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Making Sense of Design Space:

Design Perspectives on the Idea of Organization and Strategizing

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ABSTRACT

Making Sense of Design Space: Design Perspectives on the Idea of Organization and Strategizing

This dissertation bridges areas of design research with organization and management studies with the aim of increasing interdisciplinary understanding of design. An increasing number of designers in industrial settings, besides designing physical objects, are involved in shaping services and experiences by utilizing evolving information technology. While design approaches have gained increased visibility in managerial realms the position of design managers participating in strategizing and organizational action calls for proliferation of paradigms and reflexivity on frames guiding such action. This research aims at enriching both design theories and areas of research in organization and management studies by bridging perspectives emerging from these fields. It does so by asking whether and how design theories and design managers might influence the idea of organization and its strategic direction.

The positivist understanding of an organization is juxtaposed with philosophical perspectives from the traditions of social constructionism, hermeneutics and reflexivity. Qualitative research approaches are combined with sensemaking and design approaches. The research is positioned at the intersection of managerial traditions and frames and general values of design often concerned with human wellbeing. However, instead of embedding design into organizational traditions and structures, the research moves from this pre-understanding towards suggesting and making sense of an evolving design space as a social and linguistic, but also material and embodied phenomenon in which strategizing, sensemaking and design are in a continuous flow of becoming.

Through the three sub-studies, the research evolves towards broader understanding of designing in organizational industrial settings. Design managers´ context is addressed by disclosing possible frames while combining micro and macro levels of organizational thinking from partly critical perspectives. The longitudinal research covers interviews among experienced designers in middle or senior management positions working in Silicon Valley between the years 2013 and 2016. Most participants represented large technology-driven multinationals and design consultancies.

The first sub-study utilized theory elaboration by combining perspectives on sensemaking, strategizing and design into a preliminary theoretical model. The second sub-study focused on design managers´ language through identification

of normalising and denormalising language use. The third sub-study addressed the information technology field as an example to discuss the need for ethics and attention to potential harmful consequences in the domain of design and strategizing for more awareness and responsible future outcomes. Reaching beyond the firm-centric and use-stage specific questions, designers might display more intense participation in strategic decision making concerning pre-use and post-use stage consequences for users, and additionally, for third-parties, locally, globally and digitally.

Designers may act as supporters and challengers of evolving strategies while mediating between frame adoption and frame extension. At times, historically developed strategic frames may become reproduced. However, denormalising language used by design managers with material–linguistic strengths could trigger critical reflection on strategic assumptions.

The dissertation proposed a way of understanding organizational strategizing differently through the suggestion to rather speak about design space in which strategic action and sensemaking are situated. The design space understood as a continuously evolving social construction in becoming is a site of sensemaking inviting actors from diverse fields into an interdisciplinary dialogue. By questioning the obvious, designers as managers may contribute to increased responsibility, transparency, sustainability and ethics in decision making concerning the rapidly evolving industrial and digitalizing contexts. Future designers as hybrid co-strategists may gain more power through their managerial roles making awareness and critical discussion on frames and taken-for-granted beliefs across occupational domains important. Finally, a suggestion to reframe the concept of meaning innovation was made.

The research makes a design contribution to creative and critical streams of organization and management studies, as well as sensemaking studies and suggests some interdisciplinary issues for further research bridging these fields.

Keywords: Design theory, becoming, strategizing, critical sensemaking, reflexivity, hermeneutics, design transparency, ethics

TIIVISTELMÄ

Tulkintoja muotoilutilasta organisaation ja strategia-ajattelun kehyksenä

Väitöskirja sijoittuu muotoilututkimuksen ja organisaatio- ja johtamistutkimuksen välimaastoon poikkitieteellisen ymmärryksen kasvattamiseksi. Vaikka muotoilujohtamisen näkyvyys johtamisen konteksteissa on lisääntynyt, suunnittelijoiden ja itse muotoilun asemaa ja taustalla vaikuttavia paradigmoja ja kehyksiä voidaan tarkastella eri näkökulmista. Tavoitteena on ymmärtää organisaation ja strategian ajatusta muotoilun usein monialaisessa kontekstissa. Näin väitöskirja etenee kohti muotoilutilan (design space) käsitettä, jossa tutkimuksen pääkysymyksen pohjalta käydään poikkitieteellistä dialogia muotoilujohtajien ja muotoiluteorioiden mahdollisesta kontribuutiosta suhteessa organisaation ideaan ja käsityksiin strategiasta suunnitteluna.

Positivistinen funktionalisuutta korostava tulkinta organisaatiosta ulkoisesta ympäristöstä erillisenä yksikkönä haastetaan nojaamalla sosiaalisen konstruktionismin, hermeneutiikan ja refleksiivisyyden perinteistä kumpuaviin ajatussuuntiin. Teorian ja empirian vuoropuhelussa strategisointia ilmiönä elaboroidaan rinnakkain muotoilunäkemysten ja sensemaking -syklien kera. Tavanomaisista oletuksista irrottaudutaan esittämällä muotoilutila (design space) sosiaalisena ja lingvistisenä sekä materiaalisena ja kehollisena ilmiönä, jossa strategisoinnin yksilölliset ja yhteisölliset merkitykset sekä muuntuvien merkitysten hahmottaminen ja tolkun tekeminen sulautuvat jatkuvaan joksikin tulemisen tapahtumaan, kehkeytymiseen (becoming). Muotoilujohtajien kontekstissa nostetaan kriittisesti pohtien esille kehyksiä (frames), jotka mikro- ja makrotasoilla ilmentävät organisatorista ajattelua.

Artikkeliväitöskirja koostuu kolmesta osatutkimuksesta sekä yhteenvedosta johtopäätöksineen. Empiirinen aineisto koostuu kansainvälisten teknologia-alan suuryritysten ja muotoilutoimistojen muotoilujohdon edustajien ajatuksista Piilaaksossa vuosien 2013 ja 2016 välillä.

Ensimmäinen osatutkimus käsittää teorian elaborointia, jossa sensemaking -ajattelu, strategisointi ja muotoilu yhdistetään alustavaksi teoreettiseksi muotoilutilan malliksi. Toisessa osatutkimuksessa keskitytään monipuoliseen muotoilukieleen, jossa tunnistetaan normalisoivaa ja ei-normalisoivaa ajattelua ilmentäviä piirteitä strategian perinteiseen kieleen ja uudempiin tutkimussuuntiin peilaten. Kolmannessa osatutkimuksessa tietotekniikka-alan esimerkkien kautta huomio kiinnitetään strategisoinnin mahdollisiin haitallisiin seuraamuksiin, jotka voidaan kuitenkin nähdä muotoilutyön strategisena mahdollisuutena vastuullisen johtamisen ja

tulevaisuuden rakentamiseksi. Kun ajattelu ulotetaan yrityskeskeisiä ja käyttäjiin rajoittuvia kysymyksiä laajemmalle, muotoilijat ja suunnittelu voivat edistää tiedostavampaa strategisointia. Näin tuotteen tai palvelun käyttövaihetta edeltävät ja sitä seuraavat mahdolliset haitallisetkin seuraamukset, kuten riskit ja haittavaikutukset kolmansille tahoille, voidaan saattaa varhaisessa vaiheessa näkyvämmin mukaan strategista päätöksentekoa haastavina kysymyksinä paikallisissa, globaaleissa ja digitaalisissa yhteyksissä.

Muotoilijat voivat monialaisina välitilan toimijoina sekä vahvistaa että haastaa jatkuvan kehkeytymisen tilassa olevia strategisia tulkintoja sukkuloiden olemassaolevien ja uusien, laajempien kehysten välimaastossa. Ei-normalisoiva muotoilun kieli moninaisuudessaan sisältää kuitenkin materiaalis–kielellisiä ja muita muotoilukielen vahvuuksia, joiden avulla kriittinen strategisten oletuksien pohdinta voi mahdollistua ja elävöityä.

Tuloksissa muotoilutila käsitteenä (design space) laajentaa tulkintoja rajallisesta organisaatio- ja johtamiskeskeisestä ajattelutavasta. Muotoilutilassa sisäinen ja ulkoinen yhdistyvät samalla kun strategista toimintaa ja sen merkityksiä voidaan punnita myös kriittisesti ennakoiden. Monialaisena sosiaalisena konstruktiona muotoilun tila mahdollistaa osallistumisen yli tieteenalojen ulottuvaan dialogiin alati kehkeytyvässä strategian merkityksiä ja tolkkua synnyttävässä vuorovaikutuksessa.

