
- Dixon, A.L. and Tanner, J.F. (2012), "Transforming selling: why it is time to think differently about sales research", *Journal of Personal Selling & Sales Management*, Vol. 32 No. 1, pp. 9–14.
- Eggert, A., Kleinaltenkamp, M. and Kashyap, V. (2019), "Mapping value in business markets: an integrative framework", *Industrial Marketing Management*, Vol. 79, pp. 13–20, doi: 10.1016/j.indmarman.2019.03.004.
- Gawer, A. (2014), "Bridging differing perspectives on technological platforms: toward an integrative framework", *Research Policy*, Vol. 43 No. 7, pp. 1239–1249, doi: 10.1016/j.respol.2014.03.006.
- Geiger, S., Guenzi, P., Storbacka, K., Ryals, L., Davies, I.A. and Nenonen, S. (2009), "The changing role of sales: viewing sales as a strategic, cross-functional process", *European Journal of Marketing*, Vol. 43 No. 7, pp. 890–906.
- Grönroos, C. (2011), "Value co-creation in service logic: a critical analysis", *Marketing Theory*, Vol. 11 No. 3, pp. 279–301, doi: 10.1177/1470593111408177.
- Grönroos, C. and Voima, P. (2013), "Critical service logic: making sense of value creation and co-creation", *Journal of the Academy of Marketing Science*, Vol. 41 No. 2, pp. 133–150, doi: 10.1007/s11747-012-0308-3.
- Haas, A., Snehota, I. and Corsaro, D. (2012), "Creating value in business relationships: the role of sales", *Industrial Marketing Management*, Vol. 41 No. 1, pp. 94–105, doi: 10.1016/j.indmarman.2011.11.004.
- Håkansson, H., Ford, D., Gadde, L.E., Snehota, I. and Waluszewski, A. (2009), *Business in Networks*, John Wiley & Sons, Chichester.
- Hanson, N.R. (1958), *Patterns of Discovery*, University Press, Cambridge, UK.
- Hartmann, N.N., Wieland, H. and Vargo, S.L. (2018), "Converging on a new theoretical foundation for selling", *Journal of Marketing*, Vol. 82 No. 2, pp. 1–18, doi: 10.1509/jm.16.0268.
- Hohenschwert, L. and Geiger, S. (2015), "Interpersonal influence strategies in complex B2B sales and the socio-cognitive construction of relationship value", *Industrial Marketing Management*, Vol. 49, pp. 139–150.
- Homburg, C., Wieseke, J. and Bornemann, T. (2009), "Implementing the marketing concept at the employee-customer interface: the role of customer need knowledge", *Journal of Marketing*, Vol. 73 No. 4, pp. 64–81.
- Hughes, D.E., Le Bon, J. and Malshe, A. (2012), "The marketing-sales interface at the interface: creating market-based capabilities through organizational synergy", *Journal of Personal Selling & Sales Management*, Vol. 32 No. 1, pp. 57–72.
- Kim, M. and Stoel, L. (2005), "Salesperson roles: are online retailers meeting customer expectations?", *International Journal of Retail & Distribution Management*, Vol. 33 No. 4, pp. 284–297.
- Kowalkowski, C. (2011), "Dynamics of value propositions: insights from service-dominant logic", *European Journal of Marketing*, Vol. 45 Nos 1/2, pp. 277–294.
- Lemon, K.N. and Verhoef, P.C. (2016), "Understanding customer experience throughout the customer journey", *Journal of Marketing*, Vol. 80 No. 6, pp. 69–96.
- MacInnis, D.J. (2011), "A framework for conceptual contributions in marketing", *Journal of Marketing*, Vol. 75 No. 4, pp. 136–154.
- Malshe, A., Johnson, J.S. and Viio, P. (2017), "Understanding the sales-marketing interface dysfunction experience in business-to-business firms: a matter of perspective", *Industrial Marketing Management*, Vol. 63, pp. 145–157.
- March, J.G. (1988), *Decisions and Organizations*, Wiley-Blackwell, Oxford.
- Marcos Cuevas, J. (2018), "The transformation of professional selling: implications for leading the modern sales organization",

- Industrial Marketing Management*, Vol. 69, pp. 198–208, doi: 10.1016/j.indmarman.2017.12.017.
- Moncrief, W.C. (2017), “Are sales as we know it dying . . . or merely transforming?”, *Journal of Personal Selling & Sales Management*, Vol. 37 No. 4, pp. 271–279, doi: 10.1080/08853134.2017.1386110.
- Paesbrugge, B., Sharma, A., Rangarajan, D. and Syam, N. (2018), “Personal selling and the purchasing function: where do we go from here?”, *Journal of Personal Selling & Sales Management*, Vol. 38 No. 1, pp. 123–143.
- Paesbrugge, B., Rangarajan, D., Sharma, A., Syam, N. and Jha, S. (2017), “Purchasing-driven sales: matching sales strategies to the evolution of the purchasing function”, *Industrial Marketing Management*, Vol. 62, pp. 171–184.
- Prahalad, C.K. and Ramaswamy, V. (2004), “Co-creation experiences: the next practice in value creation”, *Journal of Interactive Marketing*, Vol. 18 No. 3, pp. 5–14.
- Ramaswamy, V. and Ozcan, K. (2018), “What is co-creation? An interactional creation framework and its implications for value creation”, *Journal of Business Research*, Vol. 84, pp. 196–205, doi: 10.1016/j.jbusres.2017.11.027.
- Rapp, A., Bachrach, D.G., Panagopoulos, N. and Ogilvie, J. (2014), “Salespeople as knowledge brokers: a review and critique of the challenger sales model”, *Journal of Personal Selling & Sales Management*, Vol. 34 No. 4, pp. 245–259, doi: 10.1080/08853134.2014.908126.
- Rochet, J.C. and Tirole, J. (2006), “Two-sided markets: a progress report”, *The Rand Journal of Economics*, Vol. 37 No. 3, pp. 645–667.
- Rodriguez, M., Ajjan, H. and Peterson, R.M. (2016), “Social media in large sales forces: an empirical study of the impact of sales process capability and relationship performance”, *Journal of Marketing Theory and Practice*, Vol. 24 No. 3, pp. 365–379.
- Singh, J., Flaherty, K., Sohi, R.S., Deeter-Schmelz, D., Habel, J., Le Meunier-FitzHugh, K., Malshe, A., Mullins, R. and Onyemah, V. (2019), “Sales profession and professionals in the age of digitization and artificial intelligence technologies: concepts, priorities, and questions”, *Journal of Personal Selling & Sales Management*, Vol. 39 No. 1, pp. 2–22.
- Snehota, I. (2004), “Perspectives and theories of market”, in Håkansson, H., Harrison, D. and Waluszewski, A. (Eds), *Rethinking Marketing: developing a New Understanding of Markets*, John Wiley and Sons, Chichester.
- Steward, M., Narus, J., Roehm, M. and Ritz, W. (2019), “From transactions to journeys and beyond: the evolution of B2B buying process modeling”, *Industrial Marketing Management*, Vol. 83 No. 11, pp. 288–300.
- Syam, N. and Sharma, A. (2018), “Waiting for a sales renaissance in the fourth industrial revolution: machine learning and artificial intelligence in sales research and practice”, *Industrial Marketing Management*, Vol. 69, pp. 135–146, doi: 10.1016/j.indmarman.2017.12.019.
- Thaichon, P., Surachartkumtonkun, J., Quach, S., Weaven, S. and Palmatier, R.W. (2018), “Hybrid sales structures in the age of e-commerce”, *Journal of Personal Selling & Sales Management*, Vol. 38 No. 3, pp. 277–302.
- Trainor, K.J. (2012), “Relating social media technologies to performance: a capabilities-based perspective”, *Journal of Personal Selling & Sales Management*, Vol. 32 No. 3, pp. 317–331.
- Vargo, S.L. and Lusch, R.F. (2004), “Evolving to a new dominant logic for marketing”, *Journal of Marketing*, Vol. 68 No. 1, pp. 1–17, doi: 10.1509/jmkg.68.1.1.24036.
- Vargo, S.L. and Lusch, R.F. (2008), “Service-dominant logic: continuing the evolution”, *Journal of the Academy of Marketing Science*, Vol. 36 No. 1, pp. 1–10.
- Vargo, S.L., Lusch, R.F. (2011), “It’s all B2B. . .and beyond: toward a systems perspective of the market”, *Industrial Marketing Management*, Vol. 40 No. 2, pp. 181–187, doi: 10.1016/j.indmarman.2010.06.026.
- Vargo, S.L. and Lusch, R.F. (2016), “Institutions and axioms: an extension and update of service-dominant logic”, *Journal of the Academy of Marketing Science*, Vol. 44 No. 1, pp. 5–23, doi: 10.1007/s11747-015-0456-3.
- Verbeke, W., Dietz, B. and Verwaal, E. (2011), “Drivers of sales performance: a contemporary meta-analysis. Have salespeople become knowledge brokers?”, *Journal of the Academy of Marketing Science*, Vol. 39 No. 3, pp. 407–428, doi: 10.1007/s11747-010-0211-8.
- Weitz, B.A. and Bradford, K.D. (1999), “Personal selling and sales management: a relationship marketing perspective”, *Journal of the Academy of Marketing Science*, Vol. 27 No. 2, pp. 241.
- Yadav, M.S. (2010), “The decline of conceptual articles and implications for knowledge development”, *Journal of Marketing*, Vol. 74 No. 1, pp. 1–19.
- Zanette, M.C., Brito, E.P.Z. and Coutinho, M. (2013), “New influencers: an exploratory study on blogs”, *Journal of Direct, Data and Digital Marketing Practice*, Vol. 15 No. 1, pp. 36–46, doi: 10.1057/ddmp.2013.45.

Further reading

- Liu, A.H. and Leach, M.P. (2001), “Developing loyal customers with a value-adding sales force: examining customer satisfaction and the perceived credibility of consultative salespeople”, *Journal of Personal Selling & Sales Management*, Vol. 21 No. 2, pp. 147–156.
- Marshall, G.W., Moncrief, W.C., Lassk, F.G. and Shepherd, D. (2012), “Linking performance outcomes to salesperson organizational citizenship behavior in an industrial sales setting”, *Journal of Personal Selling & Sales Management*, Vol. 32 No. 4, pp. 491–501.
- Panagopoulos, N.G., Rapp, A.A. and Ogilvie, J.L. (2017), “Salesperson solution involvement and sales performance: the contingent role of supplier firm and customer–supplier relationship characteristics”, *Journal of Marketing*, Vol. 81 No. 4, pp. 144–164.

Corresponding author

Sami Rustholllkarhu can be contacted at: sami.rustholllkarhu@tuni.fi

For instructions on how to order reprints of this article, please visit our website:

www.emeraldgroupublishing.com/licensing/reprints.htm

Or contact us for further details: permissions@emeraldinsight.com

PUBLICATION II

Materials to resources – Innovating economic agency in a circular economy

Rusthollkarhu, S., & Uusikartano, J.

In *Proceedings of ISPIM Connects Valencia*, November 30 – December 2, 2021. Valencia, Spain.

<https://www.proquest.com/docview/2617200146?pq-origsite=gscholar&fromopenview=true>

Publication reprinted with the permission of the copyright holders.

Materials to resources—innovating economic agency in a circular economy

Sami Rustholllkarhu*

Tampere University, Korkeakoulunkatu 7, Tampere, Finland.
E-mail: sami.rustholllkarhu@tuni.fi

Jarmo Uusikartano

Tampere University, Korkeakoulunkatu 7, Tampere, Finland.
jarmo.uusikartano@tuni.fi

* Corresponding author

Abstract: Understanding the circular economy (CE) is vital for sustainable innovation. By realizing cyclic material flows in a market context, CE can prevent environmentally harmful take-make-dispose market-outcomes. However, theoretical endeavors in CE have focused on conceptualizing material flows on a system level without the theoretical understanding of the link between materials and economic activity. This is a detrimental gap, as the CE literature explicitly expresses the aim of linking economic behavior to material flows and their environmental outcomes. We structure this link by theorizing why materials flow in the market by building on the literature in sociology, economics, and marketing. We explain the materials to flow with the process between human and non-human actors, leading to material–resource or material–waste conversions. Based on these conversions, we build a model for materials in economic agency and show why material conversions render the well-established dichotomy of linear and circular flows meaningless in a market context.

Keywords: Circular economy; materials; material flows; resources; economic agency; value creation; economics; market

1 Introduction

In the last decade, the Circular Economy (CE) has emerged as a prominent approach to carbon neutrality (Türkeli et al., 2018), resource efficiency (Ghisellini, Cialani and Ulgiati, 2016), industrial ecology (Zaoual and Lecocq, 2018), and as an overall framework for the global transition to sustainability (Hopkinson et al., 2018). CE aims to conceptualize systems of material use where, instead of ecologically unsustainable linear extract-produce-use-dump material and energy flows (Frosch and Gallopoulos, 1989), the flows are organized in a cyclical way, preventing the excessive dump and thereby diminishing the long-term cost to the natural environment (Korhonen, Honkasalo and Seppälä, 2018). As implied by the concept itself, the CE literature explicitly expresses the aim of understanding material flows in the context of economic activity (see, e.g., Kirchherr, Reike and Hekkert, 2017; Murray, Skene and Haynes, 2017; Prieto-Sandoval, Jaca and Ormazabal, 2018) characterized by resource integration and value creation through the act of exchange (Vargo and Lusch, 2004, 2016). However, by far, theoretical

endeavors in CE have focused on conceptualizing material flows in economic systems (e.g., reduce, reuse, recycle, repair, refurbish, remanufacture, repurpose, recover; Reike, Vermeulen and Witjes, 2018), leaving the link between flows and economic activity unaddressed. Considering the explicitly expressed aim of CE, this is a detrimental gap.

In this paper, we contribute to this gap by theorizing why materials flow in the market. By utilizing the literature in sociology, economics, and marketing, we build on the theory of material agency (e.g., Latour, 1996; Pickering, 1993), the institutionalist theory of resources (e.g., De Gregori, 1987; Zimmermann, 1951), and the theory of value creation (e.g., Grönroos and Voima, 2013; Vargo and Lusch, 2004, 2011). By merging these established streams, we conceptually show that, in the context of economic activity, *material flows happen due to two kinds of material conversions: material–resource conversion, or material–waste conversion. Material conversions are inter-agential processes between human actors and material substance. These processes either bring to light the capabilities that define the functional relationship to material, rendering it to a resource, or they lead to an absence of function in the relationship, rendering the material to waste.* Both conversions cause materials to flow, as economic actors either want to buy resources to create value or buy services to dispose of the waste, to avoid opportunity costs of dysfunctional materials. We further build on our reasoning by structuring the model for materials in economic agency and we illustrate our theorizing with empirical observations gathered on material flows in contemporary CE settings. Finally, we examine our theory building in light of CE principles by showing why *material conversions render the well-established dichotomy of linear and circular flows meaningless in the market context*, and discuss how this should be accounted by future CE research.

This paper builds three theoretical contributions. First, we provide the explanation for material flows in the market by structuring the concepts of material–resource and material–waste conversions. Second, we utilize these concepts to structure the model of materials in economic agency, to explain the intertwined nature of material and human entities in economic activity. Third, we show why understanding material conversions renders the dichotomy of linear and circular flows meaningless in the market context, and we discuss what this means for the future of CE research. As economic activity accounts for a great proportion—as do social (Padilla-Rivera, Russo-Garrido and Merveille, 2020) and environmental (Goodland, 1995) activity—of the outcomes of materials, our work contributes to all contexts of material flows in the CE literature: social, environmental, and economic.

2 Materials in economic agency and value creation

We start our theory building by examining value creation and materials in the context of CE. We then focus on value creation in market contexts and deepen our understanding by explaining the role of materials as manifestations of resources in market exchange. We conclude the section by presenting our conceptualization of material–resource/waste conversions and theorizing how materials “become” resources.

Materials and value creation in a circular economy

In the time of growing concern about our environment, the circular economy (CE) has gained wide traction among scientists and practitioners, who have viewed it as an operationalization by which businesses can aim for a sustainable future (e.g., Kirchherr,

Reike and Hekkert, 2017). By synthesizing the varying scientific definitions presented, we may define CE as *an economic system or model interested in how materials that are meaningful for societies are used and transformed within economies over time (Blomsma and Tennant, 2020) in such a way that the highest utility or value of products, components, and materials can be extracted throughout the material lifecycle (Zacho, Mosgaard and Riisgaard, 2018) in order to maximize ecosystem functioning and human well-being (Murray, Skene and Haynes, 2017). CE reconsiders the way human society is interrelated with nature at the micro, meso, and macro levels (Prieto-Sandoval, Jaca and Ormazabal, 2018) and bases the circular business models on the principles of reducing, reusing, recycling, and recovering materials to accomplish sustainable development in environmental, social, and economic terms (Kirchherr, Reike and Hekkert, 2017).*

As expressed by the CE definition, the perception of value in CE is pluralistic, including environmental, social, and economic value. Thus, the core of practicing sustainable business is to achieve a competitive advantage by delivering to the customer such value that now also includes social and environmental dimensions alongside the economic ones (Yang et al., 2017). In other words, the concept of value should be reconsidered in CE and the complexity of sustainability understood for achieving sustainable value (Kristensen and Remmen, 2019). This sustainable value related to materials is to be created and preserved in closed systems as long as possible (Zacho, Mosgaard and Riisgaard, 2018). Indeed, value in CE is linked to material flows in an inseparable way. There are different value levels related to the resource-efficiency in flows of materials (i.e., used goods to be incinerated, raw materials to be recycled, goods to be remanufactured and goods in use to be reused; Zacho, Mosgaard and Riisgaard, 2018).

The generally shared core concept of CE is the cyclical closed-loop system where the economy has no net effect on the environment by being circular, i.e., restoring damages caused during resource acquisition and generating waste as little as possible (Murray, Skene and Haynes, 2017). Indeed, CE deals ultimately with resource cycling and is a “Resources Circulated Economy” (see Yang and Feng, 2008, 814). The shared common basis of circular business models seems to be that the models substitute primary material input with secondary production, extend the lifetime of products through longer lifespans and a second life, and concentrate on material recycling (Nußholz, 2017). In other words, value in CE is embedded in materials, and CE aims for creating environmental, social, and economic value through cyclical flows of materials.

However, this paper concentrates explicitly on the economic value that we still argue to be the requirement for any business to prosper (see, e.g., Ranta, Aarikka-Stenroos and Mäkinen, 2018), be it circular or some other economic model. In CE, business models are tailored material feedstock-wise to enable the recovery of the specific feedstocks, which also differentiates the related value capture and creation strategies (Valve, Lazarevic and Humalisto, 2021). The fundamental challenge of implementing CE principles for companies is “to rethink their supply chains [in order to develop diverse reverse cycles], and as a consequence the way they create and deliver value through their business models” (Lüdeke-Freund, Gold and Bocken, 2019). This means a need to integrate business models that consider the value creation architectures of firms with circular strategies that aim for resource efficiency through circular resource flows (Nußholz, 2017).

Yet, CE business studies have not explicitly concentrated on the related economic value perspectives and value creation logic to answer how to execute environmentally friendly yet profitable businesses in CE (Ranta, Aarikka-Stenroos and Mäkinen, 2018). To

promote a more circular economy, it is still necessary to study how business models interact with and reorganize material circuits (Valve, Lazarevic and Humalisto, 2021).

Resources as a basis for value creation in markets

To understand material circuits in a market context, we first need to capture their relevance in the context of market value creation, which has largely been recognized as the main driver for actors to participate in market exchange (Sheth and Uslay, 2007). To put in other words, actors participate in exchange for getting access to something they deem valuable to them. When compared to pluralistic value conceptualization in CE (social, environmental, economic) (Yang et al., 2017), value creation in a market setting can more simply be explained by customer value (i.e., what can I get as a customer, or what can our company provide to our customers) (Grönroos and Voima, 2013; Teece, 2010). Although the dichotomy between actors who produce (producers) and actors who consume (consumers) is well established, both kinds of actors are fundamentally driven by their pursuit of value creation. Consumers purchase products and services to satisfy their needs (Houston and Gassenheimer, 1987). Companies, on the other hand, acquire means of production and resources to produce products and services that they can sell for profit (Wernerfelt, 1984).

Early classical and neoclassical economics conceptualized the relation of materials and value creation similar to that of CE. Value was seen to be embedded in matter, either as an inherent property, or created through manufacturing. Value was then exchanged to a monetary amount of value (i.e., price) and transferred from provider to customer with the material body (see, e.g., Marshall, 1890; Say, 1821; Shaw, 1912; Smith, 1776). However, in later, vastly marketing-dominated discussion, the understanding of value creation in economic activity has developed drastically. In the current paradigm of value creation, value is not perceived as a property of the matter but rather as something to be created in use (Eggert et al., 2018; Grönroos and Voima, 2013). This automatically emphasizes the customer's role in value creation. Customers are no longer seen as passive receivers of value embedded in physical products, but as active creators of value by using the products (Vargo and Lusch, 2004). This means that value creation is then not only dependent on the provider's capability to create a product or service, but also on the customer's capability to use the product or to participate in the service as intended (Grönroos, 2011; Vargo and Lusch, 2008).

The capability of using something for something is the definition of a resource. Resources are not things or stuff or materials but capabilities that define a functional relationship between human and non-human substance (De Gregori, 1987; Zimmermann 1951). As all products and services are, in essence, outcomes of purposefully applied capabilities, they fundamentally manifest a set of interdependent functional relationships (i.e., a set of resources). For example, consider a factory assembly line, in which each person uses his/her knowledge to carry their part of a process leading to a finished product. Furthermore, products and services have an intended purpose planned by the provider. To put in other words, products and services have potentially functional relationships between them and the user/participant. These potentially functional relationships are more often referred to as value propositions (Teece, 2010) or as potential value (Grönroos and Voima, 2013). Users of the products and participants of the service then realize the functionality of the relationship (or more familiarly, they realize the value) by bringing in their capabilities to use a product for their purpose, or their capabilities to participate in a service (Grönroos and Voima, 2013; Vargo and Lusch, 2004). This renders all economic actors as resource integrators (Vargo and Lusch, 2008,

2011, 2016). To understand material flows in markets, we next focus on the relationship between materials and resources.

Resources are not, they become

As defined earlier, resources are not materials themselves but the capabilities to use materials for a given purpose (i.e., capabilities that define functional relationships) (De Gregori, 1987; Zimmermann, 1951). As resources, by definition, have use, so are they also prone to flow in markets, as economic actors need them to create value. In other words, economic actors participate to exchange to access resources, that can then be used to the purposes the actors have capabilities to identify. We also emphasize that “resource likeness” (i.e., the existence of a functional relationship) is not an inherent, fixed property of a material but emerges through time in inter-agential processes between humans and materials (Jokinen et al., 2021), in which humans learn how a given material could be used (Zimmermann, 1951). In this paper we call this process the *material–resource conversion*.

Materials can also lose their resource status, either with a change in material properties or a change in the capabilities that defined the functional relationship to the material (De Gregori, 1987). We refer to this as the *material–waste conversion* and define waste as an opposite of a resource, as *an absence of capabilities defining function in the relationship*. Like the *material–resource conversions*, also the *material–waste conversions* can explain material flows. Unlike the *material–resource conversions*, where material flow is based on identified ways of using the material, in *material–waste conversion* economic actors are willing to exchange for service that promises to dispose of such material. Although waste is often approached through its material properties or place of origin (Huysman et al., 2017), we argue that, in the market context in which actors aim for value creation, the absence of function in the relationship to material is the fundamental defining factor. This brings economic actors to a situation where the inability to identify the use brings to the material an opportunity cost, compared to usable material that could occupy the same space. This creates a motivation to dispose of the material.

As an action, material–resource/waste conversion takes place in the interaction of material and human agency where the material in question is given a status of resource or waste by humans. In this action, materials have their own voice (see Russell, 2018) and ways to resist and reshape the practices of humans (Fatimah and Arora, 2016). Materials “do not have agency by themselves, if only because they are never by themselves” (Sayes, 2014), but materials are temporally emergent (see Pickering, 1993) in the dynamic spatio-temporal relations between material and human agency (Malafouris, 2008). This means that material is never a neutral distinct actor observable as such; when confronted by humans, a material unveils itself through different representations based on how humans experience it. Thus, human actors, being unable to definitively know the contours of material agency in advance, need to continuously explore (Pickering, 1993).

As humans have intentions toward materials (usually an intention toward capturing some essence of the material), they try to align the material toward this goal, i.e., to manipulate materials to work as humans’ allies (Fatimah and Arora, 2016). This process of conversion happens between the humans and material agency that are in a temporally emergent dialogue of resistance (i.e., “occurrence of a block on the path to some goal” as nonhumans resist the control by humans) and accommodation (i.e., human actors revising their action as trying to overcome or avoid those resistances), where human agency tries to capture and control the material agency toward its goals (cf. Pickering’s (1993)

“mangle of practice”). In this dialogue, the two agencies are “interactively stabilized over time” through mutual adjustments (cf. Pickering’s (1995) “dance of agency”). Based on how well the material in question becomes our ally, i.e., aligned with our goals, in this interaction, the material is converted into resources (material aligning with humans’ goals) or waste (material misaligned with humans’ goals), depending on the meanings defined by humans.

3 The model for materials in economic agency

In this paper we argue that two kinds of different material conversions conceptualize the fundamental explaining phenomena behind material flows in the market: *material–resource conversions* and *material–waste conversions*. In this section, we structure our argument to the model of materials in economic agency. Table 1 summarizes key concepts discussed in this paper and utilized in our model.

Table 1 Key concepts for understanding materials in economic agency

| <i>Concept</i> | <i>Definition</i> | <i>Implication to materials</i> |
|-----------------|---|--|
| Economic agency | Dynamics between actions and actors that aim to value creation (Sheth and Uslay, 2007) by integrating resources through participating to exchange (Vargo and Lusch, 2004, 2016) | Materials take part in economic agency together with human and other non-human elements (e.g., technology). |
| Value creation | The act of integrating resources for the given purpose (Vargo and Lusch, 2004, 2016). The value is determined in the process of integration (i.e., in use) by the user and in relation to what was expected prior to the use. | Materials take part in value creation by manifesting the resources. |
| Resources | Capabilities that define function in relationships between human and non-human substance (adapted from De Gregori, 1987; Zimmermann, 1951). | Resources can manifest through materials (De Gregori, 1987). Resources are not materials themselves, but the capabilities to find the use for given materials. |
| Waste | The absence of capabilities that define the function in relationship between a human and non-human substance. | Waste comprises materials that do not serve any purpose to us, but with which we are forced to interact. |

To summarize our reasoning for why materials flow in the market, a visual model of materials in economic agency is provided in Figure 1. The model shows how a material enters the circle of agencies (*the arrowed circle in the figure*) when there forms an interaction between a human actor(s) and the representation of the material. In this interaction, the representation of the material receives meanings based on which humans give the material either the status of resource or waste. This process, where the material becomes a part of economic agency (*the square in the figure*), we call conversion. Economic agency in turn refers to the humans creating value by integrating resources and

abandoning wastes (*the smaller circle in the figure*). To further explain and validate our conceptual model, next we apply the model in an empirical case, namely, zero fiber.

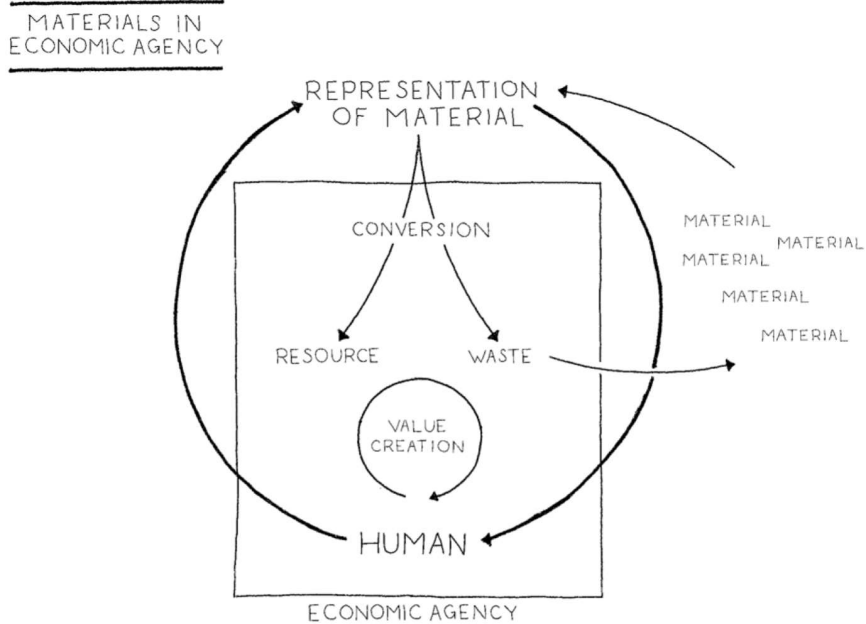


Figure 1 The model of materials in economic agency.

In the City of Tampere (Finland), there lays approximately 1.5 M m3 of sedimented zero fiber in the bay of Lake Näsijärvi. Zero fiber is a by-product of cellulose manufacturing, usually viewed as not having business potential, which is why a pulp mill previously legally disposed of the fiber at the bottom of the bay. After the fiber has been “a part of” the Lake Näsijärvi for decades, the City of Tampere has now become interested in the fiber as it limits the lake's value for the planned suburban area and poses a future risk of greenhouse gas emissions. Here, the zero fiber (or actually the representation of it as “potentially usable material”) enters the cycle of agencies as humans start to have intentions toward it (*arrow from materials to representation of material in Figure 1*).

The city, various companies, and research institutes are now trying to find ways to remove the zero fiber from the lake and utilize it in a profitable way. This creates an interaction between human and material agency where humans interact with different representations of the zero fiber (*the arrowed circle in Figure 1*). This is to say, humans seldom identify the whole essence of a material, and we interact with the material through our experiences of it. Moreover, the interaction between the zero fiber and humans unveils new characteristics of the material, i.e., new representations of it.

As the actors are interested in the business potential of the zero fiber, the fiber potentially enters economic agency (*the square in Figure 1*; note that the square highlights how we now concentrate only on one dimension of agency; we do not consider environmental or social agency related to human–material interaction here). This entering happens through a process of conversion (*the two-headed arrow in Figure 1*) where several humans and

representations of the material interact as humans perform various pilot studies, tests, and studies with the zero fiber, aiming to find those representations for which humans possess capabilities to find a use. For example, there have been studies on the suitability of the fiber for composting, biogas production, incineration, and biological conversion into chemicals. One notable attempt has been to desiccate the fiber (90% of the sedimented fiber mass lifted from the lake is water) and in this way shape it into a resource for further processors. Ultimately, the process of conversion leads to humans giving the material a resource or waste status based on how well the representation of the material is aligned with humans' goals and capabilities.

The economic agency manifests itself when humans interact with the material, now experienced as a resource or waste, and create value with it (*the small circle in Figure 1*). When a material is experienced as a resource, it manifests some capability that some humans are interested in utilizing. As an example, there have been pilot studies where the zero fiber has been processed into biogas, i.e., the fiber manifests a capability of producing biogas. If a material is experienced as a waste, humans do not have capabilities to utilize it and want to abandon it because of the costs (e.g., storage costs of the material) and the opportunity costs related to it. This was the case in the first place when a pulp mill disposed of the zero fiber in the lake. When the waste is abandoned and the interaction between it and humans ends, it becomes a material in nature, outside the realm of human interaction—as the zero fiber has been for decades in the bay of Lake Näsijärvi.

Finally, materials in economic agency can be part of an ongoing interaction in which a resource can become new resource(s) or waste. This happens through the circle of agencies where interaction with the resource can result in new representations of materials that enter the economic agency. Also, waste that has exited the economic agency and become non-interacting material can return to the circle of agencies as different representations and eventually become a resource. As a hypothetical example, if the zero fiber were to be processed into biogas, the process residues that are waste for the biogas plant could be reconsidered as resources by biofertilizer producers.

4 Discussion

In this paper we have explained how the materials flow in the market by structuring the concepts of material–resource and material–waste conversions and we have utilized these to build the model of materials in economic agency by which to explain the intertwined nature of materials and economic activity. When reflecting on our reasoning from the CE objective to create circular material flows (Murray, Skene and Haynes, 2017), we come to the crucial realization of temporality, introduced by the linearity or circularity of the material flow. For the flow to be determined as linear or circular, it needs to have its history in the market system. While circular flows have existed and continue to exist in markets (Yang and Feng, 2008, p. 814), linear flows require an end point to their history; in the CE literature this is usually referred to as dumping (Frosch and Gallopoulos, 1989) or disposing (Moreno et al., 2016). From the perspective of market dynamics, materials are used as instantiations of resources (De Gregori, 1987). And, by integrating resources actors create value in the present moment of use (Grönroos and Voima, 2013; Vargo and Lusch, 2016). When looking from the temporality viewpoint, this means that the history of the material is embedded in current material properties. Naturally, market perspective cannot blindly deny that we might still acknowledge the history that materials have. In fact, many brands quite liberally introduce their raw material sources and production phases, as this knowledge can manifest a valuable resource for their customers (for a

detailed discussion on knowledge and brand as a resource in value creation, see, e.g., Chandler and Vargo, 2011). Furthermore, as materials are not destined with ever existing/non-existing functional relationships with human actors (De Gregori, 1987; Zimmermann, 1951) and we can only unclearly, if at all, predict the future (Kahneman and Tversky, 1973), it makes little to no sense to destine certain flows to be linear—let alone label linearity to an economic model of any sort (for linearity as an economic model, see, e.g., Ghisellini et al., 2016; Ness, 2008).

While we argue that the linear–circular dichotomy makes no sense from an economics perspective, we cannot emphasize enough how it makes complete sense from the environmental and social perspectives. Materials can have drastic and long-lasting effects on both social and natural environments in all phases of their flow, leading the history of material to matter in a very literal, and also in a future-defining (Huysman et al., 2017) sense. From this viewpoint it is also reasonable to identify flows that appear linear at certain times, and although the interaction between material and human actors may have ended, the material continues to exist in the natural environment.

Furthermore, it is highly important to emphasize that markets are deeply intertwined with both social and natural environments (Goodland, 1995), to the point where natural environments, as well as cultural and legal institutions, directly influence the materials that can manifest resources and how the integration of given resources can be organized (Ranta et al., 2018). Moreover, knowledge of the outcomes of materials in nature or society can manifest important resources for economic activity, and thereby greatly affect resource integration in market systems.

Academics in the field of CE are left with the immensely complex task of understanding the link between materials and value creation in three systems: environmental, social, and economic (Yang et al., 2017). As individuals and materials simultaneously exist in all of these, the outcomes of one system are also shared with the other two. However, as previously discussed, the ways to conceptualize value creation as well as the fundamental understanding of what constitutes a value, drastically differ among these systems. While the theoretical tools to identify, let alone to understand, the interrelated dynamics these differences constitute are yet largely missing, we hope that this work helps to bridge this gap by focusing on the links between value and materials in the context of economic agency.

This paper has built a total of three theoretical contributions. First, we provided the explanation for material flows in the market by structuring the concepts of material–resource and material–waste conversions. Second, we utilized these concepts to structure the model of materials in economic agency in order to explain the intertwined nature of materials and humans in economic activity. Third, we showed why understanding material conversions render the dichotomy of linear and circular flows meaningless in the market context, and we discussed this from the perspective of CE research. As economic activity accounts for a great proportion of outcomes of materials, as does social (Padilla-Rivera, Russo-Garrido and Merveille, 2020) and environmental activity (Goodland, 1995), our work has contributed to all contexts of material flows in the CE literature: social, environmental, and economic.

From a practical perspective, we address our contribution to regional development professionals and policy makers who are balancing between the environmental, social, and economic prosperity of their area of responsibility. Understanding the link between materials, value creation, and economic agency enables decision-makers to identify

operation models early on that might later fail due to their economic unsustainability. Furthermore, our work helps business developers and C-level managers in charge of creating circular business model innovations to better understand the business potential of material flows and resources.

Acknowledgements

This work was supported by the European Regional Development Fund through the projects “6Aika: ILPO – Climate positive business parks and value chains” (grant ID A75909), and “Utilization of side streams and masses of soil in the cities” (CircVol) (grant ID A74186) as well as the Strategic Research Council, Academy of Finland, through the research projects entitled “Sustainable Industry Ecosystems” (SIE) (grant ID 337722). Special thanks to our colleagues Lauri Alkki, Eeva Pohls, and Leena Aarikka-Stenroos, for providing valuable feedback and input to advance this work. Furthermore, we want to thank Sakari Ermala and Harri Kallio for valuable practitioner insights.

References

- Becker, G.S., and Mulligan, C.B. (1997) “The Endogenous Determination of Time Preference,” *The Quarterly Journal of Economics*, 112(3), p729–758. Available at <https://about.jstor.org/terms>
- Blomsma, F. and Tennant, M. (2020) “Circular economy: Preserving materials or products? Introducing the Resource States framework,” *Resources, Conservation and Recycling*, 156. doi:10.1016/j.resconrec.2020.104698.
- Chandler, J.D., and Vargo, S.L. (2011) "Contextualization and value-in-context: How context frames exchange," *Marketing Theory*, 11(1), p35–49. <https://doi.org/10.1177/1470593110393713>
- De Gregori, T. (1987) "Resources Are Not; They Become: An Institutional Theory," *Journal of Economic Issues*, 21(3), p1241–1263.
- Eggert, A., Ulaga, W., Frow, P., and Payne, A. (2018) "Conceptualizing and communicating value in business markets: From value in exchange to value in use," *Industrial Marketing Management*, 69, p80–90. <https://doi.org/10.1016/j.indmarman.2018.01.018>
- Fatimah, Y.A. and Arora, S. (2016) “Nonhumans in the practice of development: Material agency and friction in a small-scale energy program in Indonesia,” *Geoforum*, 70, p25–34. doi:10.1016/j.geoforum.2016.01.009.
- Frosch, R.A., and Gallopoulos, N.E. (1989) "Strategies for Manufacturing," *Scientific American*, 261(3), p144–152. <https://doi.org/10.1038/scientificamerican0989-144>
- Ghisellini, P., Cialani, C., and Ulgiati, S. (2016) "A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems," *Journal of Cleaner Production*, 114, p11–32. <https://doi.org/10.1016/j.jclepro.2015.09.007>
- Goodland, R. (1995) "The concept of environmental sustainability," *Annual Review of Ecology and Systematics*, 26(1), p1–24.
- Grönroos, C. (2011) "Value co-creation in service logic: A critical analysis," *Marketing Theory*, 11(3), p279–301. <https://doi.org/10.1177/1470593111408177>
- Grönroos, C., and Voima, P. (2013) "Critical service logic: Making sense of value creation and co-creation," *Journal of the Academy of Marketing Science*, 41(2), p133–150. <https://doi.org/10.1007/s11747-012-0308-3>
- Hopkinson, P., Zils, M., Hawkins, P., and Roper, S. (2018) "Managing a Complex Global

- Circular Economy Business Model: Opportunities and Challenges," *California Management Review*, 60(3), p71–94. <https://doi.org/10.1177/0008125618764692>
- Houston, F.S., and Gassenheimer, J.B. (1987) "Marketing and Exchange," *Journal of Marketing*, 51, p3–18.
- Huysman, S., De Schaepmeester, J., Ragaert, K., Dewulf, J., and De Meester, S. (2017) "Performance indicators for a circular economy: A case study on post-industrial plastic waste," *Resources, Conservation and Recycling*, 120, p46–54. <https://doi.org/10.1016/J.RESCONREC.2017.01.013>
- Jokinen, A. et al. (2021) "The interagency cycle in sustainability transitions," in *Research Handbook of Sustainability Agency*, p307–320. Cheltenham, UK: Edward Elgar Publishing. doi:10.4337/9781789906035.00027.
- Kahneman, D., and Tversky, A. (1973) "On the psychology of prediction," *Psychological Review*, 80(4), p237–251. <https://doi.org/10.1037/H0034747>
- Kirchherr, J., Reike, D. and Hekkert, M. (2017) "Conceptualizing the circular economy: An analysis of 114 definitions," *Resources, Conservation and Recycling*, 127, p221–232. doi:10.1016/j.resconrec.2017.09.005.
- Korhonen, J., Honkasalo, A., and Seppälä, J. (2018) "Circular Economy: The Concept and its Limitations," *Ecological Economics*, 143, p37–46. <https://doi.org/10.1016/j.ecolecon.2017.06.041>
- Kristensen, H.S. and Remmen, A. (2019) "A framework for sustainable value propositions in product-service systems," *Journal of Cleaner Production*, 223, p25–35. doi:10.1016/j.jclepro.2019.03.074.
- Lüdeke-Freund, F., Gold, S. and Bocken, N.M.P. (2019) "A Review and Typology of Circular Economy Business Model Patterns," *Journal of Industrial Ecology*, 23(1), p36–61. doi:10.1111/jiec.12763.
- Malafouris, L. (2008) "At the Potter's Wheel: An Argument for Material Agency," in Knappett, C. and Malafouris, L. (eds) *Material Agency*, p19–36. doi:10.1007/978-0-387-74711-8_2.
- Moreno, M., Rios, C.D. los, Rowe, Z., and Charnley, F. (2016) "A Conceptual Framework for Circular Design," *Sustainability 2016*, 8(9), p937. <https://doi.org/10.3390/SU8090937>
- Murray, A., Skene, K. and Haynes, K. (2017) "The Circular Economy: An Interdisciplinary Exploration of the Concept and Application in a Global Context," *Journal of Business Ethics*, 140(3), p369–380. doi:10.1007/s10551-015-2693-2.
- Ness, D. (2008). "Sustainable urban infrastructure in China: Towards a Factor 10 improvement in resource productivity through integrated infrastructure systems." *International Journal of Sustainable Development and World Ecology*, 15(4), p288–301. <https://doi.org/10.3843/SusDev.15.4.2a>
- Nußholz, J.L.K. (2017) "Circular business models: Defining a concept and framing an emerging research field," *Sustainability* (Switzerland), 9(10). doi:10.3390/su9101810.
- Padilla-Rivera, A., Russo-Garrido, S., and Merveille, N. (2020) "Addressing the Social Aspects of a Circular Economy: A Systematic Literature Review," *Sustainability* 12(19), p7912. <https://doi.org/10.3390/SU12197912>
- Pickering, A. (1993) "The Mangle of Practice: Agency and Emergence in the Sociology of Science," *American Journal of Sociology*, 99(3), p559–589. doi:10.1086/230316.
- Pickering, A. (1995) "The Mangle of Practice," in *The Mangle of Practice: Time, Agency, and Science*. University of Chicago Press, p282. doi:10.2307/3106908.
- Prieto-Sandoval, V., Jaca, C. and Ormazabal, M. (2018) "Towards a consensus on the circular economy," *Journal of Cleaner Production*, 179, p605–615. doi:10.1016/j.jclepro.2017.12.224.

- Ranta, V., Aarikka-Stenroos, L. and Mäkinen, S.J. (2018) "Creating value in the circular economy: A structured multiple-case analysis of business models," *Journal of Cleaner Production*, 201, p988–1000. doi:10.1016/j.jclepro.2018.08.072.
- Ranta, V., Aarikka-Stenroos, L., Ritala, P., and Mäkinen, S.J. (2018) "Exploring institutional drivers and barriers of the circular economy: A cross-regional comparison of China, the US, and Europe," *Resources, Conservation and Recycling*, 135, p70–82. <https://doi.org/10.1016/j.resconrec.2017.08.017>
- Russell, A. (2018) "Can the plant speak? Giving tobacco the voice it deserves," *Journal of Material Culture*, 23(4), p472–487. doi:10.1177/1359183518799516.
- Sayes, E. (2014) "Actor-Network Theory and methodology: Just what does it mean to say that nonhumans have agency?," *Social Studies of Science*, 44(1), p134–149. doi:10.1177/0306312713511867.
- Sheth, J.N., and Sharma, A. (2008) "The impact of the product to service shift in industrial markets and the evolution of the sales organization," *Industrial Marketing Management*, 37(3), p260–269. <https://doi.org/10.1016/j.indmarman.2007.07.010>
- Sheth, J.N., and Uslay, C. (2007) "Implications of the revised definition of marketing: From exchange to value creation," *Journal of Public Policy and Marketing*, 26, p302–307. <https://doi.org/10.1509/jppm.26.2.302>
- Teece, D.J. (2010) "Business models, business strategy and innovation," *Long Range Planning*, 43(2–3), p172–194. <https://doi.org/10.1016/j.lrp.2009.07.003>
- Türkeli, S., Kemp, R., Huang, B., Bleischwitz, R., and McDowall, W. (2018) "Circular economy scientific knowledge in the European Union and China: A bibliometric, network and survey analysis (2006–2016)," *Journal of Cleaner Production*, 197, p1244–1261. <https://doi.org/10.1016/j.jclepro.2018.06.118>
- Valve, H., Lazarevic, D. and Humalisto, N. (2021) "When the circular economy diverges: The co-evolution of biogas business models and material circuits in Finland," *Ecological Economics*, 185, p107025. doi:10.1016/j.ecolecon.2021.107025.
- Vargo, S.L., and Lusch, R.F. (2004) "Evolving to a New Dominant Logic for Marketing," *Journal of Marketing*, 68(1), p1–17. <https://doi.org/10.1509/jmkg.68.1.1.24036>
- Vargo, S.L., and Lusch, R.F. (2008) "Service-dominant logic: Continuing the evolution," *Journal of the Academy of Marketing Science*, 36(1), p1–10. <https://doi.org/10.1007/s11747-007-0069-6>
- Vargo, S.L., and Lusch, R.F. (2011) "It's all B2B...and beyond: Toward a systems perspective of the market," *Industrial Marketing Management*, 40(2), p181–187. <https://doi.org/10.1016/j.indmarman.2010.06.026>
- Vargo, S.L., and Lusch, R.F. (2016) "Institutions and axioms: an extension and update of service-dominant logic," *Journal of the Academy of Marketing Science*, 44(1), p5–23. <https://doi.org/10.1007/s11747-015-0456-3>
- Wernerfelt, B. (1984) "A resource-based view of the firm." *Strategic Management Journal*, 5(2), p171–180. <https://doi.org/10.1002/smj.4250050207>
- Yang, M. et al. (2017) "Value uncaptured perspective for sustainable business model innovation," *Journal of Cleaner Production*, 140, p1794–1804. doi:10.1016/j.jclepro.2016.07.102.
- Yang, S. and Feng, N. (2008) "A case study of industrial symbiosis: Nanning Sugar Co., Ltd. in China," *Resources, Conservation and Recycling*, 52(5), p813–820. doi:10.1016/j.resconrec.2007.11.008.
- Zacho, K.O., Mosgaard, M. and Riisgaard, H. (2018) "Capturing uncaptured values - A Danish case study on municipal preparation for reuse and recycling of waste," *Resources, Conservation and Recycling*, 136, p297–305. doi:10.1016/j.resconrec.2018.04.031.
- Zaoual, A.R., and Lecocq, X. (2018) "Orchestrating Circularity within Industrial

Ecosystems: Lessons from Iconic Cases in Three Different Countries," *California Management Review*, 60(3), p133–156. <https://doi.org/10.1177/0008125617752693>
Zimmermann, Erich W. (1951), *World Resources and Industries*. New York: Harper and Row

Reproduced with permission of copyright owner. Further reproduction prohibited without permission.