Digitalisoituvassa teollistuvassa kontekstissa uusi muotoilujohtaminen voi kyseenalaistaa itsestäänselvyyksiä ja kannustaa vastuullisuuteen ja läpinäkyvyyteen sekä eettisiin ja kestäviin ratkaisuihin. Näin tulevaisuuden hybridimuotoilijat voivatkin tulla strategiakumppaneiksi ja toimia osallistavina johtajina. Näin on mahdollisuus lisätä tietoisuutta ja kriittistäkin pohdintaa alakohtaisista strategisen toiminnan kehyksistä ja taustaoletuksista, horisonttia laajentaen. Täten merkityksen innovaation (meaning innovation) käsite voidaan myös ymmärtää laajemmin ja inhimillisemmin kuin kaupallis-teknologisissa yhteyksissä yleensä.

Tutkimus kokonaisuutena luo ja avaa muotoilun näkökulmia kriittisen ja luovan organisaatio- ja johtamistutkimuksen kontekstissa laajemman strategiaymmärryksen tulkintoina. Tutkimus monipuolistaa sensemaking -ajattelua tuomalla mukaan muotoilualan perspektiivejä. Lopussa nostetaan esille aiheita jatkotutkimusta varten.

Avainsanat: muotoilutila, design space, sensemaking, merkitys, strategia, kriittinen teoria, refleksiivisyys, hermeneutiikka, design transparency, läpinäkyvyys, eettisyys, tolkku, muotoilu, kriittinen muotoilu, strateginen muotoilu

ESIPUHE

Koen olevani etuoikeutettu saatuani mahdollisuuden vuonna 2017 aloittaa tohtoriopintoni Lapin yliopistossa. Näin saatoin vihdoin keskittyä kaipaamaani muotoilun maailmaan, joka on ollut läsnä elämässäni monilla tavoin jo nuoruudestani asti.

Kun aloitin opintoni professori Satu Miettisen johdolla, sain kokemuksen tulla täysin hyväksytyksi yhteisöön, joka tuntui välittömästi oikealta paikalta. Erityisesti mieleeni on jäänyt kokemus läsnäolosta ja sallivasta ilmapiiristä. Sain tilaa edetä tutkimukseni eri vaiheissa näkökulmia vaihdellen ohjaajani suhtautuessa ilmeisen luottavaisena edesottamuksiini. Itselleni tolkun tekeminen on vienyt aikaa, mutta juuri tilan saaminen ja ajatuksen vapaus johtivat myöhemmin työni monialaiseen tarkastelutapaan. Ilman ohjaajaani en olisi tässä tilanteessa. Emerita professori Kaarina Määttää kohtaan tunnen nöyrää kiitollisuutta aktiivisesta kannustamisesta ja energisestä otteesta, jolla hän aikaa ja vaivaa säästämättä auttoi minua erityisesti yhteenveto-osan yhteydessä. Kiitän niistä monista oppimistani asioista, joissa sain yksityiskohtaista tukea ja konkreettista apua väitösprosessin viimeistelyssä. On ollut kunnia-asia saada työskennellä yhdessä.

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I am especially indebted to Dr Melanie Sarantou, Adjunct Professor (Arts-based Research in Social Design) at the University of Lapland who has supported me during the publication process of the international articles. Her experience in scientific publishing and peer review processes has greatly improved my understanding of academic work. I feel gratitude for her warm and supportive guidance in moments of hesitation.

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The Academy for Design Management Innovation Conference held in London in 2019 provided me an opportunity to meet again with Dr Mikko Koria, Professor and Chair of Design Innovation at Loughborough University London and Director of the Institute for Design. I also had the privilege of meeting with many of the international scholars whose work had inspired me for quite some time. I am grateful for the discussions and encouragement. Many scholars have challenged my earlier assumptions which makes scientific work fascinating.

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LIST OF ORIGINAL ARTICLES

This doctoral dissertation includes three original peer-reviewed articles indicated with numbers I, II, and III below. Each article is followed by an explanation of the contribution I have made. All the articles have been peer-reviewed, accepted and published internationally after the presentations.

I. Pääkkönen, T., Miettinen, S., & Sarantou, M. (2019). A Model of Positive Strategic Sensemaking for Meaningfulness. Conference Proceedings of the Academy for Design Innovation Management, 2(1), 710–721.

   After identifying overarching themes in the data and gathering the theoretical insights for theory elaboration I created the preliminary model suggested in the article. I wrote the original article, including the methodology description. Based on peer reviews and supported by the second and the third author´s reviewing and editing, I was responsible for revising and submitting the final published article and presented it in the conference.

II. Pääkkönen, T., Sarantou, M. & Miettinen, S. (2020). Design Languages in the Design Space: Silicon Valley. Proceedings of DRS 2020 International Conference: Synergy. S. Boess, M. Cheung and R. Cain (eds.). Vol 1, 4–22. https://doi.org/10.21606/drs.2020.148

   As the first author, I wrote and submitted the original article including the chosen perspectives, methodology and approaches to data. The article gained clarity as a result of valuable peer reviews, followed by reading, reviewing and commenting by the second and the third authors with whom team consultations and discussions were conducted for refining the ideas. I was responsible for submitting and presenting the final published article.

III. Pääkkönen, T., Sarantou, M. & Miettinen, S. (2020). Meaning Innovations with Design Support: Towards Transparency and Sustainability in the IT field. The 22nd dmi: Academic Design Management Conference Proceedings, 741–752. Design Management Institute, MA: USA.

   The original article, of which I was the first author, was further developed through reviewing, commenting and editing by the second and the third authors. I conducted the analysis and wrote the methodology section. The team consultations supported refining the ideas and concepts for editing the final publication after peer reviews. I was responsible for submitting and presenting the final version.

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1. INTRODUCTION

This interdisciplinary dissertation bridges areas of design with organization and management studies. The higher status of design, much desired in the design community over the past decades (Cross, 1982) has led to more visibility for design and designers. Intriguing in the development is the involvement of designers in more strategic questions (Cooper, Junginger, & Lockwood, 2009; de Mozota, 2017) that ultimately may guide organizations and actors towards thinking beyond the traditionally assumed organizational borders. Digital technologies have dramatically modified the landscape of designing (Maguire, 2014; Rogers, Conerney, Mazzarella, 2019). Designers across different organizations and design sub-fields are faced with new situations increasing the need to explore the position of design managers and their work contexts.

A question that has propelled this dissertation from early on has been to better understand whether or how designers might change the way organizations make sense of themselves, their strategic direction and the core reason of their existence. Therefore, it is important to try to understand how designers, especially those in different managerial positions, make sense of their professional situation. Moreover, the understanding of an organization as a monolithic entity is not necessarily the only possible one. The tension in this research is created in the intersection of the positivist managerial tradition stressing financial performance on the one hand, and the general values of design that seek to improve things and the lives of people (cf. Simon, 1969), on the other hand. By combining ideas of the organization, strategic questions and design perspectives, the research is shaped by making sense of what is going on in organizational sensemaking and strategizing when design perspectives are adopted as an integral part of the phenomenon.

By challenging the traditional division between organizational borders, linear thinking and top-down strategies and by incorporating design perspectives in this discussion something quite familiar for design takes place: reframing (Dorst, 2015) the issue at hand. In this dissertation, the author is using creativity and looking for a fresh perspective on design involvement in organizational settings. Instead of embedding design into self-evidently assumed organizational traditions and structures, this research seeks to make sense of a design space in which strategizing, sensemaking and design merge.

1.1. The objectives of the research

The dissertation attempts to divert from mainstream positivist (Burrell & Morgan, 1980) managerial thinking about design efficiency towards discovering and understanding the ways in which design ideas might enrich thinking of organizations, their strategies and future visions. The main research question is formulated as:

> *RQ: How might design managers and the theories of design influence the idea of organization and its strategic direction?*

The object of the research is to explore the research question from various perspectives as follows:

-Firstly, the research seeks to contribute to *the call for paradigmatic proliferation of design research*. Johansson and Woodilla (2017) suggest that the positivist paradigm has dominated most design management research (cf. Candi, 2016; Candi & Saemundsson, 2008).