PUBLICATION III

How digital technologies boost value potential creation and value realisation in CE: Insights from a multiple case study across industries

Rusthollkarhu, S., Ranta, V., & Aarikka-Stenroos, L.

In S. Jakobsen, T. Lauvås, F. Quatraro, E. Rasmussen, & M. Steinmo (Eds.), *Research handbook of innovation for a circular economy* 236–250.
<https://doi.org/10.4337/9781800373099>

**Publication is licensed under a Creative Commons Attribution 4.0
International License CC-BY-NC-ND**

20. How digital technologies boost value potential creation and value realization in CE: insights from a multiple case study across industries¹

Sami Rustholkkarhu, Valtteri Ranta and Leena Aarikka-Stenroos

INTRODUCTION

Digital technologies and technological innovations have been identified as important catalysts for business model innovations that enable value creation while adhering to circular economy (CE) principles (Nascimento et al. 2019; Rosa et al. 2020; Ranta et al. 2021; Bocken et al. 2016). Although the concept of business models has often been used in the CE literature, its primary function has been to showcase a more holistic perspective on how CE principles can be implemented in business (see e.g. Lüdeke-Freund et al. 2019). Thus, the business models in the CE literature have mainly focused on value proposition (Manninen et al. 2018), value creation (Bocken et al. 2016), and value capture (Ranta et al. 2018) activities of companies that enable adhering to CE principles in business. The literature, however, has not given much attention to the models' primary role in describing customer value creation (Teece 2010) and the necessary participation of the customer in value creation (Vargo and Lusch 2004, 2016). In this chapter, we therefore discuss how digital technologies enable and boost customer value creation in CE. We give special attention to not only the effects of digital technologies in creating value potential for customer but also the effects in the customer's possibilities to realize this value.

As with business model innovations, the CE literature has approached digital technologies from a circularity and material efficiency perspective. Technologies have allowed companies to better utilize their supply chain data to track products and materials, potentially improving their ability to retain value (Lopes de Sousa Jabbour et al. 2019) and thus better fulfil the requirement for circularity (Ranta et al. 2020). However, adhering to CE principles does not determine a company's ability to succeed or even exist in the market. For this, the value perceived by the customer is considered fundamental (Slater and Narver 1994). For a business model to be applicable, it must create value for the customer and be able to capture a part of that value (Teece 2010).

The dominant approach to customer value considers it as something determined by the customer (Vargo and Lusch 2004, 2016) and created through interactions between the customer and the supplier (Lindgreen et al. 2009). The supplier is seen as a facilitator (Grönroos and Voima 2013), or proposer (Vargo and Lusch 2004, 2016), of value as well as an organizer of the value process (Aarikka-Stenroos and Jaakkola 2012). The customer realizes the value as co-creator and evaluator (Grönroos 2011; Grönroos and Voima 2013; Prahalad and Ramaswamy 2004; Vargo and Lusch 2016) by interacting with the supplier and using the products and services offered to them (Grönroos and Voima 2013; Vargo and Lusch 2004).

The chapter adopts this dominant approach, in which the customer is seen as the necessary co-creator of value. Customer-perceived value is then determined by two aspects: (1) the value potential created and (2) the customer's ability to realize that potential. We utilize these two aspects to examine the effects of digital technologies on value creation in the CE context. We aim to understand how digital technologies allow companies to develop and redesign their CE business by (1) improving the value potential of CE business and (2) improving the customer's ability to realize that value. Together, these two aspects explain how providers can utilize digital technologies to enhance customer value creation in order to strengthen CE innovations.

We conducted a multiple case study among six companies from different industries. The study examined their CE solutions, in which digital technologies were utilized for both customer value creation and adherence to CE principles. The interview data gathered were categorized according to different digital technologies as well as their effects on value potential and its realization.

This study aims to contribute to the literature on circular and sustainable business, CE innovations, and value creation by exploring the relationship between circularity, digital technologies, and customer value creation. In addition to introducing the topic of customer value creation in CE, this chapter provides managerial guidelines for practitioners in their innovative business endeavours.

VALUE CREATION IN THE CE CONTEXT

A business model's ability to provide realizable value for the customer determines the company's likelihood of remaining in the market (Teece 2010). In this section, we discuss creating and realizing customer value potential in relation to CE principles.

Creating and Realizing Value Potential

Customers have an active role in the process of value creation. The customer realizes value by interacting with the value proposition of the company (Vargo and Lusch 2004) and can also participate in the process in a more extensive manner as a co-producer, designer, developer, or marketer (Aarikka-Stenroos and Jaakkola 2012). The role of the company is to offer value propositions (Vargo and Lusch 2004) and facilitate the value process (Grönroos and Voima 2013). We emphasize that the creation and realization of value propositions take place in an ecosystem, meaning that propositions can be created by multiple actors (Vargo and Lusch 2016).

Furthermore, the customer's process of realizing value is guided by a broad range of inter- and intra-organizational interactions, not just those with value proposition. Thus, the value realized by the customer is not necessarily similar to the value proposition offered by the company (Rustholkkarhu et al. 2020). This is especially relevant in the context of CE, as the function of products and materials differs in different parts of the cycle. For example, recycled or reused goods can have functions for customers distinct from their original purposes (Ranta et al. 2020). To capture a more holistic view of customer-perceived value, we use the concept of value potential, which includes all the potential value the customer can realize while interacting with the physical good or service, including the intended value communicated by the value proposition. Next, we discuss the connection between value potential and CE activities.

Value Potential in CE Business

To understand CE characteristics in value creation, we use the four CE value creation logics described by Ranta et al. (2020): resurrect, share, optimize, and replace value. These logics are consistent with other CE business model categorizations (e.g. Ellen MacArthur Foundation 2015; Bocken et al. 2016; Lüdeke-Freund et al. 2019). However, while the other models primarily focus on improving the circularity of business, the value creation logics explicitly focus on value creation but from the perspective of the company (Ranta et al. 2020). Thus, the crucial activities within these value creation logics provide an understanding of the value-potential-building activities of CE business models. An important aspect of value creation logics is that while each describes core aspects of how certain activities aim to increase value potential, multiple value creation logics can and often are found simultaneously in a CE business model (Ranta et al. 2020).

In the *resurrect value logic*, the company focuses on reintroducing value back into resources, such as products, components, and materials. To leverage this logic, companies need to be able to reintroduce value cost efficiently so that the revitalization of value offers competitive value potential for customers compared to new resources while enabling profitable value capture for the company (Ranta et al. 2020). Crucial CE activities for this logic include the acquisition of the resources with diminished value in the value resurrecting process through, for example, take-back systems (Lewandowski 2016) or circular supply chains (Centobelli et al. 2020); the actual process of resurrecting value, be it maintenance, repairing, remanufacturing, or recycling (Lüdeke-Freund et al. 2019); and the sale of the resources back to the market (Ranta et al. 2018).

In the *share value logic*, the company focuses on enabling customers to move from the ownership of products toward using shared resources, which reduces the amount of resources and, thus, the materials needed to fulfil the needs of the customer base. To leverage this logic, companies need to overcome the existing customer preference for owning their own resources by providing a shared resource alternative with competitive value potential (Ranta et al. 2020). Crucial CE activities, thus, make it convenient and economically viable for customers to discover, access, and use shared resources. Companies can, for example, improve the discoverability of shared resources by implementing online marketplaces and ensuring the accessibility of shared resources. Companies using this logic can either own the resources themselves and fully manage the fleet of shared resources (Ranta et al. 2020), or they can enable resource sharing between customers with excess resources and customers with resource needs, following a sharing economy approach (Belk 2014).

In the *optimize value logic*, the company focuses on providing specialized knowledge and resources for the customer's use, enabling them to create more value with fewer resources. Companies can provide monitoring services that allow customers to identify waste in energy and material usage as well as services that allow customers to improve on identified issues. For example, monitoring data from an industrial machine enables the provision of predictive maintenance services, optimizing the uptime of the machine. To leverage this logic, companies need to have a sound understanding of both the resource for which value creation is to be optimized as well as the business of the customer in order to improve both the value potential of the resource and the customer's realization of that potential (Ranta et al. 2020). Important activities for this logic, thus, include the ones that deepen the customer's understanding of resource use in their value realization process.

In the *replace value logic*, the company focuses on providing an alternative resource that can fulfil the same customer needs as traditionally used resources while fulfilling the emerging sustainability needs related to CE principles. This logic is especially relevant concerning generally unsustainable resources; an example of it is the increasingly popular plant-based meat replacement products that help reduce the environmentally unsustainable levels of meat consumption while offering customers competitive value potential compared to actual meat (Ranta et al. 2020). Crucial activities for this logic involve identifying certain needs of the customer that if left unfulfilled would deter the customer from switching from the traditional resource to the replacement one. Such needs can be properties of the resource itself (e.g. the taste of the plant-based protein product), or they can be the qualities of the resource that make it suitable for the customer to use without other large investments, such as using waste oil-based diesel in the same vehicle as fossil fuel-based diesel. As this logic usually builds upon a novel innovation, research and development activities are often central to it.

Digital Technologies in CE

Digital technologies have been identified as having a key role in enabling CE principles in business (Pagoropoulos et al. 2017) by narrowing, slowing, and closing of resource loops (Ranta et al. 2021). In particular, the product-service systems (PSS) model, in which product-oriented offerings are transformed by supporting services or even by selling the product as a service (Tukker 2015), benefits from the implementation of digital technologies. In this context, digital technologies enable remote monitoring of the product, which, in turn, allows optimizing the provision of maintenance services for the customer, thus lengthening the product's lifecycle. Furthermore, as the product reaches the end-of-life stage, digital technologies enable the PSS provider to collect the product and identify whether reusing, remanufacturing, or recycling of the product is economically feasible through analysing the data collected from the product during the use phase or embedded in the product as a product passport (Alcayaga et al. 2019). Thus, in the PSS model, digital technologies facilitate closing the loop on the products and improving the ability to select the optimal revalorization route when products reach their end-of-life stage.

Five technology groups are identified as relevant in the context of CE: cyber-physical systems (CPS), Internet of Things (IoT), big data and analytics (BDA), additive manufacturing (AM), and simulation (Rosa et al. 2020). CPS refers to the embedded computers and networks used in monitoring physical processes (Lee et al. 2015). IoT technologies utilize modern wireless telecommunications (e.g. radio frequency identification [RFID], sensors, tags, actuators) to enable interaction among people, devices, and objects (Nasiri et al. 2017). BDA is an umbrella term for applications of advanced data analysis techniques applied to big data, including cloud storage and computing as well as AI analysis techniques (Soroka et al. 2017). AM describes technologies that allow production via layering or 3D printing (Dutta et al. 2001). Lastly, simulation refers to a wide range of mathematical programming techniques (Rosa et al. 2020).

RESEARCH DESIGN, CASES, DATA, AND ANALYSIS

To study how digital technologies enable and boost customer value creation in CE, we chose a qualitative multiple case study strategy. This approach enables us to develop a theoretical understanding of the focal phenomenon in its natural setting (Yin 1994) and to integrate conceptual research-based knowledge and empirical insights derived from the cases (Dubois and Gadde 2002). By selecting a multiple case study strategy with six cases from different industries with differing business models, we could uncover differences between the cases regarding how digitalization shapes value creation in the CE setting and identify similar patterns across different company cases. The case companies are headquartered in Northern Europe, although they conduct most of their business globally.

The case selection was purposive. First, by using maximum variation criteria (Patton 1990), we carefully selected cases from various CE-related businesses. These businesses used different business models and came from different industries; they also differed in terms of their size and types of digital tools used. Second, by choosing cases where diverse resource flow strategies and CE principles are followed – including narrowing, slowing, and closing resource flows – we ensured that our findings captured the full spectrum of CE business models. Third, we selected successful cases (see Patton 1990), as we assumed that by focusing on companies running feasible CE-related businesses, we would be able to analyse implemented digital technologies for CE and examine how this shapes value creation for all involved actors (suppliers, customers, other actors). Additionally, to improve case selection, we conducted a preliminary analysis of more than ten cases and then focused our analysis on the six cases (see Table 20.1) from different industries.

We built on both the primary and secondary data sources for each case. The primary dataset comprised 14 semi-structured face-to-face and remote interviews, conducted between July 2019 and January 2020 with key actors, such as business, logistics, technology, software, and project managers as well as experts directly involved in the use of digitalization and business development in the field of CE. The secondary dataset supported and extended each case; these data comprised internal and media-originated data, such as technical documents, articles, companies' websites, and other web pages concerning the solutions, the companies, and their evolving market and business environments.

In our case analysis, we first conducted a within-case analysis as we generated an overview of digital technologies used and their effect on value potential. Next, we conducted a cross-case analysis and generated more synthesized patterns by identifying similarities and differences across the cases. To improve quality of analysis and trustworthiness of the results, we applied a range of tools and tactics, such as a structured coding procedure as well as researcher triangulation with drafted tables and figures, which encouraged discussion among all involved researchers (Flick 2004).

DIGITAL TECHNOLOGIES IN CUSTOMER VALUE CREATION: CREATING AND REALIZING VALUE POTENTIAL IN THE CE CONTEXT

Next, we discuss the results gained from the six company cases. In Table 20.2, we summarize the results. We present the identified digital technologies, short descriptions of how the tech-

Table 20.1 The cases and their background information

| Case | Company size (revenue) | Industry | Description | Interviews | Secondary data |
|---------------------------------|------------------------|---------------------------------------|--|--|---|
| Construction tool service | 5,300 MEUR | Tools/construction | Provider of technologically leading tool products and digital solutions for professional construction sites. | Services & software, area sales manager | Company web pages, annual reports |
| Forest machinery and harvesting | 610 MEUR | Machinery | Digital solutions aim to improve resource efficiency in construction areas. Manufacturer of forest machinery. | | Company web pages, annual reports |
| Waste management | 370 MEUR | Waste management (public) | It utilizes digital tools in harvesting solutions to optimize machine usage and provide maintenance services. A municipal body that develops resource efficient reuse processes for city waste. | Logistics manager, Landfill field manager, Project manager | N/A |
| Oil refinery | 14,900 MEUR | Oil refinery and technology developer | Oil refinery producing refined oil products from renewable feedstock. | Chief information officer, Head of digital transformation | Company web pages, annual reports, news articles |
| Fertilizers and infra products | 8 MEUR | Forestry and agriculture | Produces fertilizers for forestry and agriculture and products for groundworks and environmental construction from industrial side flows. | Technical sales specialist | Company web and social media pages, industrial area case report |
| Pulp refinery | 10240 MEUR | Pulp refinery | Produces, refines, and markets pulp products and energy solutions. Applies tailored digital solutions to close flows and develops platforms for utilization of industry side flows. | Director of business, Partner company CEO, Partner company, head of circular economy. Partner company environment chief, Partner company, technology platform manager | Technical platform documents |

nologies enable the value potential provided by the CE company in each case, and the different interfaces that enable the realization of the provided value potential. The interfaces are categorized as company-provided ones that are managed by the provider and third-party ones that are not owned by the company but through which customers can realize the value potential.

Five different technology categories were indicated in relation to creating value potential: IoT technologies, cloud technologies, enterprise resource planning (ERP) systems, artificial intelligence (AI), and automation. IoT included sensors and systems that enabled information gathering concerning production or customer machine use. Both cloud technologies and ERP were mentioned in the context of integrating information from multiple sources and allowing easy access to it. Because of their learning capabilities, AI tools were utilized in the analysis of vast datasets concerning forecasting tasks. One case company bundled their production technologies under the general term ‘automation’, including both the software and hardware components that enable autonomous actions in manufacturing. Our findings concerning technology categories are in line with Rosa et al.’s (2020) categorization. CPS, BDA, and simulations present themselves in descriptions of the use of cloud and AI systems. ERP systems were also brought up as a tool for lighter data storage and analysis. AI’s forecasting capabilities were used to simulate the material flows in supply chains. AM was the only technology category that was not mentioned in the interviews, as none of the case companies relied on 3D printing/layering technologies in their manufacturing. Furthermore, interviewees highlighted the importance of cloud technology. Although cloud technologies do not form a separate category in Rosa et al.’s (2020) categorization, data storage and computing capabilities, such as cloud technologies, are inherently imbedded in categories of IoT, BDA, and simulation.

DISCUSSION

The Four Roles of Digital Technologies in CE Value Creation

All company cases analysed in this chapter utilize digital technologies for creating value potential, enabling value realization, and adhering to the CE principles, which supports the value logic of the company. Based on our results, we propose four roles for digital technologies in CE value creation: *digital technology acting as an interface*, *digital technology providing access to value potential*, *digital technology improving operational efficiency*, and *digital technology helping to understand value realization*. These four roles explain how companies with CE solutions can use digital technologies to enhance the value potential of their offerings and empower their customers in value realization through diverse digital tools.

Digital technology acting as an interface: Digital technology forms the communication interface between the customer and the company or other ecosystem actors. Convenient interfaces for customers are crucial for value realization in all CE value logics. API, mobile, and online interfaces utilized in the cases of construction tool service, forest machinery, and oil and pulp refinery demonstrate the technology’s role as an interface. These solutions provide an example of how companies can utilize different digital interfaces to enable value realization in resurrect, share, optimize, and replace value logics.

Digital technology providing access to value potential: Digital technologies ensure that value potential is accessible to the customer through the interface. Cloud, IoT, and ERP technologies utilized in resurrect logics of construction tools and forest machinery and harvesting

Table 20.2 Digital technologies, value potential, and interfaces for value realization in CE setting

| Case | Digital technologies | Value logic and technologies' effect on value potential | Link to CE principles | Company-provided interfaces for value realization and customer's actions | Third-party provided interfaces for customer's value realization |
|--|--|--|---|--|--|
| <p>Construction tool service <i>Product-service system operator, tool manufacturer for the construction industry</i></p> | <p>IoT technologies collect data from machines, providing machine health and location information. Cloud technologies integrate and show data to the company and customer, enabling the potential for offering context-specific maintenance services.</p> | <p>Optimize: IoT technologies enable tool tracking and data generation. Data allow the company to fulfil the needs of customers with fewer overall tools. Data from construction machines are used to provide higher quality maintenance service at a lower cost. Resurrect: Cloud technologies provide customers convenient, timely access to maintenance services, increasing demand and use of services.</p> | <p>Narrow^a resource flows by serving customers with fewer tools and slow^b flows by increasing the demand for maintenance service by making it accessible.</p> | <p>Tools and machines used in construction sites, mobile app, QR tags, online interface. Customer uses tools and interacts with mobile and online interfaces to conveniently access to maintenance services as well as tool location and use information.</p> | <p>Third-party tools and machines used in construction sites</p> |

| Case | Digital technologies | Value logic and technologies' effect on value potential | Link to CE principles | Company-provided interfaces for value realization and customer's actions | Third-party provided interfaces for customer's value realization |
|--|---|---|--|---|--|
| <p>Forest machinery and harvesting <i>Product service system operator, forestry machine manufacturer</i></p> | <p>IoT technologies collect machine health and usage data. An ERP system integrates data for maintenance and product development operations. The online ordering system allows customers to directly order spare parts.</p> | <p>Optimize: IoT technologies allow gathering the data on the customer's use of the machine. The data can be utilized in product development to optimize a machine's fuel consumption and make the product more desirable and cost effective for the customer. Optimize and resurrect: IoT technologies enable data gathering on machine health and customer's machine usage. The ERP system allows data integration into maintenance and product development operations, enabling the provision of high quality and cost effective maintenance services and spare part ordering.</p> | <p>Narrow resource flows by optimizing fuel economy and slow them by increasing the efficiency of maintenance and spare part services.</p> | <p>Machines, online interface. Customer uses the machines and interacts with online interfaces to access spare part and maintenance services.</p> | <p>Third-party provided interfaces for customer's value realization Third-party parts</p> |
| <p>Waste management <i>Material processor, municipality-owned waste and water management group</i></p> | <p>IoT technologies provide data from vehicles used in logistics systems.</p> | <p>Optimize: IoT technologies enable tracking and data generation of the logistics system. Data can be utilized to identify opportunities for efficiency and cost reductions.</p> | <p>Narrow resource flows by increasing operational efficiency of logistics system.</p> | <p>Waste collection bins and stations. Customer interacts with waste collection bins and stations. Efficient logistics ensure that bins and stations are usable at all times.</p> | <p>No identified third-party interfaces</p> |

| Case | Digital technologies | Value logic and technologies' effect on value potential | Link to CE principles | Company-provided interfaces for value realization and customer's actions | Third-party provided interfaces for customer's value realization |
|--|---|--|---|---|---|
| <p>Oil refinery <i>Material processor, producer of refined products from renewable feedstock in the oil industry</i></p> | <p>IoT technologies collect data from chemical processes and the supply chain Cloud technologies store, integrate, and analyse large volumes of data AI technologies provide forecasting capabilities.</p> | <p>Replace: IoT technologies enable the optimization of production and supply chain processes. This enables production with fewer materials, reducing costs while simultaneously improving the quality of the product. Replace: Cloud technologies allow the company to access larger volumes of data from the supply chain, increasing knowledge about its real-time operation, thus enabling a cost-effective, more reliable supply chain. Replace: AI technologies allow the company to better forecast supply for waste materials and demand for refined products, developing knowledge for supply chain management and reducing unnecessary warehousing and potential shortages.</p> | <p>Narrow and close resource flows with more efficient production and supply chain processes.</p> | <p>Distribution substations, online interface for ordering, oil refinery logistics services. Customer uses refined oil products, interacts with online ordering system, logistics services and with distribution substation.</p> | <p>Third-party distribution substations, machines using the product</p> |

| Case | Digital technologies | Value logic and technologies' effect on value potential | Link to CE principles | Company-provided interfaces for value realization and customer's actions | Third-party provided interfaces for customer's value realization |
|---|--|--|--|---|--|
| <p>Fertilizers and infra products <i>Produces fertilizers for forestry and agriculture and products for groundworks and environmental construction from industrial side flows</i></p> | <p>Manufacturing automation increases operational efficiency in production processes.</p> | <p>Replace: Manufacturing automation enables operational efficiency in production, where industrial side flows are utilized in the manufacturing of fertilizer and groundworks products, closing resource flows. Operational efficiency ensures the low cost of production and enables economic value for customer.</p> | <p>Close resource with more efficient production processes.</p> | <p>Fertilizers, infra products Customer uses fertilizers and infra products.</p> | <p>Agricultural and forest machinery/ services, machines and tools used in construction site</p> |
| <p>Pulp refinery <i>Producer of pulp and refined products, developing industry-wide platform for utilizing side streams</i></p> | <p>Cloud technologies store, integrate, and analyse large volumes of data.</p> | <p>Share: Cloud technologies allow integrating real-time information on the side streams of individual companies closing resource flows.</p> | <p>Close resource flows by allowing shared use of side streams.</p> | <p>Online interface, application programming interfaces (APIs) with ERP and CRM when compatible. Customers interact with online interfaces to access side-stream information and to engage with the side-stream. APIs enable the automation of the interaction.</p> | <p>ERP and CRM systems</p> |

Notes: ^a Narrowing resource flows: using fewer resources per product (Bocken et al. 2016); ^b Slowing resource flows: extending the life of a product (Bocken et al. 2016); ^c Closing resource flows: through recycling, closing the loop between post-use and production (Bocken et al. 2016).

demonstrate this role. In these solutions, customers can realize value without interacting with the tools, machines, or service personnel of the company. Conveniently accessible interfaces combined with wide access to value potential allowed case companies to increase the demand for their CE services.