-Secondly, the research seeks to follow *the call for more creativity* in management and organization research (Hernes, 2014). Hernes (2014, 853), for example, problematizes the slicing of reality into categories as the very basic of scientific ideals.

-Thirdly, the research proposes some possible *links with streams of sensemaking* (Weick, 1995, 2011) in which, from the perspectives of design, issues such as materiality or practice-based know-how (Cross, 1982) play a role in how individuals and organizations make sense.

- Finally, this research explores what *a design-inspired interdisciplinary view on strategizing* might look like:

Although the research does not take a strategy-as-practice approach, and instead, uses sensemaking and other approaches, it has affinity with five suggested directions of strategy research (cf. Vaara & Whittington, 2012) modified below, by suggesting to:

-place design agency and situation in a web of sensemaking frames, combine micro and macro levels, view strategy-making rather as emergent than planned, explore how materials (but also other issues such as language) matter, while adopting partly critical perspectives. In the language-based view on strategizing, for example, strategic concepts are suggested to be central micro-level tools in strategic sensemaking (Balogun, Jacobs, Jarzabkowski, Mantere, & Vaara, 2014; Jalonen, Schildt, & Vaara, 2018; Mantere, 2014).

Understanding the way designers think and organizations make sense has been the overarching motivation for this dissertation. It aims at improving understanding on how designers in managerial positions working in Silicon Valley-based design-driven organisations might make sense of their contextual industrial settings while also making sense of such contexts on a more holistic and theoretical level. Langley

and Abdallah (2011) find that it is making sense of data in terms of a valuable theoretical contribution that forms the key challenge in studying organizational processes. While not a process study, this dissertation adopts views of organizational becoming (Tsoukas & Chia, 2002) leaning partly on social constructionism (Berger and Luckmann, 1966) and sensemaking (Weick, 1995; Weick, 2011) and takes a more philosophical and reflexive stance (Alvesson & Sköldberg, 2018). The research is occupied with how design managers might view issues such as future possibilities with actors whose assumptions may originate from the frames of management, science or technology. The research aims at juxtaposing but also bridging managerial, organizational and designerly ways of thinking and framing issues. By taking a more reflexive stance, it suggests interdisciplinary sensemaking aimed at transcending some fragmented theories and professional traditions, including the idea of organization.

1.2. The research process

Sensemaking perspectives (Helms-Mills, Thurlow, & Mills, 2010; Weick, 1995; Weick 2011) form the overarching background of the three sub-studies conducted for this dissertation, resembling the way designers may proceed with a design task. Dorst (2001) refers to co-evolving problem and solution spaces with designers´ constant iteration of analysis, synthesis and evaluation processes. However, the object of "designing"this research is not an artefact or a final truth, but triangulating and fitting theoretical and empirical pieces together such that something novel and worthwhile might be generated to improve awareness and suggest improvement to things (Denzin & Lincoln, 2011; Fallman, 2008; Simon, 1969). Alvesson and Sköldberg (2018) refer to reflexive and creative rigour when key assumptions are studied, revealed and, perhaps, challenged, including the researcher´s own. Sanders and Stappers (2008) describe the fuzzy front end of the design process which evolves towards more clarity. Fallman and Stolterman (2010, 8) prefer to speak about design explorations — or 'critical design'— when design is used for indicating the possible, desirable, ideal, or what is different from a mainstream view: this might "... reveal alternatives to the expected and traditional, ...transcend accepted paradigms, ... bring matters to a head, ...be proactive and societal". From the point of view of Fallman´s model (2008), this dissertation merges design studies and design exploration, yet with some implications for practice. The aim is to bridge streams of thinking about organizations and design involvement and move from pre-understanding towards deeper and broader understanding (cf. Alvesson & Sköldberg, 2018) through the sub-studies. The aim is to proceed towards triggering and enabling future conversation and some fusion of horizons (Gadamer, 2004; Dubberly & Pangaro, 2015; Malpas, 2018) on a more interdisciplinary grounding (Rodgers et. al, 2019).

1.3. The research context

Although numerous sub-fields of design exist, a selection to speak only about some of them, such as service, positive, ecological, sustainable, engineering or industrial design (cf. Heskett, 2005) would not have been feasible partly due to the diversity of the participants´ backgrounds in this research. Each specific branch deserves its own in-depth research. In the context of this research the design managers represent various sub-fields of design such as interaction, service, UX, graphic, or strategic design and not strictly one of them. The work context is interdisciplinary covering design, managerial and organization related issues. Readers from another specific (sub-)discipline may find the vocabularies challenging, although an attempt to create clarity has been made. The advantage of broad scholarship is its aim for synthesis, instead of splitting realities into fragmented pieces (cf. Buchanan, 2001). The risks and limitations of such a choice will be discussed; there will be no single truth as an outcome.

Interview data with design managers working in Silicon Valley based design-driven organizations form the empirical material. These organizations had acknowledged a role for design in their innovation activities and many represent internationally well-known technology firms. Silicon Valley is an agglomeration of design companies working with businesses viewed as unique; design being adopted into business reinvention and strategies, particularly in the US (Cooper, Junginger, & Lockwood, 2009). The longitudinal research focuses on experienced professional designers in middle or senior management positions in companies ranging from large technology driven international manufacturers to some specialized renowned design consultancies. Designers are claimed to be increasingly involved in strategic questions (Brown, 2009; Buchanan, 2015; de Mozota, 2017; Liedtka, 2015). Especially digital technologies have rapidly changed the landscape of both design and management (cf. Brown, 2009; Katz, 2014). How to design a well-functioning device or system, however, is not the key focus of this research. Nor does this research aim to measure the impact of design (cf. Hernandez, Cooper, Tether, & Murphy, 2018), which forms another stream of research. Rather, attention shifts to the contextual issues behind the assumptions and frames through which these phenomena could be observed. These are addressed through (critical) sensemaking, hermeneutics and reflexivity.

While "many complex problems are approached from a technological/ technocratic perspective, much of the complexity in today's problems stems from the human domain. Design, as a natural bridge-builder between technology and humanity, is ideally positioned to contribute." (Dorst, 2019). Dorst (2019, 120) refers to the playful process of design as "the skillful juggling of problem frames, design principles and solution ideas until they fit in snugly". Having the theoretical

and empirical issues as the object of sensemaking in this longitudinal research, much of the research at hand resembles such design juggling.

1.4. The structure of the research

This dissertation first presents the theoretical foundations (Chapter 2) and the research questions (Chapter 3), followed by philosophical and methodological considerations (Chapter 4). The results (Chapter 5) will be presented prior to the discussion section (Chapter 6) in the end.

2. MAKING SENSE OF THE IDEA OF ORGANIZATION, DESIGN AND STRATEGY

For qualitative interpretive organizational research, the very question of what constitutes an organization and whether it even exists in the sense that realism assumes, is a rich area of exploration. Strati (1999) in the context of organizational aesthetics suggests that studying organizations is not analyzing something fixed and objective, but the ways both organizational actors and the researcher understand organizational life and its aims. In the following, the subject area of design with knowing "of the third kind" expands the context of conventional assumptions about organization leading to the idea of a broader design space as an interdisciplinary sensemaking space.

2.1. Reframing interpretations on organizations: different paradigms

Leaning on Burrell and Morgan (1980) most research on organizations has traditionally been based on the functionalist paradigm stressing concepts such as structure, hierarchy, goals and performance. The classical management theory mainly took an objective, managerial viewpoint in which the individual was neglected. Rather, objective facts were sought for causing individual behavior desired by management. The cause-effect aim depicts the standing derived from natural sciences with the desire to yield objective knowledge and characterizes the functional paradigm that has dominated the research on organizations (Burrell & Morgan, 1980). Max Weber (1922) mentioned the ideal type of a formal organization as a feature of bureaucracy compared to society. Strati (1999, 4) problematizes this idealized view on organizations as being merely rational entities and the way organization and management theories have deprived them of their "earthly features of physicality and corporeality". He finds it curious that organization and management theories should have reached social legitimacy for such an idealized view. In a same vein, Orlikowski and Scott (2008, 466) declare: "to the extent that the management literature continues to overlook the ways in which organizing is critically bound up with material forms and spaces, our understanding of organizational life will remain limited at best, and misleading at worst". As to design management research, however, Johansson and Woodilla (2017) point out that a large part of it confines to the functionalist positivist tradition in Burrell and Morgan´s taxonomy (1980). Cross (2001) explains that throughout much of the modern movement there was

a similar desire to produce art and design based on objectivity and rationality. An illustrative example is building a house as "a machine for living" as Cross (2001) puts it when referring to Le Corbusier and de Stijl movement in the early 1920s. The design methods movement from the 1960s onwards stressed objectivity and rationality in the design process (Cross, 2001). Donald Schön (1983) challenged the positivist doctrine underlying the "design science" movement and offered instead a constructivist paradigm. Bamberger and Schön (1983) suggested connections between materials and making as a conversation with materials for developing new insights. However, even Simon (1969), although criticized for taking a positivist stance, considered interdisciplinary issues. Johansson and Woodilla (2017) problematized the design management perspective, in which the organization is assumed to pursue the ideas promoted by mainstream management scholars. New ways of studying organizational phenomena such as strategy formation have since been encouraged (Hernes, 2014; Mantere, 2014).

An interpretive paradigm, instead, rejects reality independent of the human mind. Rather, human beings are assumed to create a social world of intersubjectively shared meaning when developing and using common language and interactions of everyday life (Berger and Luckmann, 1969; Burrell & Morgan, 1980). It follows, that organizations in the sense of the functionalist concepts, such as hierarchy, linear thinking and measurement, do not necessarily exist from the interpretive perspective (Burrell and Morgan, 1980, 260). The idea of organization need not have a clear line distinguishing it from its environment as earlier management theories suggest. Nor does it necessarily consist only of tasks in planned boxes and processes.

Weick and Roberts (1993) elaborate on the idea of a learning system, a form of organizing as heedful careful interrelating, believed to come about as an outcome of training and experiences weaving together thinking, feeling and willing. In their view, the collective mind emerges from interrelating. The authors seek a way of linking individual subjective actions and group actions while showing how heedfulness resides in the interaction itself, rather than in planning careful action. The collective mind emerges during interrelating itself in a socially structured field under continuous structuring and restructuring. Such a socially structured field is shaped by individual activities which are in turn influenced by the field. The level of collective comprehension is critical to cope with unexpected situations. (Weick & Roberts, 1993.) However, it is not clear to which extent individuals are free to choose how they work with, for or even against each other. No individual steers the outcome of interaction, but the collective interrelating itself gives direction to action. Weick (2011) additionally prefers the verb organizing to the noun organization. Later, critical sensemaking scholars have pointed out that Weick´s model avoids power issues and new critical sensemaking perspectives have been added (Helms-Mills, Thurlow & Mills, 2010) to the original seven properties suggested by Weick (1995; see 4.2.1.).

2.1.1. Towards the idea of design space

Weick and Roberts (1993, 367) suggested the language of care to be more suited to systems than the language of efficiency. They rely on Mead (1934, 191–192) who depicts social processes as prior resources from which individual mind, self, and action are fashioned and Walsh and Ungson (1991, 60) who defined organization as a "network of intersubjectively shared meanings that are sustained through the development and use of a common language and everyday social interactions." For more interpretative organizational research the very question of what constitutes an organization thus remains open for rich explorations.

Linear mainstream management thinking tends to measure and control individual actors´ behavior to optimize rational efficiency for the benefit of an organization. However, an organization as a space can entail dimensions beyond rationality and functionality, such as aesthetics (Strati, 1999), stories, beliefs or myths; or social relations through which participants learn (Gherardi, 1999) or understood through various forms of interaction and activity (Weick & Roberts, 1993). Interpretive perspectives suggest that organizational members actively form or enact their environments through their social interaction (Smircich and Stubbart, 1985). Many interactions are open, and incorporate stakeholders and participants from other spheres, to the extent the sphere has any borders that could be defined. Digital spheres turn into virtual experiences of imagined relationships with others. To theoretically define an exact design space is not possible nor useful taken the evolving nature of organizing.

However, when uncertainty prevails in the face of complexity, people start framing issues in different ways to make sense and gain clarity. The way Weick (1995, 2011) depicts organizing and sensemaking, preferring the verbs, resonates well with the idea of an "unlimited" organization as a design space transcending the mental ideas about a well-defined entity with clear borders (cf. Burrell and Morgan, 1980). When asked, many a designer would consider the world to be the object of design (cf. Nelson & Stolterman, 2012), extending design scope to practically anything that is man-made or artificial (Simon,1969) and mostly manufactured by collaborating organizations and individuals. Jahnke (2013) refers to immersion through design hands-on interventions in which established meaning-spaces gradually expand through processes of entwined conversation and hands-on making while new product understandings are developed. Such a design space entails not only the objects and interactions but should also entail reflection on consequences, if one is to follow design principles suggested by Buchanan (2015), Sanders and Stappers (2008) and others. The design space suggests a creative and flexible space for actors for making sense of what is going on, what matters most and how action is directed. As language use tends to reside in historically adopted assumptions (Gadamer, 1970/2006) the idea of design space may counterbalance more limited concepts stemming from solely managerial realms or from technology and engineering (such

as speaking about matrix, unit, business ecosystems or infrastructure) which tend to bypass the human perspective.

Strategic sensemaking has been described as an activity through which managers and organizational members deal with strategic issues to construct shared understanding of the issues under consideration and the actions taken by the organization in response (Jalonen, Schildt, & Vaara, 2018; Rouleau & Balogun, 2011). On the other hand, the strategy evolves collectively, and, over time, legitimates itself while giving direction to collective organizational action. This perspective means, in Weickian (2011) terms, that collective justification directs action while premises made early in the sensemaking process tend to determine the following course of action. Strategy can additionally be researched from diverse perspectives such as strategy emergence, the role of materiality, language, and critical interpretations (Mantere & Vaara, 2008; Smircich & Shubbart, 1985; Vaara & Whittington, 2012). Strategies have been linked with fantasising (Sajasalo., Auvinen, Takala, Järvenpää, & Sintonen, 2016). One can think of design managers as actors in collective sensemaking processes with other actors in the design space. Dorst (2001) depicts designers being involved in constant iteration of analysis, synthesis and evaluation processes between problem space and solution space in specific projects. These can be considered to constitute a part of the constantly evolving macro idea of design space. Individual actors involved in interactions represent various subject specializations and professions from designers and design teams or management to engineering, production, users and so on, depending on the specific subject field. Gadamer (Malpas, 2018) has reflected on the role of language behind evolving phenomena and encourages conversation across differently framed understandings for gaining broader horizons. In the field of design, reframing (Dorst 2011; van der Bijl-Brouwer & Dorst, 2017) is depicted as an activity that enables participants to reframe issues, such as discussions on individual and organizational values, aims and strategic direction. The idea of framing and re-framing suits well with the ongoing nature of collective sensemaking. Gadamer (Gadamer, 2004; Malpas, 2018) refers to the fusion of horizons.

2.1.2. The fluid nature of the design space: organizational becoming and strategizing

Both design and some organizational scholars have described the activities related to organizational sensemaking and design as fluid and under ongoing development. Tsoukas and Chia (2002, 567) stress that organizational change is a normal condition in organizational life challenging the assumption that fixity normally prevails. They use the concept organizational becoming while referring to "the reweaving of actors' webs of beliefs and habits of action to accommodate new experiences obtained through interactions." By viewing organizational change as an ongoing process, one can understand individual actors in their efforts to try to make sense and act coherently in the world. They continue: "change is inherent in human action, and

organizations are sites of continuously evolving human action". The authors cite William James (1909/1996, 263–264) whose views support design perspectives:

> What really exists is not things made but things in the making. Once made, they are dead, and an infinite number of alternative conceptual decompositions can be used in defining them. But put yourself in the making by a stroke of intuitive sympathy with the thing and, the whole range of possible decompositions coming into your possession, you are no longer troubled with the question which of them is the more absolutely true. [emphases in the original].(William James 1909/1996, 263–264, as cited in Tsoukas & Chia, 2002, 567).