Digital technology improving operational efficiency: Digital technologies increase economic value for customers by lowering production costs. Illustrative examples in our study were production automation in the case of fertilizers and infra products; IoT, cloud, and AI technologies in supply chain efficiency in the case of oil refinery; and IoT technologies in logistics efficiency in the case of the waste management company. The operational efficiency also highlights that CE innovation does not need to be radical to be successful. Improvements in operational efficiency can take place in company processes without radically changing the business model.

Digital technology helping to understand value realization: Digital technologies monitor customer's use of the product or service improving the company's understanding of the customer's value realization process. The data gathered from the customer provides valuable information to guide further development and innovation. The final role is especially crucial to optimize logic, as the value potential in it is directly linked to customers' use of the product/service. IoT technologies in cases of construction tool service, forest machinery, and harvesting, are examples of digital technologies in enabling customer understanding in optimize value logic.

Practical Implications

The four roles of digital technology in CE value creation generate insights for managers on how to implement diverse digital technologies to develop their CE business and customer value. Therefore, managerial takeaways for each identified role of digital technology are presented. We suggest the four principles of digital CE value creation: relevance of interfaces, accessibility of the value potential, the efficiency of the processes, and analysis of value realization. Practitioners should consider these as guidelines for digital and business innovation in the field of CE.

1. **Relevance of interfaces:** Identify the interfaces that are most accessible for your customer and build service by utilizing those interfaces. For example, in the case of a construction tool service, the mobile application ensured that every worker on the construction site could interact with the service regardless of time or location.
2. **Accessibility of the value potential:** Ensure that the customer can realize the highest possible value potential through each interface. For example, in the case of the pulp refinery, cloud technologies ensured that the information on the side streams was accessible through both online and API interfaces.
3. **Efficiency of the processes:** Ensure a sufficient level of operational efficiency for a low production cost to provide economic value for the customer. For example, in the case of the oil refinery, IoT, cloud, and AI technologies were used to ensure that the supply chain worked efficiently.
4. **Analysis of value realization:** Build technologies and processes to understand the value realization processes of the customer for continuous improvement and further innovation. For example, in the case of the forest machinery and harvesting, IoT technologies were

used to monitor the customer's usage of the machine. This information was used in R&D and was also provided to the customers to help them optimize their own machine usage.

Theoretical Contributions and Directions for Future Research

Our study provides theoretical contributions to the literature on business and technology innovations in CE, to the literature on sustainable business, to the literature on the role of digital technology in CE business and to the literature on value creation. Prior circular and sustainable business literature covered technology and business innovation from the view of circularity (see e.g. Bocken et al. 2016; Lüdeke-Freund et al. 2019; Manninen et al. 2018; Ranta et al. 2018), leaving the realm of customer value creation unexplored. By taking the customer value approach and revealing aspects of value potential, as well as its realization, this chapter provides conceptualization for future studies focusing on customer value in circular and sustainable business as well as on business and technology innovations in CE.

The literature on the role of digital technologies in CE business has thus far been task and business model centric. These studies describe how various digital technologies enable the circulation of materials and products within CE business models (Pagoropoulos et al. 2017; Rosa et al. 2020) and analyse how the implementation of digital technologies enables incremental and radical sustainability and business model innovations (Ranta et al. 2021). Our study explicitly links digital technologies to the customer value by identifying the four roles of digital technologies in CE value creation. By doing so, the chapter has initiated a discussion for combining the customer value creation and CE principles; it has contributed to the literature on circular and sustainable business as well as to the literature on value creation, which have previously focused on the dynamics between the customer and provider (Aarikka-Stenroos and Jaakkola 2012; Grönroos and Voima 2013; Vargo and Lusch 2004) without explicit focus on the role of digital technologies.

For future research endeavours in the field of value creation in CE, we propose the following themes:

- The relevance of different roles of digital technology: Are all technology roles identified in this study equally relevant in other business environments?
- Customer-centric view on value realization: How is the customer's process of value realization and the customer's engagement with CE business models? Which technologies are used and how? Which actors participate in the value realization process?
- Processes with ecosystem actors: What kinds of roles do interactions with different ecosystem actors have in the creation of value potential or its realization in CE?

ACKNOWLEDGEMENTS

The data generation and writing of this book chapter were supported by the Strategic Research Council, Academy of Finland, through the research projects entitled 'Circular Economy Catalysts: From Innovation to Business Ecosystems' (CICAT2025) (grant ID 320194) and 'Sustainable Industry Ecosystem' (SIE) (grant ID 337722). Special thanks to research assistants Juha-Matti Väisänen, Puja Saha, and Roosa Lahtinen for their efforts in data collection for this study.

NOTE

1. This is an open access work distributed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 Unported (<https://creativecommons.org/licenses/by-nc-nd/4.0/>). Users can redistribute the work for non-commercial purposes, as long as it is passed along unchanged and in whole, as detailed in the License. Edward Elgar Publishing Ltd must be clearly credited as the rights holder for publication of the original work. Any translation or adaptation of the original content requires the written authorization of Edward Elgar Publishing Ltd.

REFERENCES

- Aarikka-Stenroos, L., & Jaakkola, E. (2012). Value co-creation in knowledge intensive business services: A dyadic perspective on the joint problem solving process. *Industrial Marketing Management*, 41(1), 15–26.
- Alcayaga, A., Wiener, M., & Hansen, E. G. (2019). Towards a framework of smart-circular systems: An integrative literature review. *Journal of Cleaner Production*, 221, 622–634.
- Belk, R. (2014). You are what you can access: Sharing and collaborative consumption online. *Journal of Business Research*, 67(8), 1595–1600.
- Bocken, N. M. P., de Pauw, I., Bakker, C., & van der Grinten, B. (2016). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, 33(5), 308–320.
- Centobelli, P., Cerchione, R., Chiaroni, D., Del Vecchio, P., & Urbinati, A. (2020). Designing business models in circular economy: A systematic literature review and research agenda. *Business Strategy and the Environment*. <https://doi.org/10.1002/bse.2466>.
- Dubois, A., & Gadde, L. (2002). Systematic combining: An abductive approach to case research. *Journal of Business Research*, 55, 553–560.
- Dutta, D., Prinz, F. B., Rosen, D., & Weiss, L. (2001). Layered manufacturing: Current status and future trends. *Journal of Computing and Information Science in Engineering*, 1(1), 60–71.
- Ellen MacArthur Foundation (2015). *Growth Within: A Circular Vision for a Competitive Europe*.
- Flick, U. (2004). Triangulation in qualitative research. In U. Flick, E. von Kardoff, & I. Steinke (eds.), *A Companion to Qualitative Research*. Thousand Oaks, CA: Sage Publications, 178–183.
- Grönroos, C. (2011). Value co-creation in service logic: A critical analysis. *Marketing Theory*, 11(3), 279–301.
- Grönroos, C., & Voima, P. (2013). Critical service logic: Making sense of value creation and co-creation. *Journal of the Academy of Marketing Science*, 41(2), 133–150.
- Lee, J., Bagheri, B., & Kao, H. A. (2015). A cyber-physical systems architecture for Industry 4.0-based manufacturing systems. *Manufacturing Letters*, 3, 18–23.
- Lewandowski, M. (2016). Designing the business models for circular economy: Towards the conceptual framework. *Sustainability (Switzerland)*, 8(1), 1–28.
- Lindgreen, A., Antiooco, M., Palmer, R., & van Heesch, T. (2009). High-tech, innovative products: Identifying and meeting business customers' value needs. *Journal of Business and Industrial Marketing*, 24(3–4), 182–197.
- Lopes de Sousa Jabbour, A. B., Rojas Luiz, J. V., Rojas Luiz, O., Jabbour, C. J. C., Ndubisi, N. O., Caldeira de Oliveira, J. H., & Junior, F. H. (2019). Circular economy business models and operations management. *Journal of Cleaner Production*, 235, 1525–1539.
- Lüdeke-Freund, F., Gold, S., & Bocken, N. M. P. (2019). A review and typology of circular economy business model patterns. *Journal of Industrial Ecology*, 23(1), 36–61.
- Manninen, K., Koskela, S., Antikainen, R., Bocken, N., Dahlbo, H., & Aminoff, A. (2018). Do circular economy business models capture intended environmental value propositions? *Journal of Cleaner Production*, 171, 413–422.
- Nascimento, D. L. M., Alencastro, V., Quelhas, O. L. G., Caiado, R. G. G., Garza-Reyes, J. A., Lona, L. R., & Tortorella, G. (2019). Exploring Industry 4.0 technologies to enable circular economy prac-

- tices in a manufacturing context: A business model proposal. *Journal of Manufacturing Technology Management*, 30, 607–627.
- Nasiri, M., Tura, N., & Ojanen, V. (2017). Developing disruptive innovations for sustainability: A review on impact of Internet of Things (IOT). *PICMET 2017 – Portland International Conference on Management of Engineering and Technology: Technology Management for the Interconnected World, Proceedings, 2017 January*, 1–10. <https://doi.org/10.23919/PICMET.2017.8125369>.
- Pagoropoulos, A., Pigosso, D. C. A., & McAloone, T. C. (2017). The emergent role of digital technologies in the circular economy: A review. *Procedia CIRP*, 64, 19–24.
- Patton, M. (1990). Designing qualitative studies. In *Qualitative Evaluation and Research Methods* (2nd ed.). Beverly Hills, CA: Sage Publications, 169–186.
- Prahalad, C. K., & Ramaswamy, V. (2004). Co-creation experiences: The next practice in value creation. *Journal of Interactive Marketing*, 18(3), 5–14.
- Ranta, V., Aarikka-Stenroos, L., & Mäkinen, S. J. (2018). Creating value in the circular economy: A structured multiple-case analysis of business models. *Journal of Cleaner Production*, 201, 988–1000.
- Ranta, V., Aarikka-Stenroos, L., & Väisänen, J. M. (2021). Digital technologies catalyzing business model innovation for circular economy: Multiple case study. *Resources, Conservation and Recycling*, 164, 105155.
- Ranta, V., Keränen, J., & Aarikka-Stenroos, L. (2020). How B2B suppliers articulate customer value propositions in the circular economy: Four innovation-driven value creation logics. *Industrial Marketing Management*, 87, 291–305.
- Rosa, P., Sassanelli, C., Urbinati, A., Chiaroni, D., & Terzi, S. (2020). Assessing relations between circular economy and Industry 4.0: A systematic literature review. *International Journal of Production Research*, 58(6), 1662–1687.
- Rusthollkarhu, S., Hautamaki, P., & Aarikka-Stenroos, L. (2020). Value (co-)creation in B2B sales ecosystems. *Journal of Business and Industrial Marketing*. <https://doi.org/10.1108/JBIM-03-2020-0130>.
- Slater, S. F., & Narver, J. C. (1994). Market orientation, customer value, and superior performance. *Business Horizons*, 37(2), 22–28.
- Soroka, A., Liu, Y., Han, L., & Haleem, M. S. (2017). Big data driven customer insights for SMEs in redistributed manufacturing. *Procedia CIRP*, 63, 692–697.
- Teece, D. J. (2010). Business models, business strategy and innovation. *Long Range Planning*, 43(2–3), 172–194.
- Tukker, A. (2015). Product services for a resource-efficient and circular economy: A review. *Journal of Cleaner Production*, 97, 76–91.
- Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68(1), 1–17.
- Vargo, S. L., & Lusch, R. F. (2016). Institutions and axioms: An extension and update of service-dominant logic. *Journal of the Academy of Marketing Science*, 44(1), 5–23.
- Yin, R. K. (1994). *Case Study Research: Design and Methods*. London: Sage Publications.

PUBLICATION IV

Managing B2B customer journeys in digital era: Four management activities with artificial intelligence-empowered tools

Rusthollkarhu, S., Toukola, S., Aarikka-Stenroos, L., & Mahlamäki, T.

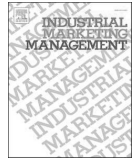
Industrial Marketing Management, 104(July 2022), 241–257
<https://doi.org/10.1016/j.indmarman.2022.04.014>

**Publication is licensed under a Creative Commons Attribution 4.0
International License CC-BY**



Contents lists available at ScienceDirect

Industrial Marketing Management

journal homepage: www.elsevier.com/locate/indmarman

Managing B2B customer journeys in digital era: Four management activities with artificial intelligence-empowered tools

Sami Rusthollkarhu, Sebastian Toukola, Leena Aarikka-Stenroos, Tommi Mahlamäki*

Tampere University, Unit of Industrial Engineering and Management, P.O. Box 541, 33014 Tampereen yliopisto, Finland

ARTICLE INFO

Keywords:

Customer journey
B2B
Artificial intelligence
Management
Digital tools
Activities

ABSTRACT

Business-to-business (B2B) customer interactions and customer journeys increasingly occur in digital spaces, often aided with diverse digital and artificial intelligence (AI)-empowered tools. This requires more in-depth understanding of how to manage such journeys and interactions, particularly with AI-empowered tools that enhance B2B companies' diverse and crucial marketing management operations, ranging from forecasting to managing relationships. To reach this research goal, this paper integrates the current scattered understanding of B2B customer journeys and their management into AI research and presents a two-phase empirical study. First, through an integrative literature review, this study analyzes the relevant contemporary B2B management activities for managing customer journeys and identifies four key management activities: analyze, design, engage, and guide. Second, through mapping over 150 digital tools under 16 marketing management–tool categories and identifying and analyzing AI functions within those tools, the study examines how AI supports companies in the B2B customer journey management activities. The study makes contributions to B2B digital marketing, management and sales research, as well as customer journey management. It also provides guidance for B2B marketers and AI tool technology developers on how AI-empowered tools can be applied and developed to support B2B marketing management, particularly B2B customer journeys.

1. Introduction

Business-to-business (B2B) customer interactions increasingly occur in digital spaces, requiring companies to adopt novel technological solutions and tools to manage their customers' journeys (Steward, Narus, Roehm, & Ritz, 2019; Zolkiewski et al., 2017). As complex B2B buying and selling processes turn to digital (Steward et al., 2019), the shift requires companies and managers to develop their managerial practices and digital toolboxes in order to survive and thrive in the digital era. Customers' movements across multiple channels and touchpoints call for companies' fusion of marketing and sales operations to offer a coherent customer experience, from their first brand exposure to purchase and use (Rusthollkarhu, Hautamaki, & Aarikka-Stenroos, 2021), comprising B2B customers' journeys to be managed (Steward et al., 2019). Technologies, such as artificial intelligence (AI) (Syam & Sharma, 2018), virtual reality (VR) and augmented reality (AR) (Flavián, Ibáñez-Sánchez, & Orús, 2019), and Internet of Things (Aunkofer, 2018), offer B2B companies new possibilities to manage customer interactions in digital environments. Due to the data-

generative nature of digital buying environments, AI technologies in particular are expected to transform and enhance marketing and sales processes (Davenport, Guha, Grewal, & Bressgott, 2020; Iansiti & Lakhani, 2020; Syam & Sharma, 2018). In this paper, we focus on AI, specifically AI-empowered tools in B2B customer journey management. We define AI-empowered tools on the basis of AI as computational agents that demonstrate intelligence (Shankar, 2018) by acting or reasoning (Russell & Norvig, 2016) and are technologically based on their ability to recognize patterns in data (i.e., machine learning [Murphy, 2012]). Thus, AI-empowered tools are tools that have one or more functions based on their pattern recognition ability, allowing the tools to demonstrate intelligence by acting or reasoning. We develop an understanding of the management of increasingly digital B2B customer journeys and related interactions with AI-empowered tools. This research goal is crucial in contemporary B2B settings because (in addition to its theoretical contributions) it may help diverse B2B companies manage their marketing management operations better throughout the customer journey.

With our particular focus on AI-empowered B2B customer journey

* Corresponding author.

E-mail addresses: sami.rusthollkarhu@tuni.fi (S. Rusthollkarhu), sebastian.toukola@tuni.fi (S. Toukola), leena.aarikka-stenroos@tuni.fi (L. Aarikka-Stenroos), tommi.mahlamaki@tuni.fi (T. Mahlamäki).

<https://doi.org/10.1016/j.indmarman.2022.04.014>

Received 3 February 2021; Received in revised form 19 April 2022; Accepted 20 April 2022

Available online 12 May 2022

0019-8501/© 2022 The Author(s). Published by Elsevier Inc. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

management, we also rely on the current understanding of (B2B) customer journeys. A customer journey refers to an entity consisting of multiple touchpoints – moments of interaction between a prospect/customer and a service provider that form the holistic customer experience (Lemon & Verhoef, 2016). The current theoretical understanding of the customer journey has focused on conceptualizing what customer journeys comprise (e.g., touchpoints [Lemon & Verhoef, 2016; Steward et al., 2019]; phases, i.e., prepurchase, purchase, and postpurchase [Frambach, Roest, & Krishnan, 2007; Lemon & Verhoef, 2016] and offline and online channels [Edelman & Singer, 2015; Frambach et al., 2007; Wolny & Charoensuksai, 2014]). While different customer journey “building blocks” are well established, the realm of customer journey management is quite scattered and lacks conceptual coherence. Despite the growing research interest in customer journeys, surprisingly, there is little discussion about managing B2B customer journeys. Customer journey management-related issues are largely covered by sales and marketing literature that uses conceptualizations differing from those of customer journey’s touchpoints and phases. In B2B, particularly the topics regarding relationship management (Viio & Grönroos, 2014), key account management (Guesalaga, Gabriellson, Rogers, Ryals, & Marcos Cuevas, 2018; Peters, Ivens, & Pardo, 2020), as well as buying (Diba, Vella, & Abratt, 2019) and selling processes (Mahlamäki, Storbacka, Pylkkönen, & Ojala, 2020; Moncrief, 2017), address customer journey management-related issues. However, these streams provide a limited understanding of B2B customer journey management as they only address handling a limited set of touchpoints on a specific process, phase, or channel of the customer journey. This disregards the complexity of linking multiple touchpoints on different channels to provide a seamless experience for customers. This is a crucial gap since the management of different touchpoints is usually dispersed among multiple teams and people within an organization, introducing challenges for customer journey management as a whole (Rusthollkarhu et al., 2021).

Although the B2B literature elaborates less on the role of AI in customer journey management, some complementary knowledge can be sourced from the literature on marketing-related decision systems, suggesting that AI can enhance selling and marketing processes and different areas of their management. AI has been found to improve demand forecasting (O’Neil, Zhao, Sun, & Wei, 2016; Yuan, Xu, & Yang, 2014), lead generation and qualification (D’Haen & Van Den Poel, 2013), pricing (Ferreira, Lee, & Simchi-Levi, 2016), and gaining customer insights (Prasasti & Ohwada, 2014; Shimomura, Nemoto, Ishii, & Nakamura, 2018). The marketing literature has also discussed the potential of AI through the lens of marketing (Davenport et al., 2020) and sales (Syam & Sharma, 2018) in general, as well as in the B2B setting through the lens of market knowledge (Paschen, Kietzmann, & Kietzmann, 2019). Extant research on the potentials of AI has applied also a more critical lens by focusing on customer dissatisfaction caused by AI failure (Castillo, Canhoto, & Said, 2021), its’ disrupting effects to human work (Ozkazanc-Pan, 2019), or ethical concerns (Jobin, Ienca, & Vayena, 2019).

The aforementioned studies highlight the relevance of AI in management, but they do not mention anything about how AI can be utilized to manage B2B customer journeys, the perspective that is increasingly crucial in the field of B2B marketing (Steward et al., 2019). In this paper, we contribute to this research gap by analyzing how AI-empowered tools enable companies to manage B2B customer journeys. Thus, we focus on B2B companies’ management activities that are needed to manage B2B customer journeys, as well as the AI-empowered tools that support such activities.

To bridge the identified knowledge gaps, our study intends to contribute to the existing literature with our analysis of *how AI-empowered tools and their AI functions enable companies to manage B2B customer journeys*. Therefore, we identify companies’ B2B customer journey management activities and the digital, particularly AI-empowered, tools and their AI functions that support such activities.

This requires a two-phase research design. First, by reviewing the current literature on customer journeys, as well as B2B sales, marketing, and relationship management, we recognize four customer journey management activities: analyze, design, engage, and guide. Second, to understand the possibilities of AI in customer journey management, we systematically review 152 commonly used sales and marketing tools, validate our tool selection using an online questionnaire, and categorize the tools based on the core functionality of each. Based on our AI definition, we then identify 58 AI-empowered tools and analyze the managerial benefit of each AI functionality in customer journey management activities. Our identification of customer journey management activities contributes to the B2B marketing and customer journey literature by synthesizing previously scattered knowledge on the required managerial actions. Our analysis on the possibilities of AI in these activities continues the discussion on AI in the contexts of marketing (Davenport et al., 2020), sales (Syam & Sharma, 2018), and B2B market knowledge (Paschen et al., 2019).

We start by building an understanding of AI, customer journeys, and their management. Next, we explain our research design and present the findings on AI in customer journey management activities. Finally, we highlight our key contributions to theory and practice, as well as discuss our study’s limitations and future directions.

2. Artificial intelligence in customer journey management

We start this section by discussing AI and its role in business and marketing management. We then elaborate on the literature on customer journey and its management and synthesize this section by presenting a priori framework for B2B customer journey management activities and supporting AI-empowered tools.