Even routines contain the seeds of change (Tsoukas & Chia, 2002, 568). Orlikowski (1996) depicted organizational change as ongoing improvisation. Rather than viewing organizational change as orchestrated from the top, Orlikowski (1996, 65) sees organizational transformation as "an ongoing improvisation enacted by organizational actors trying to make sense of and act coherently in the world". Orlikowski (1996, 66) continues: "Every action taken by organization members either reproduces existing organizational properties or it alters them. Through sustained adjustments in organizing practices — however unintentional and unacknowledged — social changes can be enacted. Change is thus inherent in everyday human action."

For Tsoukas and Chia, (2002, 570) "organization is an attempt to order the intrinsic flux of human action, to channel it towards certain ends, to give it a particular shape, through generalizing and institutionalizing particular meanings and rules. At the same time, organization is a pattern that is constituted, shaped, emerging from change." In Gadamerian terms, organizations can be considered historically produced compositions of worldviews, horizons, which language passes on. In this sense, new vocabularies, those that are not taken-for-granted, offer openings for understandings beyond the conventional.

Tsoukas and Chia (2002, 570) suggest two levels for understanding organizational becoming. First, it entails "a socially defined set of rules aiming stabilizing an ever-mutating reality by making human behavior more predictable"..."Second, organization is an outcome, a pattern, emerging from the reflective application of the very same rules in local contexts over time. While organization aims at stemming change, it is also the outcome of change".

Organizational phenomena from such perspectives are not entities or accomplished events, but "enactments — unfolding processes involving actors making choices interactively, in inescapably local conditions, by drawing on broader rules and resources" (Tsoukas & Chia, 2002, 577).

Much in line with organizational becoming are ideas of strategies that deviate from the traditional view of strategy as a deliberate plan. Mintzberg and Waters (1985)

in their well-known theorizing described strategy developments as fluctuating between the extremes of being planned or emergent. Since the implementation of a planned strategy often has proved difficult, they suggest viewing strategies as more evolving and in flux. The emergent nature of strategizing has implications for the idea of viewing the design space as an emerging cognitive and material concept that cannot be reduced and will not freeze into a certain fixed category or be given a definition that would capture its ever-changing nature. Interdisciplinary possibilities of learning and understanding organizational and inter-organizational connections emerge through human interaction, as sites of the evolving nature of organizing and strategizing, in which design managers among other actors, are occupied with sensemaking in the contexts of strategic (and other) issues.

2.1.3. Socio-material aspects of design in strategic sensemaking

Orlikowski and Scott (2015, 699) emphasize materiality and discourse as being constituted through each other. The authors concentrate on materializations — how meanings are materially enacted in practice (Introna, 2011) and use these to discover what is taken-for-granted or for studying how material enactments produce outcomes with ethical implications. They find the approach useful for studying materializations in the context of metadata, algorithms, social media and analytics which are "imposing increasingly consequential forms of surveillance" in addition to producing data such as performance indicators for managerial aims.

Stigliani & Ravasi (2012) describe the materialization of strategizing through design approaches: designers supported conversational practices by exchanging, combining, and constructing interpretations collectively, and in prospective sensemaking in future oriented group processes (Gioia, Thomas, Clark, & Chittipeddi, 1994), such as strategy making or new product development. Change can occur in the strategic position or in the cognitive perspective of an organization (Mintzberg, 1981, 319–324). Participants can make sense of their situation for themselves and others, while simultaneously acting both as influenced and influencing actors in uncertainty and ambiguity (Gioia et al., 1994, 376).

Numerous design approaches utilize material and embodied approaches to sensemaking. Participatory design approaches support inclusion and involvement in co-creation (Sanders & Stappers, 2008) that align well with viewing strategies rather as emergent than rigid top-down plans set by the organizational top (Mintzberg & Waters, 1985). As Minzberg and Waters suggest, strategy could better be described as crafting, and rather profits from experimentation than (often failing) implementation. Consequently, the values may transform or be transformed by the way organizations and people in organizations understand and modify the core meanings that drive organizational life. For example, workshops, facilitation (Stickdorn, Hormess, Lawrence, & Schneider, 2018) or bodystorming (Márquez Segura, Turmo Vidal, & Rostami, 2016) enable participants to discuss

and experience organizational scenarios. Buchanan (2015) speaks of organizational cultural transformation enabled by design:

> "The principle of design that stands behind the organizational culture reform movement in which design thinking is central is grounded in the quality of experience for all of those served by the organization. This includes the individuals who directly use the products and services of the organization, but it also includes those who are affected by the internal and external operations of the organization and by those in society at large who are ultimately affected by the vision and strategies of the organization. The search for such a principle is a dialectical task." (Buchanan, 2015, 17)

Several scholars have pointed out that design has gained increasing importance in addressing strategic questions (Åman, Andersson, & Hobday, 2017; Brown, 2009; de Mozota, 2017; Liedtka, 2015; Muratovski, 2015). However, Johansson and Woodilla (2017) noticed that most design management research confines to conventional positivist managerial assumptions.

In addition, research threads of strategy as practice, SAP, (Jarzabkowski, Spee, & Mets, 2013, 41–44), and open strategy (Whittington, Cailluet, & Yakis-Douglas, 2011) may yield insights for understanding design professionals working in strategic sensemaking contexts. SAP uses the verb strategizing to place emphasis on the strategic practices by practitioners (Jarzablowski et al., 2013, 41). Forming part of a "linguistic turn" and "practice turn" in social sciences these approaches have the aim of humanizing organization and management research which has tended to forget the human actor by focusing on macro level firm-market research (Jarzabkowski, Balogun, Seidl, 2007). Practice theorists respect both the efforts of individual actors and the workings of the social (Whittington, 2006). Whittington (2006, 615) continues: "actors may be creative agents: they are potentially reflexive enough, and their social systems open and plural enough, to free their activity from mindless reproduction of initial conditions (Giddens 1984; 1991). In their practice, actors may amend as well as reproduce the stock of practices on which they draw. For practice theory, people count".

Hernandez et al. (2018) in their design literature review arrive at suggesting that design has become "the language of innovation", yet pointing out that most design research is anecdotal and lacks robust (quantitative) evidence on design contribution to innovations (cf. Hernandez et al., 2018) despite the numerous claims in this direction.

Strategizing comprises "actions, interactions and negotiations of multiple actors and the situated practices that they draw upon in accomplishing that activity" (Jarzabkowski et al., 2007, 8). Balogun et al. (2014) suggest that discourse and language based theories of strategizing could be connected to the physical, sociomaterial practices involved in strategy work. They mention examples such

as whiteboards, flipcharts, post-it notes and agendas with spatial and material arrangements of rooms and places in which strategizing takes place (Whittington 2006; Rouleau, 2005). Events facilitated by design managers and their teams with the use of design methods and materials seem to fit in this theory development well. In addition, (Balogun et al., 2014) link strategy discourse with the psychological as well as cognitive aspects of strategic sensemaking in which the performative power of discourse is a central thesis (Rouleau & Balogun, 2011). Mantere and Vaara (2008) further point to the social aspects of strategy discourse which has power and influences the subjectivity and power relations between sensemaking actors. Designers are involved in sensemaking embedded in social and discursive, but also material and embodied contexts of strategizing. Designers guided by their ethos may challenge existing organizational values or suggest new meanings. For example, service designers´ specific values have been identified to include holism, empathy, and co-creation (Fayard, Stigliani, & Bechky, 2016, 282). Weick (2011, 14–15) suggests that micro behavioral commitments can have macro consequences with a social basis. The language of goals implies collective justification (Weick, 2011, 7). When designers participate in strategic sensemaking, different perspectives become potentially voiced and visualized. Strategy as a discourse has potential far-reaching effects beyond the firm and its actors (Balogun et al., 2014).

Bakke and Bean (2006, 1) suggest that sensemaking processes are anchored in and engage with material settings. They transcend the cognitive, intersubjective or communicative approaches and propose materiality to form the basis of sensemaking suggesting that both sensemaking and design have an influence on future actions through material elements. Sensemaking studies may hence gain insights from design studies and vice versa. There is an emergent perspective of organizations as social, discursive, and material systems or spaces, shaping and being shaped by, individuals, other organizations or societies.