2.1. AI and its role in business and marketing management

The marketing management and business literature has commonly approached AI through its management applications (see, e.g., automation of management accounting [Korhonen, Selos, Laine, & Suomala, 2021], transformation of management tasks [Kolbjørnsrud, Amico, & Thomas, 2016], robotization of customer service [Wirtz et al., 2018], and applications to future marketing [Davenport et al., 2020]). Also more critical remarks on AI failure and customer dissatisfaction (Castillo et al., 2021), disrupting effects of AI to human work (Ozkazanc-Pan, 2019), or ethical concerns pertaining to the use of AI (Jobin et al., 2019) have been discussed in literature. In business and marketing management, AI is often labeled as technology for intelligence that enables the argued managerial application. However, since it is difficult to define exactly what constitutes an intelligence, in this paper, intelligence-based AI definitions (Nilsson, 2009; Paschen et al., 2019; Russell & Norvig, 2016; Shankar, 2018) are complemented with a technology-based focus on pattern recognition (Louridas & Ebert, 2016; Murphy, 2012). We then define AI as follows: *Artificial intelligence is a term for computational agents equipped with properties that enable them to interact with their surroundings and, based on recognized patterns in data, are able to reason or modify their behavior or surroundings in a goal-oriented way*. Our intention is not to find “a superior” AI definition but to build definition toward a solution that provides a managerially relevant understanding of AI while minimizing the risk of AI becoming an “all-inclusive concept” for all IT management systems. Next, we present a more detailed discussion on which we base our AI definition.

2.1.1. AI as a form of non-human intelligence

In general terms, AI refers to algorithms, systems, and machines that demonstrate intelligence (Shankar, 2018). Traditionally, intelligence is perceived as a property of the mind and tightly linked to consciousness. In this human context, intelligence is defined as the abilities to learn, understand abstract concepts, deal with new situations, and use previously gained knowledge to manipulate one’s environment (Legg &

Hutter, 2007). As the term *artificial* disconnects the link between consciousness and intelligence, in AI the concepts of learning, understanding, and dealing with new situations change to the more general abilities of interacting with the surroundings and perceiving and processing data, as well as the ability to behave in a goal-directed manner (Nilsson, 2009; Paschen et al., 2019).

Depending on the context, different AI definitions consider intelligence either through acting or thinking, as well as measure AI's success in its fidelity to human performance or opposition to the ideal performance, referred to as rationality (Russell & Norvig, 2016). Regardless of the approach, deciding whether or not something is AI, based on its intelligence, is tightly linked to human perception of intelligence (i.e., whether humans observe a non-human agent's thinking or acting that demonstrates its interaction with the environment and goal-directed behavior). In practice, this leaves intelligence-based AI definitions interpretive. For example, early water clocks used in 270 BCE utilized mechanical means to interact with the environment in order to modulate the water flow to a system (Nilsson, 2009). While these early systems technically interacted with their surroundings and could achieve their goals based on the environmental input they received through mechanical means that utilized rods and corks, we rarely consider them AI systems.

2.1.2. AI as technology

Modern AI applications that solve problems, reason, plan, learn, communicate, perceive, and act (Russell & Norvig, 2016) are methodologically linked to advanced data processing technologies that enable the utilization of vast data masses (Iansiti & Lakhani, 2020; Paschen et al., 2019). The umbrella term machine learning (ML) is used to describe the functioning of these methods. ML allows the machine (instead of preprogrammed rules) to learn to perform a task by examining previous examples (Louridas & Ebert, 2016). The process of examining examples is also referred to as ML's ability to automatically find patterns from the data (Murphy, 2012). ML methods include artificial neural networks, decision trees, regression methods, and random forests, among others (Asare-Frempong & Jayabalan, 2017). Different ML methods are also often discussed by referring to the area of application without identifying the exact statistical method. Two examples are natural language processing (NLP), which refers to ML in the context of written texts (Nuruzzaman & Hussain, 2018), and image recognition in the context of picture data (He, Zhang, Ren, & Sun, 2016).

Whereas AI concepts focus on the abilities of an entity or the outcome of a process (e.g., learning, adapting, pattern recognition, language understanding), ML describes the way that the outcome is obtained. To demonstrate, we refer to Meire, Ballings, and Van den Poel's (2017) study in which they used 225 different variables to develop the ML model that would identify the most promising restaurant company leads for Coca-Cola Refreshments Inc. The authors trained the model to identify the restaurants that (based on these variables) would best correspond to the company's current B2B customers. After each training round, the ML model changed the weight for each parameter to correspond to the customer profiles in the training set. After extensive repetitions, the model was able to learn the right weights for the parameters to choose which prospective restaurant would match the customer profile. Because of this more thorough way of presenting the thinking process of AI, ML has also been referred to as the brains of AI (Chatterjee, Ghosh, Chaudhuri, & Nguyen, 2019).

Research on business and management usually approaches AI through intelligent-based definitions that do not say much on technological principles (see, e.g., Davenport et al., 2020; Iansiti & Lakhani, 2020). Different technology concepts are mentioned but often cited as examples, not as criteria for including an application under an AI category. That is understandable as non-technical business managers assumingly are more interested in the benefits and value of the tool than how it technically works. However, as this approach includes the risk of AI becoming an all-inclusive, empty concept, in this paper, we want to

avoid this by focusing purely on AI-empowered tools in which AI functions are based on ML. As we are interested in how such functions empower B2B customer journey management, we next discuss the approach to the customer journey.

2.2. Managing customer journeys

2.2.1. Theoretical background of customer journeys

The customer journey concept originates from experience management (Lemon & Verhoef, 2016), but in the B2B context, it has also been used to conceptualize buying and selling processes (Steward et al., 2019), giving more emphasis on the beginning of the journey. In this paper, we utilize customer journey with its original purpose to conceptualize the whole B2B customer experience. This broad conception naturally implies that sales, marketing, and service science discussions (see, e.g., environmental and atmospheric topics [Bitner, 1990], sales processes [Moncrief & Marshall, 2005], or service recovery [Kelley & Davis, 1994]) include relevant knowledge on the topic.

The customer journey literature has divided the journey into multiple phases. For the theoretical framework of this paper, we utilize the three-phase typology of prepurchase, purchase, and postpurchase (Lemon & Verhoef, 2016). Customer behaviors in these phases include need recognition, consideration, and search (prepurchase stage); choice, ordering, and payment (purchase stage); and consumption, usage, engagement, and further service requests (postpurchase stage). Similar types of phase categorizations are presented especially in the sales literature on the sales process (e.g., three-phase categorization, comprising identification of new business opportunities, persuasion, and relationship management used in the context of sales communication [Fraccastoro, Gabriellson, & Pullins, 2021], seven-step model, consisting of prospecting, pre-approach, approach, presentation, overcoming objection, close, and follow-up [Dubinsky, 1981], and its updated version, consisting of customer retention and detection, database and knowledge management, nurturing the relationship, marketing the product, problem solving, adding value/satisfying needs, and customer relationship maintenance [Moncrief & Marshall, 2005]). For the purposes of this paper, we consider Lemon and Verhoef's (2016) customer journey-focused categorization the most suitable, due to its designed purpose of conceptualizing the customer journey.

From the perspective of customer journey management, it is important to emphasize that customers' interaction with a brand is not limited to their interaction with the company offering the solution. This interaction also includes the company's partners (Lemon & Verhoef, 2016), industry experts (Hartmann, Wieland, & Vargo, 2018), the customers' social spheres (Lemon & Verhoef, 2016), and communication within the customer organization (Sheth, 1973). The term *interaction* is used in a broad sense to include all possible ways of brand exposure, such as advertising (Kietzmann, Paschen, & Treen, 2018), communication with service employees (Lemon & Verhoef, 2016), as well as traditional (Baxendale, Macdonald, & Wilson, 2015) and electronic word-of-mouth (Wolny & Charoensuksai, 2014). This increased complexity in forming experiences calls for the shift in the locus of negotiation power from sellers to buyers (Marcos Cuevas, 2018) and requires companies to adopt technological solutions in order to gain access to customers' buying processes (Steward et al., 2019).

2.2.2. Toward an a priori framework: B2B customer journey management activities and supporting AI-empowered tools

Next, we integrate our approaches – B2B customer journey management, and AI as management supporting technology – into an a priori framework. By customer journey management, we refer to the companies' actions that aim to manage the customer experience emerging from multiple touchpoints. Here, the managerial challenge arises from the divergence of touchpoints to multiple environments, both offline and online (Rustholkarhu et al., 2021). In the B2B context, companies need to consider the B2B-specific issues originating from the complexity

of B2B markets. These issues include acknowledging the importance of customers' own customers (Homburg, Wilczek, & Hahn, 2014), the complexity of products and decision-making processes (Appio & Lacoste, 2019; Töllner, Blut, & Holzmüller, 2011) as well as the fact that multiple people from different organizations take part in the those processes (Hartmann et al., 2018). Furthermore, B2B markets particularly focus on relationships, (Chandler & Johnston, 2012; Viio & Grönroos, 2014), with explicit attention on catering the most important and strategic customers (key accounts) with particular programs (Feste, Ivens, & Pardo, 2020).

In this study, we aim to improve the understanding of AI in B2B customer journey management through AI-empowered digital tools. In managerial context, AI is generally harnessed either through statistical methods (e.g., neural networks, decision trees, random forests) (see, e.g., Fig, Le Guen, & Gauchet, 2018; Quijano-Sanchez & Liberatore, 2017) that are developed for specific task by companies themselves, or through software tools with AI functions (i.e., AI-empowered tools) used by company employees, managers, or customers (see, e.g., Davenport et al., 2020; Paschen et al., 2019). In this paper, we focus purely on the latter. Our goal is to acknowledge the full potential of these tools for B2B customer journey management, while explicitly articulating what part of this potential is enabled by AI. In Fig. 1, we integrate the theoretical setting of the research problem into an a priori model.

Following the logic of the model, first, we synthesize the scattered knowledge on customer journey management and conceptualize the required managerial activities. Second, we detect the AI-empowered tools that support such management and analyze the AI functions that serve certain activities in specific parts of or throughout the customer journey, offering us a holistic understanding of AI in B2B customer journey management.

3. Methodology

3.1. Research design

To analyze and in particular, to explore the AI-empowered tools in B2B customer journey management, we have developed a two-phase qualitative research design. Phase 1 comprises structuring a theoretical framework with an extensive literature review from which the B2B customer journey management activities are explored and conceptualized, as the current research does not provide a comprehensive framework for this management aspect. Phase 2 identifies empirical real-life AI-empowered tools supporting such activities and examines them further, specifically how the tools and their AI functions support the identified management activities. The design is illustrated in Fig. 2.

3.2. Research phases, data sources, and analysis

In Phase 1, we aimed to theorize the B2B customer journey management activities from the extant research on B2B (particularly sales, marketing, and buying literature), the customer journey, and related research. We relied particularly on a delineating analysis, referring to the conceptual work that aims to explicate in detail the entity under the study (MacInnis, 2011). This analysis phase is based on an integrative literature review (see, e.g., Torraco, 2016) of 72 peer-reviewed articles, conference proceedings, and book chapters published between 1973 and 2020. To identify the relevant literature, we conducted a database search on Scopus and Web of Science (using the search words “customer journey,” “customer process,” “buying journey,” “buying process,” “purchase journey,” or “purchase process”). This generated 742 hits on Scopus and 403 on Web of Science. We skimmed through titles and abstracts and eliminated the hits that did not represent the focus of this paper. This resulted in a total of 64 articles selected for content analysis.

Management activities for B2B customer journeys

Customer journey management refers to actions that aim to manage customer's experience, emerging through multiple touchpoints (adapted from Lemon & Verhoef, 2016).

Knowledge on business-to-business (B2B) customer journey management activities is scattered throughout the literature of customer experience management (e.g., Lemon & Verhoef, 2016), B2B relationship management (e.g., Viio & Grönroos, 2014; Appio & Lacoste, 2019), and B2B sales (e.g., Steward et al., 2019).

AI-empowered tools and AI functions

Artificial intelligence (AI) is a term used for computational agents equipped with properties that enable them to interact with their surroundings and, based on recognized patterns in data, are able to reason or modify their behavior or surroundings in a goal-oriented way (adapted from Louridas & Ebert, 2016; Murphy, 2012; Nilsson, 2009; Paschen et al., 2019; Russell & Norvig, 2016; Shankar, 2018).

AI functions are instantiations of AI (i.e., they perform reasoning or modify their behavior or surroundings in a way that is goal-oriented and based on pattern recognition).

AI-empowered tools are those that have one or more AI function.

Prepurchase

Purchase

Postpurchase

B2B customer journey

Fig. 1. A priori framework for B2B customer journey management activities and supporting AI-empowered tools.

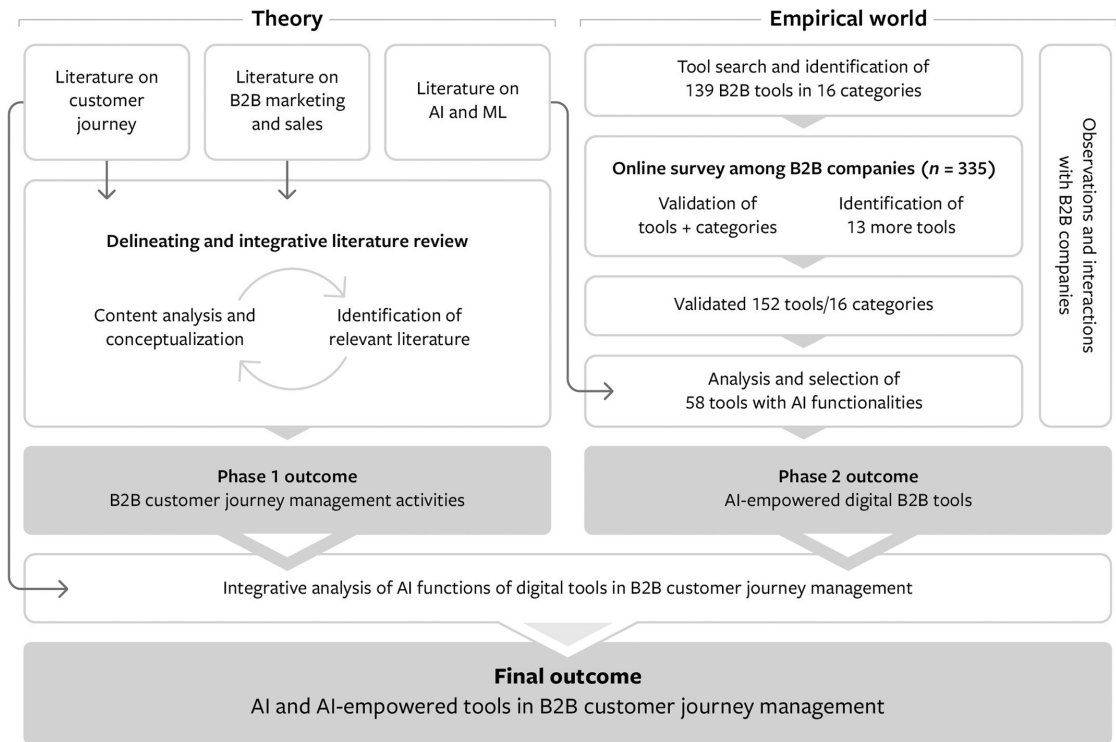


Fig. 2. Research design.

During the analysis, we continued the identification of relevant literature with a citation search and expert polling until we reached the saturation point (for literature identification strategies, see Savin-Baden & Howell, 2013). At the end, this yielded eight more journal articles for inclusion. Our analysis proceeded by first detecting subcategories, which were then condensed into the management activities proposed in this paper. These subcategories are presented with bullet points as we report our results (Table 1, column 2 and 3) in the next section of this paper.

In Phase 2, aiming to identify, analyze, and categorize diverse AI-empowered tools for B2B customer journey management, we started by detecting the tools via four information sources: Google keyword searches (e.g., “digital marketing tools,” “digital sales tools,” and “sales force tools”) with different Boolean operators, digital marketing influencers (e.g., blogs and expert interviews), web pages that had listings of these tools (see Appendix A), and managers’ perceptions and usage of AI-empowered tools for marketing and sales management, obtained in a workshop among Finnish B2B small and medium-sized enterprises (SME). The search for and analysis of AI-empowered tools was iterative. To cite examples, the first analysis rounds led to finding more tools by using their functions as keywords in a Google search (e.g., “digital tools for prospecting”), or when we explored web pages from already known tools, we found comparisons to similar tools.

Altogether, 152 commonly used sales and marketing tools were structurally analyzed and categorized based on their core functionalities; 139 were identified via searches and web pages. Next, 13 more tools were identified, and the already identified tools were validated with an online survey among sales and marketing managers in Finnish B2B companies. The target sample comprised 3869 marketing and sales managers from different industries; 335 responses were received,

representing a 6% response rate. These identification and analysis rounds resulted in a comprehensive list of 152 different tools under 16 categories (Table 2).

From the 152 tools validated by managers, we then selected 58 for further analysis, due to their AI-empowered features, based on our AI definition. Next, we analyzed the functionalities and positioning of each tool in the customer journey and its management. We analyzed the tool functionalities regarding two facets: 1) main functions (the starting point for our categorization), which are the top-level functions comprising various smaller tasks, and 2) AI-empowered functions, defined as those that use AI to perform certain tasks. Based on our definition, it means that we can identify the used data, as well as the ML-based data processing method. During the process, we analyzed the value of each tool regarding the three stages of the customer journey. Similarly, we assessed each tool’s suitability for different customer journey management activities. Our analysis of the functions was based on the information provided by the tool’s supplier on its web pages and other online sources. During the analysis, we also ensured that the tool was targeted for B2B use.

The quality of the results and the research process was ensured using different modes of triangulation (Flick, 2004). In all phases and analysis rounds, researcher triangulation was applied (Phase 1: multiple researchers participated in the literature identification, selection, and analysis; Phase 2: multiple researchers participated in tool identification and analysis). All phases also benefited from data triangulation, as tool-oriented data were multisourced and the whole research process was supported via close empirical observations, manager workshops and interviews, and ethnographic follow-ups among SMEs implementing tools and pursuing the management of their customer journeys (Fig. 2). Furthermore, diverse means of analysis and jointly generated

Table 1

Management activities for the business-to-business (B2B) customer journey.

| B2B Customer journey management activity | The main aspects to consider in customer journey management based on literature | The role/contribution of digital tools in activity-related actions |
|--|---|---|
| <p>ANALYZE: Activities that detect and gather data on a prospect's/customer's behavior and develop an understanding of it in relation to sales/marketing processes. Thus, <i>analyze</i> activity structure's understanding of how the actions of a prospect/customer and B2B provider affect each other throughout the customer journey.</p> <p>B2B companies should especially focus on implementing customer data-based analytics, since the purchase amounts of one given customer usually carry great significance (Hollikainen, Savimäki, & Laakkonen, 2020).</p> | <p>From the <i>Analyze</i> perspective, the customer journey is to be utilized as a framework to understand how B2B customer and provider actions affect each other throughout the B2B customer experience (Fälsted & Kvale, 2018; Lemon & Verhoef, 2016; Steward, Narus, Roehm, & Ritz, 2019).</p> <p>To successfully utilize the customer journey as an analysis framework, B2B companies need to:</p> <ul style="list-style-type: none"> Build metrics for understanding how customers utilize different channels (Li & Kannan, 2014) and contents (Lee, 2010) in each phase of the journey; Understand how individual touchpoints form a continuous flow constituting a full B2B customer journey (Edelman, 2010); Consider the reasoning for choosing the metrics, in order to understand the link between customer and company actions (Järvinen & Karjalainen, 2015). <p>B2B companies should:</p> <ul style="list-style-type: none"> Design customer journeys like products (Edelman & Singer, 2013); Tailor journeys for each segment (Burke, 2002); Recognize channel preferences (Sands, Ferraro, Campbell, & Pallant, 2016) and buyer characteristics (Wolny & Charonkuisal, 2014); Overcome the challenge of presenting the right information at the right time at the right touchpoint (Grant et al., 2013). <p>Customer journey design can include processual design elements such as preparation, component development, relation definition, and opportunity discovery (Moon et al., 2016).</p> | <ul style="list-style-type: none"> To gather data, B2B companies need to: <ul style="list-style-type: none"> Acknowledge the role of digital tools as an important method for data gathering, crucial for <i>analyze</i> activity (Lee, 2010); Overcome the challenge of extracting the most informative user data in a smart way (Aunkofer, 2018), (e.g., utilizing innovative mobile interfaces [Wozniak, Schaffner, Stanoevska-Slabeva, & Lenzkesekamp, 2018]). B2B companies cannot only depend on digital tools in complex B2B e-service innovation designs. They also need to re-architect inter-organizational processes and system links (Legner, 2008), which also requires commitment from senior management (Dasser, 2019). |
| <p>DESIGN: Actions aimed at planning the journey for the customer. This includes architecting journey elements (how and when to utilize online/offline channels, what to offer in each channel, etc.) and architecting sales and marketing processes (e.g. content production, lead generation, sales negotiations) in a way that produces a seamless experience for the prospect/customer.</p> <p>In B2B markets, longer purchase times, <i>fact-based decision characteristics</i> (Bakhteva, 2016), and recognizing the needs of the customers' own customers (Homburg et al., 2014) should receive special attention in the journey design.</p> | <p>B2B companies need to acknowledge the drivers for customer engagement such as:</p> <ul style="list-style-type: none"> Brand-owned drivers like brand-facilitated conversation (Hollis, 2005; Powers, Advincula, Austin, Graiko, & Snyder, 2012), paid, earned, and owned media (Barley, 2016), message creativity (Baack, Wilson, van Dessel, & Patti, 2016), product presentation videos (Flavián, Gurra, & Ortis, 2017) and technology interfaces (e.g., virtual [VR] [Williams, Brengman, & Van Kerrebroek, 2019] and augmented reality [AR] [Häkkinen et al., 2018]); Customer-owned drivers like customers' web skills and abilities (Wu, Chen, & Chiu, 2016), convenience (Schroder & Zaharia, 2008) and perceived usefulness (Liao et al., 2010). <p>Customer engagement in online channels is indicated by the frequency of visits (Fedoroko, Beck, Kot, & Kakalejčik, 2015).</p> | <ul style="list-style-type: none"> Different channels serve different purposes throughout the journey (Narayanan & Nandagopal, 2016). Online channels are most engaging in the early stage (Molesworth & Suoriti, 2002) information-seeking (Flavián, Gurra, & Ortis, 2016). Online channels are utilized excessively in both online and offline purchases (Voorveld, Smit, Neijens, & Brommer, 2016). Online channels trigger more account engagement, leading to a more positive effect on lead generation compared with offline in-person events, such as conferences (Wang, Malthouse, Calder, & Uzunoglu, 2019). However, offline procurement methods are still preferred in highly important cases (Schoenberr & Meibert, 2011). Mobile channels are not recommended for new product launch engagement (Wang, Malthouse, & Krishnamurthi, 2015). <p>Digital tools are crucial in guiding customers throughout the journey. Literature has identified the following ways B2B companies can influence customers' touchpoint choice through technological means:</p> <ul style="list-style-type: none"> Individual customization of web pages (Jacobs et al., 2018); Utilization of the Internet of Things (Higgins, McGarry, Wolf, & Wolf, 2014; Kaczorowska-Spychalska, 2017) and VR technologies (Boyd & Kolea, 2019); Social media communication (Gao, Meister, & Klante, 2014; Diba et al., 2019; Gustafson, Pomirleanu, John Mariadoss, & Johnson, 2019; Lindsey-Mullikin & Borin, 2017; Zhang & Li, 2019); The quantity, type, and timing of contacting (George & Wakefield, 2018). |
| <p>ENGAGE: Actions that steer the prospect/customer to find the next step in the customer journey.</p> <p>B2B companies need to ensure that the right people are engaged in decision making to successfully guide the customer forward (Shieth, 1973).</p> | <p>B2B companies need to recognize that customer touchpoint choices vary individually (Hierhausen, Kleinlercher, Verhoef, Ehmrich, & Rudolph, 2019), the identified drivers for touchpoint being:</p> <ul style="list-style-type: none"> Customer-owned drivers, such as personal habits, expected benefits, and hedonic motivation (Mesquera et al., 2018), as well as affective experiences (Andersson, Bodecker, & Vuori, 2017), personal decision-making styles, and product knowledge (Karimi, Papamichail, & Holland, 2015); Interaction-dependent drivers like limited data processing capabilities and information asymmetries (Rippe, Weisfeld-Spöter, Yurova, & Sussan, 2015), information availability (Burke, 2002), social communication (Blaichke, 2015), the multi-person decision-making character of the B2B setting (Shieth, 1973), and the language of communication (Carter & Yeo, 2018); <p>Company-owned drivers like checkout time (Kotmi, 2017), product availability checks (Wollenburg, Holzappel, & Hübner, 2019), the possibility for direct contact (Vaghela, 2014), instore communication (Ivaxendale et al., 2015), search costs (Su, 2008), means for transaction, availability of merchandise, and payment security (Kotmi, 2017).</p> | |