2.1.4. *The design space of sensemaking*
The origins of the concept of space can be traced back to sacred and non-sacred spaces and to ancient history such as Aristotle´s understanding of space as a constant that allows substance to change through motion. Later, Newton and Descartes examined space as a real entity, while other scholars maintained that space is a relativist and mental construct, as Leibniz suggested. (Wilwerding, 2013.) These basic orientations combined provide the basis for using the concept of design space as both concrete and cognitive, material and embodied, suitable for the purposes of design that encompasses numerous possibilities for framing for the purposes of exploring alternatives and, by doing so, often changing the way space is interpreted. Designing does not only take place in creative facilities such as specific labs (cf. Thoring, Mueller, Desmet & Badke-Schaub, 2018). Neither is design activity limited to a problem or solution space (cf. Biskjaer, Dalsgaard & Halskov, 2014)

but the entire sensemaking context related to design action and reflection. As van Amstel, Hartman, van der Voort and Dewulf (2016, 200) point out, in design studies, "design space is a term vaguely used to the many possibilities a project has to produce an object". They found scholars who refer to the cognitive activity of designers exploring and redefining an abstract space of possibilities (cf. Gero & Kumar, 2006; Goldschmidt, 1997). Van Amstel et al. (2016, 200) rather propose a dialectic relationship between design space and design activity: "Design space is produced by design actions such as imagining, sketching, visualising, weighting, generating or rejecting, but design actions are also restricted by design space". They refer to the social production of design space (van Amstel et al., 2016, 199) in which contradictions play a role. Such understanding of the design space can be extended and linked with sensemaking (cf. Weick, 2011) in which actors, not only designers, collectively make sense in an attempt to gain more clarity in the world, already made and in the making.

According to Weick, sensemaking is based on a cue, a frame and a connection between them, thus causing meanings to be relational and momentary. Uncountable contextual frames and cues are open for sensemaking. Weick (1995, 106–111) refers to minimal sensible structures. People pull words from diverse sources, such as society, organization, occupation or experiences to make sense. Frames and cues are vocabularies in which more abstract words (frames) include and point to less abstract words (cues) that become sensible in the context created by the more inclusive words (Weick, 1995, 110).

The design space as a sensemaking space suggests a broader understanding than the historically produced view on organizations as monolithic entities with machine-like efficiency separated from wider consequences or human experience. It avoids viewing organizations as internal or external, or even as inter-organizational entities or ecosystems, and diverts from popular terms used by classical management scholars. The world, ultimately, is the design space as design, from early on has stressed the notion of changing something towards something better (Simon, 1969) through iterating between micro and macro levels of sensemaking.

By merging the previously mentioned theoretical viewpoints, an interdisciplinary understanding of a design space allows a more holistic view on what is going on with people who organize and make sense of the world they design and make. Part of this scene are conventional understandings of organizations, but a large part of it reaches beyond the limited internal plans of linear organizational aims and actions.

2.2. Design knowledge: knowing by making sense

Buchanan suggests a shift from old knowledge in science to what he refers to as new knowledge:

> "We possess great knowledge, but the knowledge is fragmented into so great an array of specializations that we cannot find connections and integrations that serve human beings either in their desire to know and understand the world or in their ability to act knowledgeably and responsibly in practical life. " (Buchanan, 2001, 6).

2.2.1. *Integrative aspects of design knowledge*

Buchanan (2001) paradoxically pointed out that what was old knowledge has become new knowledge: the integrative characteristics known to design unfold into the possibility of such new kind of knowledge, design knowledge. He recognizes an ongoing debate within the design community about the role of tradition and innovation while suggesting the following definition of design as a field of knowledge: "Design is the human power of conceiving, planning, and making products that serve human beings in the accomplishment of their individual and collective purposes." Buchanan (2001, 9).

The definition allows more space for interpretations than an earlier one in the field of industrial design by Heskett (2005), mentioned in Buchanan´s article. Yet, Heskett also acknowledges the difficulty of defining design while stressing that the human factor is always present in the decisions taken at all levels in design practice.

Östman (2005) finds that research based theories regarding design knowledge in higher education come in rather limited numbers. Design education is largely established on the basis of the professional subcultures and their traditions (Östman, 2005, 348; cf. Heskett, 2005) making it challenging to provide a synthesis that would enable description and definition of the overarching features of design knowledge across diverse subdisciplines. He finds that while design knowledge is sometimes mentioned, it often remains undefined and is entwined with other concepts such as design theory, design, or designing. He supports an interdisciplinary approach, combining and comparing ideas from different fields, (Östman, 2005, 332) He adds: "Design theory is not only about generating and structuring the shared design knowledge but should also address the problems of the design fields. Östman regards design theory as a philosophical discipline while stressing the importance of practice as well (Östman, 2005, 333–334). For him the advantage is that philosophy allows combining such different aspects as form, fact and values.

For Östman (2005), design knowledge is a set of repertoires intended for managing problems, desires and puzzling situations, and for changing an existing situation into a preferred one, thus partly echoing Simon (1969). He moves on by stating that design knowledge cannot be transformed into information as design

knowledge is carried out and applied by humans in action. Information is, however, an important subset of design knowledge. Design knowledge is primarily a knowing in progress and creativity a subset in design knowledge. Design knowledge applies rational reasoning while some reasons and influencing factors remain hidden in cultural and socio-historical traditions. Design reasoning can use explicit logic, but it is only one possible option in design reasoning (Östman, 2005.)

Some attempts to define the components of design knowledge, such as in the subfield of engineering, have been made; an overview and a proposal by Wong & Radcliffe (2000) presents an example. Even when rigorously attempted with a rational and logical approach, a tacit dimension often remains undiscovered while lists of explicit requirements for engineers exist for designing, say, hydraulic equipment. And yet, the knowledge in tables and charts seems to lack a deeper human and cultural component, although the list does mention the way language is important to master, or gestures may be used (cf. Wong & Radcliffe, 2000). The analytical mind is trained not to notice tacit dimensions or they are treated as non-professional or non-scientific issues (cf. Helms-Mills et al. 2010). Tacit knowledge (Polanyi, 1966) might actually form a substantial part of design knowledge (Östman, 2005). With the help of philosophy, and by viewing design knowledge as a human, cultural and social phenomenon, one may approach designing as a specific kind of knowledge related to human understanding in practice. It is important to remind oneself of the origins of design and its connections with crafts and philosophy, easily neglected in rational modes of thinking. Notably, the word knowledge differs from information or data, by being an interpretation when a human being seeks to subjectively understand information and use it in context (Östman, 2005.)

For Nelson and Stolterman (2012, 5) design is "a compound of rational, ideal, and pragmatic inquiry. Design is constituted of reflective and critical thinking, productive action, and responsible follow through" which captures more than creativity alone and is rich in its tradition. "A design culture needs to be broad in its scope and deep in its meaning and utility". They link design with organizations and leadership and the need for good judgement instead of problem solving. They continue by suggesting that leaders and designers are often one and the same, and emphasize that leaders recognize that their challenge is that of a designer — to determine direction and destination via the design tradition. They refer to design as a tertium quid — a third way — distinct from the arts and sciences. The argument leans on the reconstitution of sophia — the integration of thought and action through design. Design, in this view, has its own tradition, one that reintegrates sophia rather than follows the historical Western split between science and craft or, between science and the humanities (Nelson and Stolterman, 2012, 11.) This third way of knowing forms thus an integrative culture. Science, as an activity of disciplined inquiry, has often been called the new religion of the contemporary age, and has tended to dominate the mode of inquiry in the past century. (Nelson and

Stolterman, 2012, 33.) For these scholars, a rational form of inquiry can be part of design, but not the only ingredient.

Nelson ja Stolterman (2012, 39) speak of a fundamental type of knowing which is knowledge associated with judgment and different in kind because of being inseparable from the knower and only made visible through action. An interesting aspect of design knowledge in their view is that it emerges from a conscious not-knowing: "Design knowledge — while using reason (conscious knowledge), intuition (hardwired, unconscious knowledge), and imagination (subconscious knowledge) as constituent elements — requires an initial state of intentional not-knowing". Nelson and Stolterman refer to product design and information systems design as a mix of "hard" science and fine art. (Nelson & Stolterman, 2012.)