Table 2
Tools and AI functions for business-to-business (B2B) customer journey management.

| Category | How the tools support companies' actions | management | Number of AI tools/ total tools in category | AI functions, utilized data and machine learning method | Activity types to which the AI functions contribute to | | | |
|---|--|------------|---|--|---|--|--|---|
| | | | | | Analyze Design Engage Guide | | | |
| 1. Prospecting and mapping | Enables companies to find potential customers and gather their contact details. | | 5 /14 | <ol style="list-style-type: none"> AI functions Utilized data Utilized method Examples of tools <p>1. Gathers relevant data about leads and predicts their potential, finds prospects interested in a company's offerings</p> <p>2. News, public statistics, lead's activities, social media data</p> <p>3. Natural language processing (NLP), image recognition</p> <p>4. Vainu, Qualifier.ai, SocialMiningAI</p> | | | | X |
| 2. Interactive content | Enables companies to interact with and gather information from web page visitors or potential customers. | | 2/8 | <ol style="list-style-type: none"> Chatbots, contextual content (personalized web content to customer's needs), predicts customer's willingness to buy Existing user data, traffic sources, customer behavior NLP Gosg, Rightmessage | | | | X |
| 3. Contacting and mass marketing | Enables companies to contact customers and do mass marketing. | | 7/25 | <ol style="list-style-type: none"> Personalized content creation, next contact step and timing suggestions, subject line writing helper (helps write, e.g., enticing subjects for emails) Existing user and customer data Not identified Creamailer, Mailchimp | | | | X |
| 4. Making appointments | Enables companies to schedule meetings. | | 1/3 | <ol style="list-style-type: none"> Automatic meeting scheduling between participants For example, emails, which inform recipients about the need for a meeting. NLP x.ai | | | | X |
| 5. Social media management | Enables companies to facilitate usage of and advertising on social media. | | 6/16 | <ol style="list-style-type: none"> Automatic posts, analyzes best timing for posts, personalized ads Data from existing users and their behaviors NLP Facebook ads, MeetEdgar | | | | X |
| 6. CRM/Marketing automation | Comprehensive tools that enable companies to automate marketing and manage the customer relationship. | | 11/18 | <ol style="list-style-type: none"> Automatic transcriptions of business calls, enricher of customer data, automatic report generation, automatic creation of new contacts, next-step suggestions on sales (e.g., how to proceed with a customer), personalized experiences for the customer (e.g., ads, campaigns), sales forecasting, predict when a customer is likely to cancel For example, available data from customer (and CRM user) behaviors and actions (e.g., engagement, click-through rates, search patterns, purchase history, past queries, or help tickets), multiple data sources NLP Hubspot, Salesforce | | | | X |
| 7. Search engine optimization (SEO) and search engine marketing (SEM) | Improve companies' marketing visibility and advertising in search engines. | | 5/11 | <ol style="list-style-type: none"> Responsive testing of alternative ads, auto-generation of SEO-optimized titles and text Ad conversion data, data from target groups Generative Pre-trained Transformer 3 (GPT-3) method Alhrefs, Google ads, Outranking | | | | X |
| 8. Digital signature tools | Manage companies' contract signing and analysis process. | | 1/6 | <ol style="list-style-type: none"> Automatic extraction of clauses and terms from new contracts, identifying and offering suggestions to replace risky clauses and terms (e.g., that might include a high risk for the company) in contracts, risk analysis of contracts Contract database, specific data from business and industry NLP, machine learning (ML), rules-based logic DocuSign | | | | X |
| 9. Sales analytics | Analytics that help companies measure sales success. | | 2/11 | <ol style="list-style-type: none"> Helps find the right information from analytics data, automatically highlights analytical facts for improvement, monitors competitors and captures their meaningful actions Social data, analytics data, competitor data Not found Google Analytics, Crayon | | | | X |
| 10. Social media analytics | Enables companies to analyze social media. | | 4/8 | <ol style="list-style-type: none"> Recognizes visual mentions of brands and sentiments on social media texts All kinds of social media data (including posts, images) Image recognition, NLP | | | | X |

Table 2 (continued)

| Category | How the tools support companies' management actions | Number of AI tools/ total tools in category | AI functions, utilized data and machine learning method | Activity types to which the AI functions contribute to | | | |
|----------------------------|--|---|---|--|--------|--------|-------|
| | | | | Analyze | Design | Engage | Guide |
| 11. Market research | Tools that companies can use for market research. | 2/4 | <ol style="list-style-type: none"> 1. AI functions 2. Utilized data 3. Utilized method 4. Examples of tools <ol style="list-style-type: none"> 4. Facebook Analytics, Talkwalker 1. Based on customer's experience, suggests things that need further development and design, classifies market survey responses by their sentiments and quality 2. Marketing survey data, user behavior and action data 3. NLP 4. Google Trends, SurveyMonkey | X | X | | |
| 12. Content production | Enables companies to create sales and marketing content and presentations. | 1/5 | <ol style="list-style-type: none"> 1. Connects user (provider) with relevant marketing content (e.g., marketing images and templates) 2. User's history data (behaviors, actions) 3. NLP 4. Canva <p>Not found</p> | | | | X |
| 13. Tools for integrating | Helps companies integrate and automate different tools to work together. | 0/3 | Not found | | | | |
| 14. Social media platforms | The most used social media platforms that companies can exploit. | 6/6 | <ol style="list-style-type: none"> 1. Personalized social media feeds, recognizes prohibited posts, image and face recognition 2. All kinds of data from social media 3. Image recognition, NLP 4. Facebook, Instagram, Twitter | | | | X |
| 15. Web page platforms | Software and tools that help companies create and maintain web pages. | 2/4 | <ol style="list-style-type: none"> 1. Helps in web page creation, improved search features (e.g., voice search) 2. User's action and behavior data 3. NLP 4. Wix, WordPress | | X | | X |
| 16. E-commerce | Software and tools that help companies create and maintain online stores. | 3/10 | <ol style="list-style-type: none"> 1. Image search monitors competitor's prices and stocks, inventory management and automatic supplement orders 2. Product information, user's behaviors and actions, data from competitors 3. Image recognition, NLP 4. Shopify, WooCommerce | | | | X |

visualizations (Excel sheets, conceptual maps, and visualized summaries) supported our analysis and served as boundary objects when researchers compared and integrated findings.

4. Results: management activities and AI-empowered tools supporting them

In this section, we present the results of our two-phase research. We start with the literature findings generated in Phase 1 on B2B journey management activities and then explain our findings on empirical AI-tool analysis for those activities in Phase 2.

4.1. Management activities for the B2B customer journey

Through delineating analysis of the extant, relevant literature, we identified and conceptualized four management activities for B2B customer journeys: *Analyze, Design, Engage, and Guide* (Table 1). The *Analyze* activity comprises actions that address detecting customers' diverse characteristics, generating data and understanding of customers' (realized and expected) behavior, and measuring the realized and anticipated success of sales and marketing processes (e.g., Lee, 2010; Li & Kannan, 2014). From the perspective of *analyze* activity, the customer journey not only represents the continuum of prospect/customer interactions with a brand, but also provides a three-phase (prepurchase, purchase, postpurchase) framework to categorize and understand data (Lemon & Verhoef, 2016; Steward et al., 2019) and thus better identify sales and marketing processes that cause the changes in a given metric.

The *Design* activity refers to actions that aim to plan the customer's journey. In practice, this does not only mean designing the journey elements (e.g., how and when to utilize online/offline channels and what to offer in each channel) but also architecting sales and marketing processes (e.g., content production, lead generation, sales negotiations) in a way that produces seamless experiences for customers. Regarding design activity, the literature identifies pursuable ideals for B2B customer journeys that emphasize temporal continuation and flow of actions and touchpoints from the customer perspective (e.g. Burke, 2002; Edelman & Singer, 2015), but anticipates that right timing and touchpoint choice for information are challenging to design (Grant, Clarke, & Kyriazis, 2013). Long purchase times, fact-based decision characteristics (Bakhtieva, 2016), and the needs of the customers' own customers (Homburg et al., 2014) are identified as crucial B2B characteristics to acknowledge in customer journey design. The literature also proposes a particular process that guides managers to design customer journeys (Moon, Han, Chun, & Hong, 2016). Furthermore, and unsurprisingly the bridge between the *Analyze* and *Design* activities is also acknowledged by identifying data based understanding as key, yet underutilized input for improving customer journey designs and related sales and marketing processes (Järvinen & Karjaluoto, 2015).

The *Engage* activity refers to actions through which a B2B company aims to capture the customer's attention and ensure customer engagement during the journey. The current literature identifies multiple drivers for customer engagement to touchpoints, acknowledging which is crucial for B2B customer journey management (e.g. Hollis, 2005; Liao, Palvia, & Lin, 2010). In B2B, strategically important customers can also be engaged with shared co-creation and co-development practices (Aarikka-Stenroos & Jaakkola, 2012). The literature also emphasizes the importance of channel choices in driving customer engagement. (e.g. Molesworth & Suortti, 2002; Narayanan & Nandagopal, 2016).

The last activity, *Guide*, couples actions aiming to steer the customer through their journey and particularly to find the next step/touchpoint of said journey. The literature identifies ways in which B2B companies can affect the customer's next touchpoint choice and thus lead the customer forward in the journey (e.g. Diba et al., 2019; Jacobs, Holland, & Prinz, 2018). Furthermore, the literature also identifies individual differences among the customers regarding the ways they select the next touchpoints (e.g. Mosquera, Juaneda-Ayensa, Olarte-Pascual, &

Pelegrín-Borondo, 2018).

When reviewing more closely what the literature says about AI in such B2B customer management and the four management activities we identified from the literature, it becomes evident that previous studies have not provided specific, focused views on how AI could contribute to customer journey management. However, the literature has discussed digital technologies' role, which we also explain in Table 1 (see the third column).

4.2. Tools and AI functions in B2B customer journey management

To understand AI-empowered tools used in customer journey management, we began Phase 2 of the study by identifying 16 categories of digital tools that help B2B companies to manage their customer journey. From those tools, we further identified the AI functions and analyzed how such functions can support B2B customer journey management activities. In Table 2, we provide the tool categories with brief explanations, list AI functions (with utilized data and AI method) found in tools within the given category, specify the B2B customer journey management activities the AI functions contribute to, and mention examples of AI-empowered tools in each category.

To build toward a more comprehensive understanding of how AI can, through AI-empowered tools, support B2B sales and marketing professionals in customer journey management, we next examine more closely the support of AI functions for each management activity in each or all of the three phases of the B2B customer journey (prepurchase, purchase, and postpurchase [Lemon & Verhoef, 2016]). The AI functions' support for each B2B customer journey management activity in certain phases or throughout the journey is presented in Table 3. Table 3 also includes specific AI functions constituting the managerial support and categories of digital tools associated with functions.

From the total sample of 152 digital sales and marketing tools, 58 (approximately 38% of the sample) were AI-empowered (i.e., had AI functions). As Table 2 shows, AI enables B2B companies to use data masses (e.g., click-through rates, search patterns, open social media data) that they would otherwise be unable to utilize in customer journey management. AI functions thus increase the efficiency of all management activities throughout the customer journey by fully automating tasks or enabling human-AI collaboration. Automatic documentation enhancing postpurchase analysis or AI chatbots guiding the customer in online channels throughout the journey are examples of automated customer journey management activities. On the other hand, AI proposing sufficient marketing materials or website designs for engaging and guiding a prospect/customer in all phases of the journey are examples of AI collaborating with human professionals. Human-AI collaboration also positively affects the quality aspects of B2B customer journey management, since human professionals can base their actions on vast data; without AI, they could not do so. Furthermore, this highlights the link between analysis and other management activities. *Tools for integrating*, specifically designed to help marketing and sales professionals manage their workflow by making simultaneous use of multiple different tools easier, are not explicitly mentioned in Table 3, since we did not find any AI-related functions in this category. Moreover, the number of integrative tools was surprisingly low relative to the number of the other digital tools.

5. Integrating and discussing the findings

With our study, we build a deeper understanding of how the B2B customer journey is and could be managed using AI. Therefore, we not only capture state of art in current possibilities of AI in B2B customer journey management but also provide a valuable view on digital tool categories that make AI accessible for companies (see Tables 2 and 3). Next, we highlight our key observations based on our findings.

Our key findings include the identified four B2B customer journey management activities and the analysis of how diverse AI-empowered

Table 3
Artificial intelligence (AI) in business-to-business (B2B) customer journey management: AI contributions, functions, and tools in management activities for a full customer journey process.

| | Prepurchase | Purchase | Postpurchase |
|---------------------------|--|--|---|
| AI throughout the journey | Customer Journey as a process to be managed and AI contributions and functions via AI-empowered tools | | |
| AI in management | | | |
| Analyze | <p>AI contribution: AI provides managers with the general view of the company's possibilities to attract new customers by highlighting meaningful data, analyzing the public image and attractiveness of the company concerning competitors while enabling faster market survey analysis.</p> <p>AI functions:</p> <ol style="list-style-type: none"> 10. Recognizes visual mentions of brands and sentiments in social media texts 11. Classifies market survey responses by their sentiments and quality <p>Tool category:</p> <ol style="list-style-type: none"> 10. Social media analytics 11. Market research | <p>AI contribution: AI increases documentation efficiency by automatically transcribing calls and highlighting important data.</p> <p>AI functions:</p> <ol style="list-style-type: none"> 6. Automatic transcriptions of business calls <p>Tool category:</p> <ol style="list-style-type: none"> 6. CRM/Marketing automation | <p>AI contribution: AI enhances sales analytics by automatically generating reports and highlighting essential data. Furthermore, the success of the company's products and services can be analyzed based on sentiment analysis of social media content and efficient market research.</p> <p>AI functions:</p> <ol style="list-style-type: none"> 6. Automatic report generator 10. Recognizes visual mentions of brands and sentiments in social media texts 11. Classifies market survey responses by their sentiments and quality <p>Tool category:</p> <ol style="list-style-type: none"> 6. CRM/Marketing automation 10. Social media analytics 11. Market research |
| Design | <p>All customer journey phases</p> <p>AI contribution: AI enables real-time sales forecasts and increases their efficiency and accuracy, enabling predictive planning for sales resources in all phases of the customer journey. AI functions also highlight important datapoints for managers for all journey phases.</p> <p>AI functions:</p> <ol style="list-style-type: none"> 6. Sales forecasting 9. Helps find the right information from analytics data <p>Tool category:</p> <ol style="list-style-type: none"> 6. CRM/Marketing automation 9. Sales analytics <p>AI contribution: AI improves search engine optimization by auto-generating texts that provide B2B companies better visibility in online search results.</p> <p>AI functions:</p> <ol style="list-style-type: none"> 7. Auto-generates SEO-optimized text <p>Tool category:</p> <ol style="list-style-type: none"> 7. SEO & SEM | <p>No AI functions particularly only to the purchase phase</p> | <p>AI contribution: By identifying customers that are likely to end the customer relationships and cancel the service subscription. AI can reveal severe issues in the postpurchase phase.</p> <p>AI functions:</p> <ol style="list-style-type: none"> 6. Predicts when a customer is likely to cancel an order <p>Tool category:</p> <ol style="list-style-type: none"> 6. CRM/Marketing automation |
| Engage | <p>Automatically raises analytical facts for improvement</p> <ol style="list-style-type: none"> 11. Based on customer's experience, suggests things that need further development and design 15. Helps in web page layout creation <p>Tool category:</p> <ol style="list-style-type: none"> 9. Sales analytics 11. Market research <p>AI contribution: AI increases the effectiveness of content production by increasing the targeting accuracy with personalized content and automated publishing timing and helping marketing professionals avoid questionable expressions in marketing materials and enable responsive ad testing.</p> <p>AI functions:</p> <ol style="list-style-type: none"> 5. Automatic social media posts and the best timing for them, personalized ads 6. Personalized experiences for customers (e.g., ads, campaigns) 7. Responsive testing of alternative ads 14. Personalized social media feeds, recognizes prohibited posts on | <p>No AI functions particularly only to the purchase phase</p> | <p>AI contribution: Like the prepurchase phase, AI-enhanced content production also serves postpurchase engagement for existing customers.</p> <p>AI functions:</p> <ol style="list-style-type: none"> 5. Automatic social media posts and the best timing for them and personalized ads 6. Personalized experiences for the customer (e.g., ads, campaigns) 7. Responsive testing of alternative ads 14. Personalized social media feeds, recognizes prohibited posts on social media <p>Tool category:</p> |

(continued on next page)

Table 3 (continued)

| | AI throughout the journey | Customer Journey as a process to be managed and AI contributions and functions via AI-empowered tools | Prepurchase | Purchase | Postpurchase |
|------------------|---|---|-------------|----------|--|
| AI in management | social media Tool category: 5. Social media management 6. CRM/Marketing automation 7. SEO & SEM 14. Social media platforms All customer journey phases AI contribution: AI helps sales and marketing professionals to produce engaging content by aiding in writing engaging text, enabling content personalization based on prospects' customers' actions and stage in the decision process; automating social media posts, optimizing timing for contacting, and proposing relevant marketing content for publishing. AI functions: 2. Contextual content (personalized web content to user's needs) 3. Next contact step and timing suggestions, personalized content creation, and subject line writing helper (helps write, e.g., enticing subjects for e-mails) 12. Connects user (B2B company) with relevant marketing content (e.g., images and templates) Tool category: 2. Interactive content 3. Contacting and mass marketing 12. Content production | | | | 5. Social media management 6. CRM/Marketing automation 7. SEO & SEM 14. Social media platforms |
| Guide | AI contribution: AI supports customer journey management by helping to allocate sales professionals time for most potential leads and providing the necessary information on the lead (e.g., company size, company-related news, and the contact information of key decision-makers). AI functions: 1. Finds prospects interested in the company's offerings and predicts their potential, and gathers relevant data about leads 6. Enricher of customer data, next-step suggestion on sales (e.g., how to proceed with the customer), and automatic creation of new contacts Tool category: 1. Prospecting and mapping 6. CRM/Marketing automation | AI contribution: AI supports sales and marketing professionals in contract formulation by aiding sales and marketing professionals to avoid unfavorable clauses. Furthermore, predictive inventory management and automatic competitor analysis help negotiate realistic and competitive terms for the customers. AI functions: 8. Automatic extraction of clauses and terms from new contracts, identifies and suggests replacing risky clauses and terms (e.g., that might include a high risk for the company) in contracts, and risk analysis of contracts 9. monitors competitors and captures their meaningful actions 16. Competitor's price and stock monitoring, inventory management, and automatic supplement orders Tool category: 8. Digital signature tools 9. Sales analytics 16. E-commerce | | | AI contribution: In the postpurchase stage, AI can help to allocate sales resources to critical customers who are most likely to cancel their order and end the customer relationship AI functions: 6. Predict when a customer is likely to cancel an order Tool category: 6. CRM/Marketing automation |
| | All customer journey phases AI contribution: Throughout the whole customer journey, AI chatbot interfaces and AI-enhanced search functions guide the prospect/customer to find relevant information on online channels. Furthermore, AI supports sales professionals by automatically recommending how to proceed with each customer in each phase of the journey (e.g. when and how to contact) and automatically schedules meetings. AI functions: 2. Chatbots 3. Next contact step and timing suggestions 4. Automatic meeting scheduling between participants 6. Next-step suggestion on sales (e.g., how to proceed with customers) 15. Voice search on web pages 16. Image search Tool category: 2. Interactive content 3. Contacting and mass marketing 4. Making appointments 6. CRM/Marketing automation 15. Web page platforms 16. E-commerce | | | | |

tools can support such management throughout the customer journey (Fig. 3). The management activity types that we propose conceptualize the necessary company actions in managing complex B2B customer journeys in offline and online environments. In Fig. 3, we explain and visualize how diverse AI-empowered tools can – in each activity type, and throughout the whole journey – support B2B companies in customer journey management.

As illustrated in Fig. 3, *analysis* is supported by AI functions in a total of four different tool categories: CRM/Marketing automation AI functions enable accurate sales forecasts that provide information throughout the journey and automatic report generation in the post-purchase phase. Social media analytics AI functions enable companies to analyze the general attractiveness of a company in prepurchase and understand the success of the company’s product and services in post-purchase. Sales analytics AI functions can highlight important data for managers for all journey phases. Finally, AI functions in market research tools enable more efficient survey analysis for company attractiveness in

the prepurchase phase and customer satisfaction in postpurchase phase.

AI functions support *design* activity in five-tool categories. Sales analytics AI functions can highlight useful data that can benefit the designing of all journey phases. Based on customer feedback, AI functions of market research tools can provide suggestions for improvement for all journey phases. AI functions of web page platforms can propose designs and page structures that provide an optimized browsing experience for the customer in all phases of the journey. AI functions in SEO and SEM especially support the prepurchase phase by generating SEO optimized texts, and CRM/Marketing automation-related AI functions support postpurchase phase design by predicting whether the customer is likely to end the customer relationship and help identify critical issues in the postpurchase phase.