Östman (2005, 84) builds his design theory on aesthetic experience leaning on Dewey (cf. Leddy, 2020) by paying attention to human interaction with objects and situations in relation to a social situation. The focus shifts from theories of the design objects towards the study of their generation, together with all the influences having an impact on the design process. He depicts design knowledge as incorporating both process and object as also Cross (2001) does. Östman (2005, 61) refers to Hillier (1996, 19) who explains how a building becomes socially significant in two ways: first by elaborating spaces to generate some socially sanctioned – pattern of encounter and avoidance; secondly, by elaborating physical forms and surfaces that enable expression of culturally or aesthetically sanctioned identities. Required is not only "the conceptualisation of pattern and configuration in vacuo, but also comparative knowledge and reflective thought" (Hillier, as cited in Östman, 2005, 54). Östman´s (2005, 61) idea here is that the design is often non-discursive but that (architectural) theory must try to conceptualize it. Much in the same way one might think of new forms of designing digital functions, such as IoT (Internet of Things), to enable and limit and perhaps guide users to certain behaviours while the process to the use stage is a long journey with interdisciplinary encounters and challenging issues, requiring overarching theories and discussions on judgement. Buchanan (2001, 11), for example, refers to a common misunderstanding of interaction design to be concerned fundamentally with the digital medium. Much of design knowledge is tacit and has remained beyond scholarly expression which itself, may enable a dynamic progress in an evolving field of inquiry. Design knowledge is embedded in practice. It is to a large part tacit; embodied and embedded in cultural traditions whilst being connected to intuition and aesthetic experiences (Östman, 2005, 337).

The tacit nature of knowledge is addressed in the seminal organizational knowledge creation theory by Nonaka and Takeuchi (1995). Four modes of knowledge conversions are suggested to take place in organisations: socialization, externalization, combination as well as internalization. Knowledge is about beliefs, commitment and action as well as about meaning, being contextual and relational. In this view, organizational knowledge creation entails a continuous and dynamic

interaction between tacit and explicit knowledge forming a spiral progress shifting from different modes of knowledge. Leaning on Polanyi (1966), the authors assign design a role in organizational knowledge production. Nonaka, Ryoko and Noboru (2000) by using the SECI model combined it with leadership. Their theory can be related to some Weickian ideas of cues, available for selecting, framing and making sense. Without the subject there is no knowledge.

Östman (2005, 62) arrives at formulating: "tacit knowledge is not a distinctive category or type of knowledge but an integral part in our interaction with the world, providing means for understanding".

By adopting the recent view of Åman, Andersson, & Hobday, (2017, 23) "design not only is a body of knowledge to be integrated ("integration of design") but also a core knowledge-generating activity ("integration by design") critical to the success of the design-intensive firm. The latter, although often overlooked, elevates the role of design to a strategic activity in firms".

Cross (2001), seeking to overcome the sub-disciplinary discrepancies, states that an axiom of the design discipline is that there are forms of knowledge special to the awareness and ability of a designer, independent of the different professional domains of design practice. Leaning on Simon (1969) he, too, explains that designers know how to propose additions to and changes to the artificial world. He refers to design knowledge by saying that "some of it is of and about the artificial world and how to contribute to the creation and maintenance of that world... Some of it is knowledge inherent in the activity of designing, gained through engaging in and reflecting on that activity" (Cross, 2001, 54). Further, some of the knowledge resides in the artifacts and including knowledge "gained through using and reflecting upon the use of those artifacts" as well as in the manufacturing of artifacts and reflecting on them. Cross continues by adding that some of the knowledge is in instructing about all the former items. He refers to "designerly" ways of knowing, thinking, and acting (Cross 2001, Cross, 1982) as specific to design, yet interdisciplinary in its character.

Much in line with the above authors, for Friedman (2000, 25), knowledge, unlike information in information systems, is embodied in human beings. Knowledge creation remains thus an intensely human act. He continues: "because knowledge is human, developing knowledge requires thinking and practice, mind and body both". Friedman (2000, 15) suggests: "Human beings shift knowledge from one frame to another. As they do so, they embrace knowledge, enlarging it, internalizing it, transmitting it, shifting it, recontextualizing and transforming it. Humans create new knowledge by acting on and working with knowledge. Knowledge creation requires social context and individual contribution. This involves an effort to render tacit or unknown explicit and known".

2.2.2. Transformative and generative aspects of design knowledge

Manzini (2009, 26–27) stresses that a profound social, cultural and economic transformation requires social learning and innovation generating and regenerated by new design knowledge. This is needed in a network and knowledge society. Buchanan (2001, 2015) observes a development from the earlier focus of designing signs and images or products and artifacts towards designing interactions between people in systems. Fourth order designers face complexity in addressing the core issues that hold together organizations, governments and society. Buchanan (2019) anticipates a shifting focus from place, space, and action to what he calls interiors of the mind. In his earlier article (2015) the title "Worlds in the making: Design, management, and the reform of organizational culture" already indicates something somewhat similar to Tsoukas and Chia´s (2002) suggestions on organizational becoming.

Design is much about the process of "coming into existence"—"a birthing, genesis, or creation" (Nelson and Stolterman, 2012, 37). For Nelson and Stolterman (2012), design is the kind of democracy that can embrace the growing diversity and complexity of human interests in contemporary world. Design provides the possibility that "each and every person's individual good can be considered, within the framework of the common good " (Nelson and Stolterman, 2012, 47). Fallman and Stolterman (2010) suggest that design can be critical and "provoke, criticize, and experiment to reveal alternatives to the expected and traditional" or transcend accepted paradigms (Fallman & Stolterman, 2010).

Östman (2005) rejects the idea of viewing design as a linear problem-solving process. The cultural perspective means that designing cannot be reduced into a simple end and a freestanding process. In a similar vein, Nelson and Stolterman (2012, 80) express their ideas by using the formulation design becoming, thus resembling Tsoukas and Chia´s (2002) and Weick´s (2011) views on organizing.

In conclusion, design knowledge is not a fixed end-result of processes, but rather the verb designing and gaining knowledge are intertwined and co-evolve. Much of design knowledge is thus connected with learning, getting to know, and becoming while making sense of things. It is sensemaking materializing when being visualized, concretized and embodied while being discussed in various interactions and encounters between actors. One may suggest it to create a way of knowing and "encounters of the third kind". Krippendorff´s (1989, 9) famous statement confirms: "design is making sense (of things)".

3. RESEARCH QUESTIONS

The dissertation seeks to make sense of the idea of organization and strategy in the context of design and interdisciplinary scholarship. It seeks alternatives to mainstream positivist assumptions.

The main research question is:
RQ: How might design managers and the theories of design influence the idea of organization and its strategic direction?

Each sub-study addresses the main research question from a different perspective as follows.

Sub-study I:
How might design perspectives contribute to an interdisciplinary theoretical understanding of a strategic design space?
Sub-study I uses theory elaboration for gaining an interdisciplinary overview of theories concerning streams of design and organization and management studies. Sensemaking, strategizing and design formed the basis for the suggested preliminary Model of Positive Strategic Sensemaking for Meaningfulness.

Sub-study II:
What are the kinds of language and their potential influence in the design space used by design managers embedded in industrial strategic contexts?
Sub-study II focuses on the language use of design managers and how cues and frames present in language and tradition may influence sensemaking and strategizing. This sub-study uses hermeneutics and reflexivity by exploring normalizing and denormalizing aspects of design managers´ language use and contrasts it to ideas of managerial and strategic language, including a critical perspective.

Sub-study III:
RQ1: What kind of harmful consequences should be considered when designing in connection with information technology (IT)?
and:
RQ2: How might designers in the digital design environment support organisational sensemaking towards the creation of transparency and more meaningful decisions?

Sub-study III discusses potential harmful consequences of design, strategies and organizational decision-making by using the IT field as an example. The scope of the design space is expanded by suggesting four paths towards transparency and sustainability drawn from selected literature. By using hermeneutics and reflexivity, present and absent themes in design manager interviews were analysed, including a critical perspective.

The three sub-studies are described in Table 1. Sensemaking perspectives were present throughout the research process supported by other approaches.

Table 1. Research questions, sub-studies, articles, data collection and analysis methods.