AI functions in a total of seven tool categories support *engage* activity. AI functions in interactive content, contacting, and mass marketing tools help sales and marketing professionals in content production, personalization, and publishing in all phases of the customer journey. AI

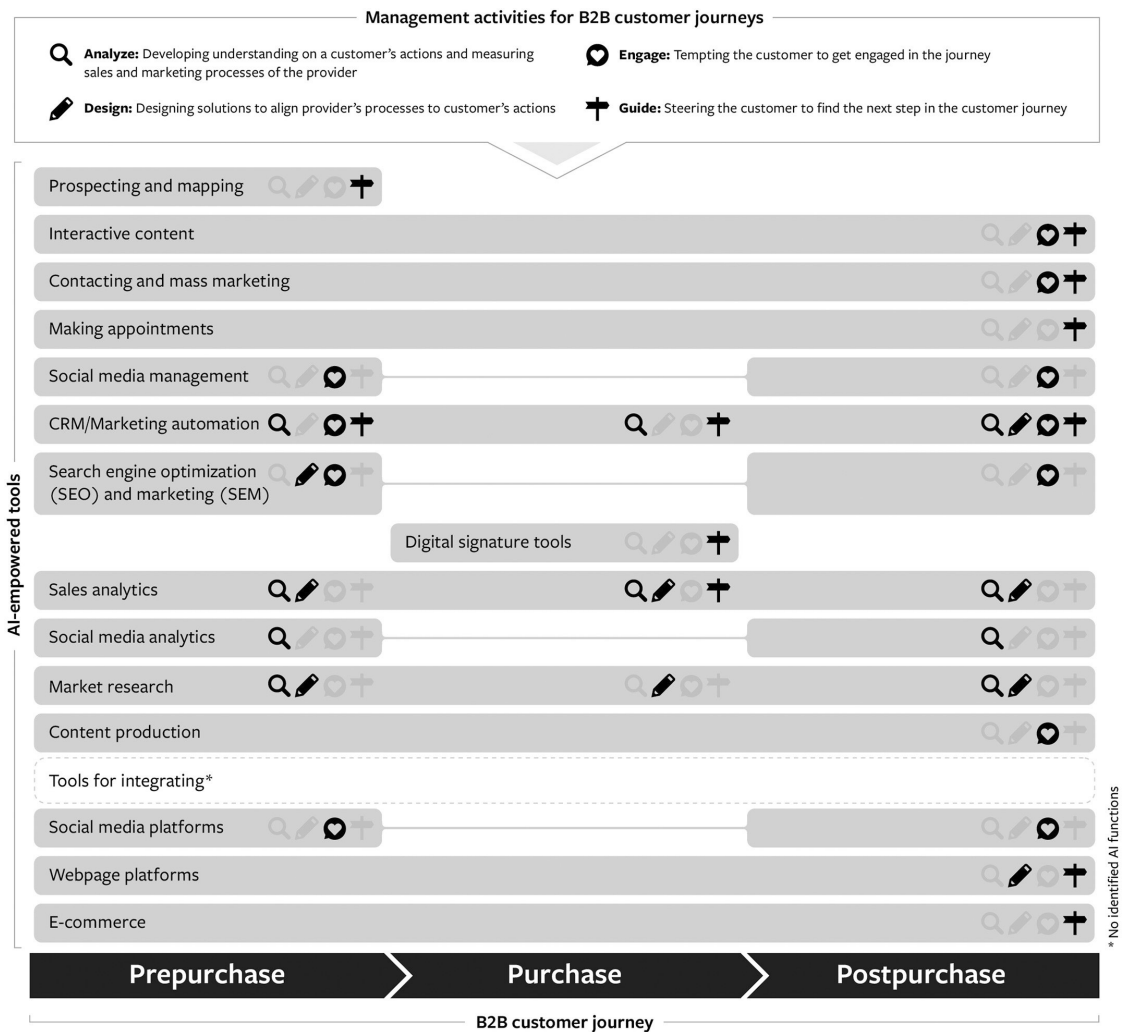


Fig. 3. Managing business-to-business (B2B) customer journey with AI-empowered tools.

functions in social media management, CRM/Marketing automation, SEO and SEM tools, and social media platforms support journey management, especially in prepurchase and postpurchase phases, by increasing the targeting efficiency of content to both prospects and current customers.

AI functions in nine tool categories support *guide* activity: AI functions in interactive content, contacting and mass marketing, appointment making CRM/marketing automation, web page platforms, and e-commerce guide the customer in all phases of the journey (e.g., chatbots and advanced search functions). CRM/marketing automation and contacting and mass marketing tools also include AI functions that provide sales and marketing professionals suggestions on how and what time certain prospects/customers are best to be contacted. In the prepurchase phase, prospecting and mapping AI functions help sales professionals allocate resources to the most promising prospects, and CRM/Marketing automation AI functions can enrich customer-related data. In the postpurchase phase, CRM/Marketing automation-related AI functions help identify customers that are likely to cancel their subscription and help to allocate sales resources to the most critical cases.

Our analysis also reveals that many of the studied tools use AI functions in highly focused actions, such as transcribing calls or generating titles and text for SEO. We consider two possible explanations. First, the scope of an AI function is naturally limited by its engine (i.e., the utilized ML method). ML-based pattern recognition serves a purpose only if the resulting recognized patterns serve a purpose in a given meaning, in the case of this study, in customer journey management activities. As the ML method, utilized data, and recognized patterns are interdependent (Murphy, 2012), the possibilities for different applications are also naturally limited (e.g., NLP-based chatbots cannot conduct click stream-based lead qualification). Although broad AI solutions and artificial general intelligence have been discussed (see, e.g., Goertzel & Pennachin, 2007), it is debatable whether they can be achieved with the current-generation AI engines (Müller & Bostrom, 2016). Second, by including limited AI capabilities, tool providers may act on their tendency to window-dress their products. By communicating to prospective/current customers that their products use AI, even in a limited way, they give their products an image of being at the forefront of technology development.

In practice, narrowly focused AI functions mean that comprehensive customer journey management still requires the combination of multiple tools and systems (see Table 3). The role of AI in given tools for customer journey management reflects the automation–augmentation dichotomy present in the current managerial AI discussion. Recent literature has argued for the benefit of deploying AI augmentatively (i.e., AI collaborating with a human professional) rather than automating (AI replacing human professional) way (see e.g., Brynjolfsson & McAfee, 2014; Daugherty & Wilson, 2018; Davenport et al., 2020). While both automation and augmentation are present in our findings, we emphasize that our results do not provide any particular reason to argue that AI functions automating sales and marketing tasks (e.g., chatbots or automated report generation) would be less significant than augmentative AI functions (e.g., providing content suggestions for sales/marketing professionals). We consider this observation, or rather lack of it, to support Raisch & Krakowski (2021) critique for approaching AI-based automation and augmentation as an either–or-dilemma and encourage further studies to approach both aspects open-mindedly.

In this study, our particular focus to digital tools and AI functions highlighted technological aspects of B2B customer journey management. However, we do not want this to deceptively over-emphasize the role of technology in customer journey management. Tools are used by sales and marketing professionals of the companies. Thus, successful implementation of tools depends not only on the properties of tools themselves but also on the organizational element guiding the use. For example, advanced analytics provide little benefit without a systematic way of interpreting the information provided by tools and understanding how it can be implemented in customer journey design and everyday

operations. Especially relevant this is in customer journey management, as it crosses multiple sales and marketing operations and, thus, challenges traditional marketing processes operating in particular departments.

As customer journey management crosscuts multiple sales and marketing operations, it touches multiple established B2B topics, such as advertising (Swani, Brown, & Mudambi, 2020), content marketing (Järvinen & Taiminen, 2016), relationship management (Viio & Grönroos, 2014), key account management (Guesalaga, Gabriellsson, Rogers, Ryals, & Marcos Cuevas, 2018; Peters et al., 2020), buying (Diba et al., 2019), and selling processes (Mahlamäki et al., 2020; Moncrief, 2017). Hence, the customer journey approach calls for finding interlinkages between these separate research streams in academia and improving collaboration among company departments, in practice, to enable more comprehensive analyses that will capture and allow management of entire customer journeys.

5.1. Theoretical contributions and directions for future research

Our study on AI-empowered tools in B2B customer journey management develops two primary contributions to the B2B marketing and customer journey literature. First, we conceptualized four B2B customer journey management activities that conceptualize companies' core management activities: analyze, design, engage, and guide. These activities then allowed us to detail how AI-empowered tools and AI functions support B2B customer journey management. These findings extend the current understanding of how interactions with B2B customers, often assisted with digital means (Steward et al., 2019) and touching several practices from content creation (Järvinen & Taiminen, 2016) to sales (Moncrief & Marshall, 2005), CRM, and account management (Guesalaga et al., 2018; Peters et al., 2020), should be managed. Previous literature on (B2B) customer journeys focused on conceptualizing the “building blocks” of the customer journey (e.g., touchpoints [Lemon & Verhoef, 2016; Steward et al., 2019]; phases, i.e., prepurchase, purchase, and postpurchase [Frambach et al., 2007; Lemon & Verhoef, 2016], and offline and online channels [Edelman & Singer, 2015; Frambach et al., 2007; Wolny & Charoensuksai, 2014]), leaving the realm of company activities and the role of digital technologies in them unconceptualized. This study particularly develops an understanding of how B2B customer journeys requiring the activities crossing the traditional sales-marketing divide should be managed.

Second, our study created a new understanding of how AI contributes to B2B management. By identifying 15 categories of AI-empowered tools, we tracked how AI-empowered tools support managers to analyze and design interactions with B2B customers and engage and guide the customer throughout the B2B experience. These results uncover the role and potential of AI in B2B management and particularly the management of interactions with customers. This contribution adds to the discussion on AI possibilities in the contexts of management (Brynjolfsson & McAfee, 2014; Daugherty & Wilson, 2018; Raisch & Krakowski, 2021) and marketing (Davenport et al., 2020). B2B marketing research has by far focused on individual digital tools and means, such as social media marketing (Iankova, Davies, Archer-Brown, Marder, & Yau, 2019), big data analytics (Hallikainen et al., 2020) or AI in sales (Syam & Sharma, 2018), and B2B market knowledge (Paschen et al., 2019). Decision support system literature has also focused on more narrowly studies on AI methods in demand forecasting (O'Neil et al., 2016; Yuan et al., 2014), lead generation and qualification (D'Haen & Van Den Poel, 2013), and pricing (Ferreira et al., 2016). While current literature has generated an understanding of AI implementations in specific tasks, it has not clarified how AI can help B2B sales and marketing managers link these individual tasks constituting a seamless experience for customers.

Furthermore, several future research avenues stem from our results and observations. The literature review revealed the dire need for purely B2B-centric customer journey literature. Although the management activity types conceptualized in this study can assumingly be

generalized to both B2B and business-to-consumer (B2C) settings, no particular study before our study has addressed the particular issues of B2B customer journeys, such as multi-actor decision making, organizational structures (Hartmann et al., 2018), and conflicting roles and preferences among multiple decision-makers (Chandler & Johnston, 2012). This calls for both conceptual and empirical efforts to contrast customer journey and AI concerning more established topics in the field of B2B (including relationship management [Viio & Grönroos, 2014], key account management [Guesalaga et al., 2018; Peters et al., 2020], buying [Diba et al., 2019], and selling processes [Moncrief, 2017]). Furthermore, while not the focus of this study, we want to emphasize the importance of the emerging field of AI ethics and data privacy. AI ethical guidelines for transparency, justice and fairness, non-maleficence, responsibility, and privacy (Jobin et al., 2019) are also relevant in the managerial context of the customer journey and B2B management. We also highlight the need for critical engagement with AI in marketing management and managerial discussion in general. Recent literature has raised not only benefits of AI but also issues, such as the customer dissatisfaction caused by AI failure (Castillo et al., 2021) or AI's disrupting effects to human work (Ozkazanc-Pan, 2019), and it has also emphasized the need for conceptual development and clarity on AI concept (Raisch & Krakowski, 2021). We consider customer journey management to be an important domain for critically oriented AI research—both empirically and conceptually. Future research directions stemming from our work include:

- Elaboration on company activities and B2B characteristics. How do B2B characteristics manifest in the companies' customer journey activities?
- The relative importance of activity types in different phases of the customer journey. Which are the most critical activities in each phase of the customer journey?
- Contribution of company's cross-departmental practices to customer journey management activities. Which company departments need to collaborate for comprehensive customer journey management? How should that collaboration be facilitated?
- Customer journey activities of B2B buyer. What are the activities of B2B customer, and how does AI affect those activities?
- Intertwined B2B customer and B2B provider activities. How are the activities of buyers and providers intertwined during the customer journey? What are the key activities, and how does technology affect intertwining?
- Ethical dimensions of AI-empowered tools in B2B. How should company (both the customer and provider) and individual worker data creation, integration, and analysis be addressed in the development of AI marketing tools?
- Critical engagement and conceptual development of AI concept. What kind of negative outcomes might potentially be caused by implementing AI in customer journey management? How should AI be conceptually approached in marketing management?

5.2. Limitations of the study

In this study, we focused on AI-empowered tools in B2B customer journey management. The tool categorization and AI functionalities are mainly based on the information provided by the tool manufacturers. As AI is often related to a technologically advanced image, this includes the risk of companies over-emphasizing the role of AI in the functioning of the tool. We have aimed at minimizing this risk by including only the tools where we have been able to identify the data and the ML method utilized by the tools. Furthermore, we focused on the AI applications currently available for B2B companies through the market. However, this approach does not provide access to the specific tools that B2B companies are internally developing for their identified challenges. We consider that the literature on decision support systems, ML, and statistics covers these issues better by more thoroughly considering the

alignment of problem characteristics, available data, and specific ML methods. However, we considered the integration and intertwining of specific, company-developed AI functionalities and third-party marketing and sales solutions an interesting research topic from both technical and managerial perspectives.

5.3. Managerial implications

The results presented in this study mainly benefit the B2B marketing and sales professionals responsible for the customer experience, sales, or marketing activities and processes (e.g., content creation or lead qualification). We considered two important implications. First, we hope that the activity types proposed in this study provide B2B marketing and sales professionals with a framework for planning management practices for B2B customer journeys and the use of AI-empowered tools in such practices.

Second, we hope that Table 3 provides marketing and C-level managers with a baseline for evaluating the level of AI utilization in their companies' marketing and sales processes. We also hope that the table reveals areas for development and ideas for guiding the development endeavors by revealing the possibilities for AI in the customer journey management context.

Adding to these two key implications, our study provides AI tool developers with a general view of AI utilization in customer journey-related management. While our observations do not focus on technology development-related insight, they explain how AI manifests in relation to customer journey management activities and other tools available to the customers of tool developers. This overall view provides tool developers with a broad understanding of the possibilities currently available to their customers.

6. Conclusion

In this study, we have examined how digital tools, particularly AI-empowered functions, can support B2B companies in their customer journey management. Based on integrative literature review, we synthesized scattered understanding of B2B customer journeys and their management. We proposed four customer journey management activities: *analyze*, *design*, *engage*, and *guide* that conceptualize the necessary company actions in managing B2B customer journeys. These activities develop a managerial understanding of how B2B customer journeys, requiring the activities cross-setting the traditional sales-marketing divide, should be managed. These activities were then complemented with the analysis of digital, AI-empowered tools. The study found 16 categories of digital tools that help B2B companies in customer journey management (Table 2). Furthermore, this study created understanding on the effects of AI in B2B customer journey management by identifying AI functions within the tools and analyzing their benefit for each customer journey management activity in certain phases or throughout the journey (Table 3 and Fig. 3). In addition to contributing in B2B customer journey and marketing management discussions, the findings of the study provide marketing and sales managers a comprehensive view on the possibilities of AI in managing customer journeys.

Acknowledgements

The data generation and writing of this paper have been supported by ROBINS research project funded by Business Finland 2019–2022 (document numbers 7885/31/2018 and 7802/31/2018), the Strategic Research Council, Academy of Finland, through the research project "Sustainable Industry Ecosystem" (SIE) (grant ID 337722), and European Union's Horizon 2020 research and innovation program through the research project "AI-REGIO" (grant agreement no. 952003). Special thanks to research assistant Roosa Lahtinen for her efforts in participating in the process of identifying relevant literature for this study.

Appendix A. The example list of webpages of reviewed tools and their background

<https://blog.hubspot.com/marketing/digital-marketing-tools>
<https://chiefmartec.com/>
<https://en.rockcontent.com/blog/digital-marketing-tools/>
<https://mailchimp.com/>
<https://neilpatel.com/blog/10-online-marketing-tools-you-need-when-starting-a-business/>
<https://sproutsocial.com/insights/digital-marketing-tools/>
<https://technologyadvice.com/crm/>
<https://www.bluefountainmedia.com/blog/the-10-best-digital-marketing-blogs-you-should-be-reading>
<https://www.capterra.com>
<https://www.g2.com/>
<https://www.hubspot.com/>
<https://www.itewiki.fi/>
<https://www.leadfeeder.com/>
<https://www.salesforce.com/fin/?ir=1>
<https://www.singlegrain.com/digital-marketing/digital-marketing-trends-2020/>
<https://www.trustradius.com/>

References

- Aarikka-Stenroos, L., & Jaakkola, E. (2012). Value co-creation in knowledge intensive business services: A dyadic perspective on the joint problem solving process. *Industrial Marketing Management*, 41(1), 15–26. <https://doi.org/10.1016/j.indmarman.2011.11.008>
- Andersson, T., Boedeker, M., & Vuori, V. (2017). Emotion-gauge: Analyzing affective experiences in B2B customer journeys. In *Strategic innovative marketing* (pp. 31–36). Cham: Springer.
- Appio, F. P., & Lacoste, S. (2019). B2B relationship management in complex product systems (CoPS). *Industrial Marketing Management*, 79, 53–57.
- Asare-Frempong, J., & Jayabalan, M. (2017). Predicting customer response to bank direct telemarketing campaign. In *2017 international conference on engineering technology and entrepreneurship, ICE2T* (pp. 1–4). IEEE. <https://doi.org/10.1109/ICE2T.2017.8215961>
- Aunkofer, R. (2018). Connecting the world and reinventing customer centrality. *GfK Marketing Intelligence Review*, 10(2), 54–59. <https://doi.org/10.2478/gfkmir-2018-0019>
- Baack, D. W., Wilson, R. T., van Dessel, M. M., & Patti, C. H. (2016). Advertising to businesses: Does creativity matter? *Industrial Marketing Management*, 55, 169–177. <https://doi.org/10.1016/j.indmarman.2015.10.001>
- Bakhtieva, E. (2016). The role of customer journey in B2B content marketing. In *Conference proceedings DOKBAT'e* (pp. 31–42). <https://doi.org/10.7441/dokbat.2016.04>
- Barley, N. (2016). Google me senseless: Skills and expertise that B2B firms are looking for in graduates today. *Journal of Customer Behaviour*, 15(1), 15–30.
- Baxendale, S., Macdonald, E. K., & Wilson, H. N. (2015). The impact of different touchpoints on brand consideration. *Journal of Retailing*, 91(2), 235–253. <https://doi.org/10.1016/j.jretai.2014.12.008>
- Bitner, M. J. (1990). Evaluating service encounters: The effects of physical surroundings and employee responses. *Journal of Marketing*, 54(2), 69–82. <https://doi.org/10.2307/1251871>
- Blackie, R. (2015). Do you know what you're doing in social. *Journal of Direct, Data and Digital Marketing Practice*, 16(4), 282–284. <https://doi.org/10.1057/ddmp.2015.24>
- Boyd, D. E., & Koles, B. (2019). Virtual reality and its impact on B2B marketing: A value-in-use perspective. *Journal of Business Research*, 100, 590–598. <https://doi.org/10.1016/j.jbusres.2018.06.007>
- Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. New York: W.W. Norton.
- Burke, R. R. (2002, September). Technology and the customer interface: What consumers want in the physical and virtual store. *Journal of the Academy of Marketing Science*, 30, 411–432. <https://doi.org/10.1177/009207002236914>
- Cao, P., Meister, S., & Klante, O. (2014). How social media influence apparel purchasing behavior. *Marketing Review St. Gallen*, 31(6), 77–86. <https://doi.org/10.1365/s11621-014-0427-y>
- Carter, S., & Yeo, A. C. M. (2018). Internet-enabled collective intelligence as a precursor and predictor of consumer behaviour. *Economics, Management, and Financial Markets*, 13(4), 11–38. <https://doi.org/10.22381/EMFM13420181>
- Castillo, D., Canhoto, A. I., & Said, E. (2021). The dark side of AI-powered service interactions: Exploring the process of co-destruction from the customer perspective. *Service Industries Journal*, 41(13–14), 900–925. <https://doi.org/10.1080/02642069.2020.1787993>
- Chandler, J. D., & Johnston, W. (2012). The organizational buying center as a framework for emergent topics in business-to-business marketing. *Advances in Business Marketing and Purchasing*, 18, 41–87. [https://doi.org/10.1108/S1069-0964\(2012\)0000018008](https://doi.org/10.1108/S1069-0964(2012)0000018008)
- Chatterjee, S., Ghosh, S. K., Chaudhuri, R., & Nguyen, B. (2019). Are CRM systems ready for AI integration? *The Bottom Line*, 32(2), 144–157. <https://doi.org/10.1108/BL-02-2019-0069>
- Dasser, M. (2019). Marketing, the change catalyst for digital business transformation: Lessons learned from the modernisation of a B2B marketing organisation. *Journal of Brand Strategy*, 8(1), 20–41.
- Daugherty, P., & Wilson, H. J. (2018). *Human + machine: Reimagining work in the age of AI*. Boston, MA: Harvard Business Review Press.
- Davenport, T., Guha, A., Grewal, D., & Bressgott, T. (2020). How artificial intelligence will change the future of marketing. *Journal of the Academy of Marketing Science*, 48(1), 24–42. <https://doi.org/10.1007/s11747-019-00696-0>
- D'Haen, J., & Van Den Poel, D. (2013). Model-supported business-to-business prospect prediction based on an iterative customer acquisition framework. *Industrial Marketing Management*, 42(4), 544–551. <https://doi.org/10.1016/j.indmarman.2013.03.006>
- Diba, H., Vella, J. M., & Abratt, R. (2019). Social media influence on the B2B buying process. *The Journal of Business and Industrial Marketing*, 34(7), 1482–1496. <https://doi.org/10.1108/JBIM-12-2018-0403>
- Dubinsky, A. J. (1981). A factor analytic study of the personal selling process. *Journal of Personal Selling and Sales Management*, 1(1), 26–33. <https://doi.org/10.1080/08853134.1981.10754192>
- Edelman, D., & Singer, M. (2015). Competing on customer journeys. *Harvard Business Review*, 1, 2001–2002. Retrieved from <https://hbr.org/2015/11/competing-on-customer-journeys>.
- Edelman, D. C. (2010). Branding in the digital age: You're spending your money in all the wrong places. *Harvard Business Review*, 88(12). Retrieved from <https://hbr.org/2010/12/branding-in-the-digital-age-youre-spending-your-money-in-all-the-wrong-places>.
- Fedorko, R., Bačić, R., Kot, S., & Kakalejčić, L. (2015). The analysis of blog use as a marketing communication tool by the selected target group in the conditions of the Slovak market. *Journal of Advanced Research in Law and Economics*, 6(1), 66–72. [https://doi.org/10.14505/jarle.v6.1\(1\).07](https://doi.org/10.14505/jarle.v6.1(1).07)
- Ferreira, K. J., Lee, B. H. A., & Simchi-Levi, D. (2016). Analytics for an online retailer: Demand forecasting and price optimization. *Manufacturing & Service Operations Management*, 18(1), 69–88. <https://doi.org/10.1134/s1062360408050056>
- Feste, J., Ivens, B. S., & Pardo, C. (2020). Key account selection as a political process: Conceptual foundation and exploratory investigation. *Industrial Marketing Management*, 90, 417–434. <https://doi.org/10.1016/j.indmarman.2020.07.024>
- Fig, T., Le Guen, R., & Gauchet, M. (2018). Dynamic pricing of airline offers. *Journal of Revenue and Pricing Management*, 17(6), 381–393. <https://doi.org/10.1057/s41272-018-0147-z>
- Flavián, C., Gurrea, R., & Orús, C. (2016). Choice confidence in the webrooming purchase process: The impact of online positive reviews and the motivation to touch. *Journal of Consumer Behaviour*, 15(5), 459–476. <https://doi.org/10.1134/s1062360408050056>
- Flavián, C., Gurrea, R., & Orús, C. (2017). The influence of online product presentation videos on persuasion and purchase channel preference: The role of imagery fluency and need for touch. *Telematics and Informatics*, 34(8), 1544–1556. <https://doi.org/10.1016/j.tele.2017.07.002>
- Flavián, C., Ibáñez-Sánchez, S., & Orús, C. (2019). The impact of virtual, augmented and mixed reality technologies on the customer experience. *Journal of Business Research*, 100, 547–560. <https://doi.org/10.1016/j.jbusres.2018.10.050>
- Flick, U. (2004). Triangulation in qualitative research. In *vol. 3. A companion to qualitative research* (pp. 178–183).
- Følstad, A., & Kvale, K. (2018). Customer journeys: A systematic literature review. *Journal of Service Theory and Practice*, 28, 196–227. <https://doi.org/10.1108/JSTP-11-2014-0261>
- Fracastoro, S., Gabriellson, M., & Pullins, E. B. (2021). The integrated use of social media, digital, and traditional communication tools in the B2B sales process of international SMEs. *International Business Review*, 30(4), Article 101776. <https://doi.org/10.1016/j.ibusrev.2020.101776>
- Frambach, R. T., Roest, H. C. A., & Krishnan, T. V. (2007). The impact of consumer internet experience on channel preference and usage intentions across the different stages of the buying process. *Journal of Interactive Marketing*, 21(2), 26–41. <https://doi.org/10.1002/dir.20079>
- George, M., & Wakefield, K. L. (2018). Modeling the consumer journey for membership services. *Journal of Services Marketing*, 32(2), 113–125. <https://doi.org/10.1108/JSM-03-2017-0071>
- Goertzel, B., & Pennachin, C. (2007). In C. Pennachin (Ed.), *Artificial general intelligence*. New York: Springer. https://doi.org/10.1007/1-4020-4107-1_14
- Grant, R., Clarke, R. J., & Kyriazis, E. (2013). Modelling real-time online information needs: A new research approach for complex consumer behaviour. *Journal of Marketing Management*, 29(7–8), 950–972. <https://doi.org/10.1080/0267257X.2011.621440>
- Guesalaga, R., Gabriellson, M., Rogers, B., Ryals, L., & Marcos Cuevas, J. (2018). Which resources and capabilities underpin strategic key account management? *Industrial Marketing Management*, 75, 160–172. <https://doi.org/10.1016/j.indmarman.2018.05.006>
- Gustafson, B. M., Pomirleanu, N., John Mariadoss, B., & Johnson, J. L. (2019). The social buyer: A framework for the dynamic role of social media in organizational buying. *Journal of Business Research*, 125, 806–814. <https://doi.org/10.1016/j.jbusres.2019.05.004>
- Hallikainen, H., Savimäki, E., & Laukkanen, T. (2020). Fostering B2B sales with customer big data analytics. *Industrial Marketing Management*, 86, 90–98. <https://doi.org/10.1016/j.indmarman.2019.12.005>

- Hartmann, N. N., Wieland, H., & Vargo, S. L. (2018). Converging on a new theoretical foundation for selling. *Journal of Marketing*, 82(2), 1–18. <https://doi.org/10.1509/jm.16.0268>
- He, K., Zhang, X., Ren, S., & Sun, J. (2016). Deep residual learning for image recognition. In *Proceedings of the IEEE computer society conference on computer vision and pattern recognition, 2016-Decem* (pp. 770–778). <https://doi.org/10.1109/CVPR.2016.90>
- Herhausen, D., Kleinerlacher, K., Verhoef, P. C., Emrich, O., & Rudolph, T. (2019). Loyalty formation for different customer journey segments. *Journal of Retailing*, 95(3), 9–29. <https://doi.org/10.1016/j.jretai.2019.05.001>
- Higgins, L. M., McGarry Wolf, M., & Wolf, M. J. (2014). Technological change in the wine market? The role of QR codes and wine apps in consumer wine purchases. *Wine Economics and Policy*, 3(1), 19–27. <https://doi.org/10.1016/j.wep.2014.01.002>
- Hilken, T., Heller, J., Chylinski, M., Keeling, D. L., Mahr, D., & de Ruyter, K. (2018, October 8). Making omnichannel an augmented reality: The current and future state of the art. *Journal of Research in Interactive Marketing*, 12, 509–523. <https://doi.org/10.1108/JRIM-01-2018-0023>
- Hollis, N. (2005). Ten years of learning on how online advertising builds brands. *Journal of Advertising Research*, 45, 255–268. <https://doi.org/10.1017/S0021849905050270>
- Homburg, C., Wilczek, H., & Hahn, A. (2014). Looking beyond the horizon: How to approach the customers' customers in business-to-business markets. *Journal of Marketing*, 78(5), 58–77. <https://doi.org/10.1509/jm.12.0529>
- Iankova, S., Davies, E., Archer-Brown, C., Marder, B., & Yau, A. (2019). A comparison of social media marketing between B2B, B2C and mixed business models. *Industrial Marketing Management*, 81, 169–179.
- Iansiti, M., & Lakhani, K. R. (2020). Competing in the age of AI. *Harvard Business Review*, 98(1), 60–67. Retrieved from <https://hbr.org/2020/01/competing-in-the-age-of-ai>
- Jacobs, J., Holland, C., & Prinz, A. (2018). Online consumer search and buying behaviour: Brand analysis in the airline industry. In *International conference on tourism research*. Academic Conferences International Limited.
- Järvinen, J., & Karjalainen, H. (2015). The use of web analytics for digital marketing performance measurement. *Industrial Marketing Management*, 50, 117–127. <https://doi.org/10.1016/j.indmarman.2015.04.009>
- Järvinen, J., & Taiminen, H. (2016). Harnessing marketing automation for B2B content marketing. *Industrial Marketing Management*, 54, 164–175. <https://doi.org/10.1016/j.indmarman.2015.07.002>
- Jobin, A., Ienca, M., & Vayena, E. (2019). The global landscape of AI ethics guidelines. *Nature Machine Intelligence*, 1(9), 389–399. <https://doi.org/10.1038/s42256-019-0088-2>
- Kaczorowska-Spychalska, D. (2017). Consumer perspective of omnichannel commerce. *Management*, 21(2), 95–108. <https://doi.org/10.1515/manment-2017-0007>
- Karimi, S., Papamichail, K. N., & Holland, C. P. (2015). The effect of prior knowledge and decision-making style on the online purchase decision-making process: A typology of consumer shopping behaviour. *Decision Support Systems*, 77, 137–147. <https://doi.org/10.1016/j.dss.2015.06.004>
- Kelley, S. W., & Davis, M. A. (1994). Antecedents to customer expectations for service recovery. *Journal of the Academy of Marketing Science*, 22(1), 52–61. <https://doi.org/10.1177/0092070394221005>
- Kietzmann, J., Paschen, J., & Treen, E. (2018, September 1). Artificial intelligence in advertising: How marketers can leverage artificial intelligence along the consumer journey. *Journal of Advertising Research*, 58, 263–267. <https://doi.org/10.2501/JAR-2018-035>
- Kolbjørnsrud, V., Amico, R., & Thomas, R. J. (2016). How artificial intelligence will redefine management. *Harvard Business Review*, 2, 1–6.
- Korhonen, T., Selos, E., Laine, T., & Suomala, P. (2021). Exploring the programmability of management accounting work for increasing automation: An interventionist case study. *Auditing & Accountability Journal*, 34(2), 253–280. <https://doi.org/10.1108/AAAJ-12-2016-2809>
- Kotni, V. V. D. P. (2017). Paradigm shift from attracting footfalls for retail store to getting hits for e-stores: An evaluation of decision-making attributes in e-tailing. *Global Business Review*, 18(5), 1215–1237. <https://doi.org/10.1177/0972150917710133>
- Lee, G. (2010). Death of “last click wins”: Media attribution and the expanding use of media data. *Journal of Direct, Data and Digital Marketing Practice*, 12(1), 16–26. <https://doi.org/10.1057/ddmp.2010.14>
- Legg, S., & Hutter, M. (2007). A collection of definitions of intelligence. Advances in artificial general intelligence: Concepts, architectures and algorithms. In *Proceedings of the AGIWorkshop 2006* (pp. 17–24). Retrieved from www.idsia.ch/~shane/www.hutter1.net
- Legner, C. (2008). The evolution of B2B e-services from first generation e-commerce solutions to multichannel architectures. *Journal of Electronic Commerce in Organizations*, 6(2), 58–77. <https://doi.org/10.4018/jecoc.2008040104>
- Lemon, K. N., & Verhoef, P. C. (2016). Understanding customer experience throughout the customer journey. *Journal of Marketing*, 80(6), 69–96. <https://doi.org/10.1509/jm.15.0420>
- Li, H., & Kannan, P. K. (2014). Attributing conversions in a multichannel online marketing environment: An empirical model and a field experiment. *Journal of Marketing Research*, 51(1), 40–56. <https://doi.org/10.1509/jmr.13.0050>
- Liao, C., Palvia, P., & Lin, H. N. (2010). Stage antecedents of consumer online buying behavior. *Electronic Markets*, 20(1), 53–65. <https://doi.org/10.1007/s12525-010-0030-2>
- Lindsey-Mullikin, J., & Borin, N. (2017). Why strategy is key for successful social media sales. *Business Horizons*, 60(4), 473–482. <https://doi.org/10.1016/j.bushor.2017.03.005>
- Louridas, P., & Ebert, C. (2016). Machine learning. *IEEE Software*, 33(5), 110–115. <https://doi.org/10.1109/MS.2016.114>
- MacInnis, D. J. (2011). A framework for conceptual contributions in marketing. *Journal of Marketing*, 75, 136–154. <https://doi.org/10.1509/jmk.75.4.136>
- Mahlamäki, T., Storbäck, K., Pyllkkönen, S., & Ojala, M. (2020). Adoption of digital sales force automation tools in supply chain: Customers' acceptance of sales configurators. *Industrial Marketing Management*, 91, 162–173. <https://doi.org/10.1016/j.indmarman.2020.08.024>
- Marcos Cuevas, J. M. (2018). The transformation of professional selling: Implications for leading the modern sales organization. *Industrial Marketing Management*, 69 (December 2017), 198–208. <https://doi.org/10.1016/j.indmarman.2017.12.017>
- Meire, M., Ballings, M., & Van den Poel, D. (2017). The added value of social media data in B2B customer acquisition systems: A real-life experiment. *Decision Support Systems*, 104, 26–37. <https://doi.org/10.1016/j.dss.2017.09.010>
- Molesworth, M., & Suortti, J.-P. (2002). Buying cars online: The adoption of the web for high-involvement, high-cost purchases. *Journal of Consumer Behaviour*, 2(2), 155–168. <https://doi.org/10.1002/cb.97>
- Moncrief, W. C. (2017). Are sales as we know it dying ... or merely transforming? *Journal of Personal Selling and Sales Management*, 37(4), 271–279. <https://doi.org/10.1080/08853134.2017.1386110>
- Moncrief, W. C., & Marshall, G. W. (2005). The evolution of the seven steps of selling. *Industrial Marketing Management*, 34(1), 13–22. <https://doi.org/10.1016/j.indmarman.2004.06.001>
- Moon, H., Han, S. H., Chun, J., & Hong, S. W. (2016). A design process for a customer journey map: A case study on mobile services. *Human Factors and Ergonomics in Manufacturing & Service Industries*, 26(4), 501–514. <https://doi.org/10.1002/hfm.20673>
- Mosquera, A., Juaneda-Ayensa, E., Olarte-Pascual, C., & Pelegrín-Borondo, J. (2018). Key factors for in-store smartphone use in an omnichannel experience: Millennials vs. nonmillennials. *Complexity*. <https://doi.org/10.1155/2018/1057356>
- Müller, V. C., & Bostrom, N. (2016). Future progress in artificial intelligence: A survey of expert opinion. In *Fundamental issues of artificial intelligence* (pp. 555–572). https://doi.org/10.1007/978-3-319-26485-1_33
- Murphy, K. (2012). Machine learning: A probabilistic perspective. Retrieved from <http://mitpress.mit.edu>
- Narayanan, S., & Nandagopal, R. (2016). From multi-channel to omni-channel: Determinants of channel choice. *Asian Journal of Research in Social Sciences and Humanities*, 6(9), 1016. <https://doi.org/10.5958/2249-7315.2016.00851.0>
- Nilsson, N. J. (2009). *The quest for artificial intelligence: A history of ideas and achievements*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511819346>
- Nuruzzaman, M., & Hussain, O. K. (2018). A survey on Chatbot implementation in customer service industry through deep neural networks. In *Proceedings—2018 IEEE 15th international conference on e-business engineering, ICEBE 2018* (pp. 54–61). <https://doi.org/10.1109/ICEBE.2018.00019>
- O'Neil, S., Zhao, X., Sun, D., & Wei, J. C. (2016). Newsvendor problems with demand shocks and unknown demand distributions. *Decision Sciences*, 47(1), 125–156. <https://doi.org/10.1111/dec.12187>
- Ozkazanc-Pan, B. (2019). Diversity and future of work: Inequality abound or opportunities for all? *Management Decision*, 59(11), 2645–2659. <https://doi.org/10.1108/MD-02-2019-0244>
- Paschen, J., Kietzmann, J., & Kietzmann, T. C. (2019). Artificial intelligence (AI) and its implications for market knowledge in B2B marketing. *Journal of Business & Industrial Marketing*. <https://doi.org/10.1108/JBIM-10-2018-0295> (June), JBIM-10-2018-0295.
- Peters, L., Ivens, B. S., & Pardo, C. (2020). Identification as a challenge in key account management: Conceptual foundations and a qualitative study. *Industrial Marketing Management*, 90, 300–313. <https://doi.org/10.1016/j.indmarman.2020.07.020>
- Powers, T., Advincula, D., Austin, M. S., Graiko, S., & Snyder, J. (2012). Digital and social media in the purchase-decision process: A special report from the advertising research foundation. *Journal of Advertising Research*, 52(4), 479–489. <https://doi.org/10.2501/JAR-52-4-479-489>
- Prasasti, N., & Ohwada, H. (2014, March). Applicability of machine-learning techniques in predicting customer defection. In *ISTMET 2014—1st international symposium on technology management and emerging technologies proceedings* (pp. 157–162). <https://doi.org/10.1109/ISTMET.2014.6936498>
- Quijano-Sanchez, L., & Liberatore, F. (2017). The BIG CHASE: A decision support system for client acquisition applied to financial networks. *Decision Support Systems*, 98 (April 2017), 49–58. <https://doi.org/10.1016/j.dss.2017.04.007>
- Raisch, S., & Krakowski, S. (2021). Artificial intelligence and management: The automation augmentation paradox. *Academy of Management Review*, 46(1), 192–210. <https://doi.org/10.5465/2018.0072>
- Rippé, C. B., Weisfeld-Spöter, S., Yurova, Y., & Sussan, F. (2015). Is there a global multichannel consumer? *International Marketing Review*, 32(3–4), 329–349. <https://doi.org/10.1108/IMR-10-2013-0225>
- Russell, S., & Norvig, P. (2016). *Artificial intelligence: A modern approach* (3rd ed.). Pearson Education Limited.
- Rustholkarhu, S., Hautamäki, P., & Aarikka-Stenroos, L. (2021). Value (co-)creation in B2B sales ecosystems. *The Journal of Business and Industrial Marketing*, 36(4), 590–598. <https://doi.org/10.1108/JBIM-03-2020-0130>
- Sands, S., Ferraro, C., Campbell, C., & Pallant, J. (2016). Segmenting multichannel consumers across search, purchase and after-sales. *Journal of Retailing and Consumer Services*, 33, 62–71. <https://doi.org/10.1016/j.jretconser.2016.08.001>
- Savin-Baden, M., & Howell, C. (2013). *Qualitative research the essential guide to theory and practice*. Routledge.
- Schoenherr, T., & Mabert, V. A. (2011). A comparison of online and offline procurement in B2B markets: Results from a large-scale survey. *International Journal of Production Research*, 49(3), 827–846. <https://doi.org/10.1080/00207540903473359>
- Schröder, H., & Zaharia, S. (2008). Linking multi-channel customer behavior with shopping motives: An empirical investigation of a German retailer. *Journal of*

- Retailing and Consumer Services*, 15(6), 452–468. <https://doi.org/10.1016/j.jretconser.2008.01.001>
- Shankar, V. (2018). How artificial intelligence (AI) is reshaping retailing. *Journal of Retailing*, 94(4), vi–xi. [https://doi.org/10.1016/s0022-4359\(18\)30076-9](https://doi.org/10.1016/s0022-4359(18)30076-9)
- Sheth, J. N. (1973). A model of industrial buyer behavior. *Journal of Marketing*, 37(4), 50. <https://doi.org/10.2307/1250358>
- Shimomura, Y., Nemoto, Y., Ishii, T., & Nakamura, T. (2018). A method for identifying customer orientations and requirements for product–service systems design. *International Journal of Production Research*, 56(7), 2585–2595. <https://doi.org/10.1080/00207543.2017.1384581>
- Steward, M. D., Narus, J. A., Roehm, M. L., & Ritz, W. (2019). From transactions to journeys and beyond: The evolution of B2B buying process modeling. *Industrial Marketing Management*, 83, 288–300. <https://doi.org/10.1016/j.indmarman.2019.05.002>
- Su, B. C. (2008). Characteristics of consumer search on-line: How much do we search? *International Journal of Electronic Commerce*, 13(1), 109–129. <https://doi.org/10.2753/IJEC1086-4415130104>
- Swani, K., Brown, B. P., & Mudambi, S. M. (2020). The untapped potential of B2B advertising: A literature review and future agenda. *Industrial Marketing Management*, 89, 581–593. <https://doi.org/10.1016/j.indmarman.2019.05.010>
- Syam, N., & Sharma, A. (2018). Waiting for a sales renaissance in the fourth industrial revolution: Machine learning and artificial intelligence in sales research and practice. *Industrial Marketing Management*, 69(December 2017), 135–146. <https://doi.org/10.1016/j.indmarman.2017.12.019>
- Töllner, A., Blut, M., & Holzmüller, H. H. (2011). Customer solutions in the capital goods industry: Examining the impact of the buying center. *Industrial Marketing Management*, 40(5), 712–722. <https://doi.org/10.1016/j.indmarman.2011.06.001>
- Torraco, R. J. (2016). Writing integrative literature reviews: Using the past and present to explore the future. *Human Resource Development Review*, 15, 404–428. <https://doi.org/10.1177/1534484316671606>
- Vaghela, B. (2014). The voice as a relationship milestone. *Journal of Direct, Data and Digital Marketing Practice*, 16(2), 98–101. <https://doi.org/10.1057/dddmp.2014.62>
- Viio, P. H., & Grönroos, C. (2014). Value-based sales process adaptation in business relationships. *Industrial Marketing Management*, 43(6), 1085–1095. <https://doi.org/10.1016/j.indmarman.2014.05.022>
- Voorveld, H. A. M., Smit, E. G., Neijens, P., & Bronner, F. (2016). Consumers' cross-channel use in online and offline purchases: An analysis of cross-media and cross-channel behaviors between products. *Journal of Advertising Research*, 56(4), 385–400. <https://doi.org/10.2501/JAR-2016-044>
- Wang, R. J. H., Malthouse, E. C., & Krishnamurthi, L. (2015). On the go: How mobile shopping affects customer purchase behavior. *Journal of Retailing*, 91(2), 217–234. <https://doi.org/10.1016/j.jretai.2015.01.002>
- Wang, W. L., Malthouse, E. C., Calder, B., & Uzunoglu, E. (2019). B2B content marketing for professional services: In-person versus digital contacts. *Industrial Marketing Management*, 81, 160–168. <https://doi.org/10.1016/j.indmarman.2017.11.006>
- Willems, K., Brengman, M., & Van Kerrebroeck, H. (2019). The impact of representation media on customer engagement in tourism marketing among millennials. *European Journal of Marketing*, 53(9), 1988–2017. <https://doi.org/10.1108/EJM-10-2017-0793>
- Wirtz, J., Patterson, P. G., Kunz, W. H., Gruber, T., Lu, V. N., Paluch, S., & Martins, A. (2018). Brave new world: Service robots in the frontline. *Journal of Service Management*, 29(5), 907–931. <https://doi.org/10.1108/JOSM-04-2018-0119>
- Wollenburg, J., Holzapfel, A., & Hübner, A. (2019). Omni-channel customer management processes in retail: An exploratory study on fulfillment-related options. *Logistics Research*, 12(1). <https://doi.org/10.23773/2019.7>
- Wolny, J., & Charoensuksai, N. (2014). Mapping customer journeys in multichannel decision-making. *Journal of Direct, Data and Digital Marketing Practice*, 15(4), 317–326. <https://doi.org/10.1057/dddmp.2014.24>
- Wozniak, T., Schaffner, D., Stanoevska-Slabeva, K., & Lenz-Kesekamp, V. (2018). Psychological antecedents of mobile consumer behaviour and implications for customer journeys in tourism. *Information Technology and Tourism*, 18(1–4), 85–112. <https://doi.org/10.1007/s40558-017-0101-8>
- Wu, I. L., Chen, K. W., & Chiu, M. L. (2016). Defining key drivers of online impulse purchasing: A perspective of both impulse shoppers and system users. *International Journal of Information Management*, 36(3), 284–296. <https://doi.org/10.1016/j.ijinfomgt.2015.11.015>
- Yuan, H., Xu, W., & Yang, C. (2014). A user behavior-based ticket sales prediction using data mining tools: An empirical study in an OTA company. In *11th international conference on service systems and service management, ICSSSM 2014* (pp. 1–6). IEEE. <https://doi.org/10.1109/ICSSSM.2014.6874135>
- Zhang, C. B., & Li, Y. (2019). How social media usage influences B2B customer loyalty: Roles of trust and purchase risk. *The Journal of Business and Industrial Marketing*, 34(7), 1420–1433. <https://doi.org/10.1108/JBIM-07-2018-0211>
- Zolkiewski, J., Story, V., Burton, J., Chan, P., Gomes, A., Hunter-Jones, P., & Robinson, W. (2017). Strategic B2B customer experience management: The importance of outcomes-based measures. *Journal of Services Marketing*, 31(2), 172–184. <https://doi.org/10.1108/JSM-10-2016-0350>

PUBLICATION
V

**How AI augments value creation: Towards a model of human–AI
cooperation in services research**

Rusthollkarhu, S., Mattila, M., Aarikka-Stenroos, L., & Yrjölä, M

In S. Scupola, A. H. Henten, & L. Fuglsang (Eds.), Handbook of artificial intelligence and
services. Edward Elgar

Manuscript accepted for publication

Publication reprinted with the permission of the copyright holders.