Research questions	Sub-study	Article	Data collection method	Analysis method
How can design perspectives contribute to an interdisciplinary theoretical understanding of a strategic design space?	I	Pääkkönen, T., Miettinen, S., & Sarantou, M. (2019). A Model of Positive Strategic Sensemaking for Meaningfulness. Conference Proceedings of the Academy for Design Innovation Management, 2(1), 710–721. https://doi.org/10.33114/adim.2019.03.217	Traditional literature review: scoping review (Jesson, Matheson, & Lacey, 2011)	Theory triangulation, theory elalaboration, sensemaking.
What are the kinds of language (and their potential influence) in the design space used by design managers embedded in industrial strategic contexts?	II	Pääkkönen, T., Sarantou, M. & Miettinen, S. (2020). Design Languages in the Design Space: Silicon Valley. Proceedings of DRS 2020 International Conference: Synergy. S. Boess, M. Cheung and R. Cain (eds.). Vol 1, 4–22. https://doi.org/10.21606/drs.2020.148	In-depth interviews (N=16) with a UX workshop recording	Qualitative analysis: hermeneutics and reflexivity, (critical) sensemaking
RQ1: What kind of harmful consequences should be considered when designing in connection with information technology (IT)? RQ2: How might designers in the digital design environment support organisational sensemaking towards the creation of transparency and more meaningful decisions?	III	Pääkkönen, T., Sarantou, M. & Miettinen, S. (2020). Meaning Innovations with Design Support: Towards Transparency and Sustainability in the IT field. The 22nd dmi: Academic Design Management Conference Proceedings, 741–752. Design Management Institute, MA: USA.	In-depth interviews (N=16) with a UX workshop recording	Qualitative analysis: hermeneutics and reflexivity, (critical) sensemaking

4. PHILOSOPHICAL AND METHODOLOGICAL CONSIDERATIONS

In the following, the chapter starts with the Philosophical underpinnings (4.1.) and Methodological considerations (4.2.) including sensemaking as an umbrella frame for the three sub-studies. This is followed by Sub-studies and research approaches (4.3.) with descriptions of literature review, theory elaboration as well as hermeneutic analysis and reflexivity.

4.1. Philosophical underpinnings

The nature of assumed reality has consequences for what might be suggested or even claimed to exist in terms of scientific inquiry. The gap between knowledge in the tradition of the natural sciences and in the tradition of cultural sciences was important for Kant (1784–1803), whose ideas later were rediscovered among scholars whose work mostly developed into the direction of the interpretive paradigm (Burrell & Morgan, 1980, 227–235) in the form of neo-Kantian and neo-idealism movements. New methods were created in organizational research. Understanding (verstehen) was regarded as a research method to produce knowledge beyond the limitations of natural sciences (Burrell & Morgan, 1980, 232–233). However, Husserl, originally committed to "rigorous science" ideals, developed his ideas towards phenomenology where the distinction between the subject and the world became diluted: the subject became the source of all objectivities. Attention thus moved away from methods to make place for other approaches to capture what natural sciences neglected.

This dissertation aims to bridge design research, with connections with the interpretive and radical humanism paradigms, and organizational contexts with a stronger tradition in research through the functionalist paradigm. The research is rather a process from preunderstanding towards understanding (Alvesson & Sköldberg, 2018) bridging from more functionalist borderlands of interpretive perspectives towards more subjective realms of interpreting and understanding the phenomena of design in organizational contexts. One might even pose the question whether organizations exist at all (cf. Burrell and Morgan, 1980). Management and designers might hold different conceptions. The author has purposively placed the research on an uncertain terrain by refusing a strict paradigmatic loyalty. As Anttila (1996, 12) has pointed out placing design under one particular paradigm is challenging.

4.1.1. Fusion of horizons

As Gadamer (2004, 17) has explained, verification became the cornerstone of modern science, and with this the method became of paramount importance even when it seemed not sufficient to cope with many of the phenomena qualitative research seeks to understand. Modern science became a technical issue. Many aspects of this dissertation lean on the more interpretivist zones of understanding. Even any quantitative measurement or scale bases on interpretations (Alvesson & Sköldberg, 2018). Instead, to gain at least some understanding one is involved in making sense of what is going on, and seeing through the context of organizations with designers involved in strategizing and organizational action. The research at hand seeks to enable a fusion of horizons (Gadamer, 2004; Malpas, 2018) of a kind by leaning on largely interpretivist approaches through three cycles of sensemaking (Weick, 1995) to address the different issues that the author noticed, paid attention to, and reflected upon to arrive at interpretations which, rather than presenting reality or one truth, invite the reader to a dialogue (Gadamer, 2004, 74–75) which might offer the possibility of new horizons. For Gadamer, understanding involves a process of mediation and dialogue between what is familiar and what is alien in which neither remains unaffected (Malpas, 2018).

The dissertation thus seeks to create dialogue between the interpretive and more functionalist perspectives on phenomena. Research in this respect may afford creativity (Hernes, 2014) with possibilities of what is deemed to make sense and be possible, even in the future. The design perspective affords additionally reflection on the not (yet) existing as an option. The world in which everyday life takes place is the material and the source for designing; the world is the outcome of design.

Knowledge, from the point of view of hermeneutics and phenomenology, appears to be of intuitive kind; truth constitutes an insight or an intuition. For Heidegger, it was important to see things in their context (Umsicht) and hermeneutically to see through (Durchsicht) any distortions that may prevent seeing. Understanding, in Husserl´s view aids in realizing the possibilities of our existence. (Alvesson & Sköldberg, 2018, 148–149.) To design is to reflect on alternative possibilities of pliable futures; in a similar vein, research might, at times, suggest new perspectives. Bohman (1991) asserts that tempering of knowledge occurs through an intersubjective exchange where transcending earlier perspectives by reflecting on them is a possibility (see Alvesson & Sköldberg, 2018, 151). In this dissertation, the author seeks to transcend disciplinary-specific rigidity by positioning herself in the in-betweenness of paradigmatic distinctions. The Gadamerian views have provided inspiration in the hermeneutic direction as explained later in Chapter 4.3.3.

4.1.2. Language and dialogue

For Gadamer (2004, 84–86) language forms the context in which all life takes place. Language is not without individual consciousness, neither is it a sum of

individual consciousnesses. Language is not consciously spoken; rather what is said forms the world and the tradition in which we all live. Language is meant to have a conversational partner. Therefore, language does not belong to the sphere of I, but it belongs to the sphere of we. Language thus combines I and you (cf. Buber, 1923/1999) and each language has its own spirit. Gadamer continues by explaining language as play, where what is said and answered play with each other. Internally, Gadamer points out, speech continues when the soul speaks with itself (Gadamer, 2004, 86–87). Language is all encompassing, it forms an open and endless space, where the never-ending conversation continues. As to meaning, there is a direction of meaning, as one can find in a translation, which is not a literal copy of its original. From this Gadamerian perspective, language is the core of existence, the space of mutual life and increasing understanding. It is just as important as the air that we breath in and out.

In this dissertation, the author seeks to understand the designer as someone willing to enter a dialogue with the other, often by means of designerly ways of knowing (Cross, 2001). Bohm (2003) explains how an artist, similar to what takes place in a conversation between two people, expresses something similar to, but not quite, what he first had in mind. The artist moves on by comparing what was created and how it was different from the original idea. Bohm continues by stating that "something new is continually created that is common to the artist and to the material on which he is working" (Bohm, 2003, 3). This dialogical relationship thus extends beyond human-human relations to materials with which the designer, collectively with others, might work. The aim, for Bohm (2003), is dialogue, which, for him, is the way to become aware of basic assumptions that people tend to have. From this perspective, shared meaning "is the cement that holds society together" and Bohm finds that the cement of his time was of poor quality. He considers collective consciousness to be fragmented due to the human nature of thoughts controlling what is perceived as real. Yet, Bohm (2003, 95) asserts that "the possibility of the transformation of consciousness, both individually and collectively...the ability to dialogue, the ability to participate in communication – is crucial. ". Elsewhere, Lockwood (2017) has expressed a similar idea of design as glue that brings the siloed parts of an organization together. Design is interdisciplinary (Cross, 2001; Simon, 1969) and involved in the making of worlds (Buchanan, 2015).

4.1.3. Social constructionism

The dissertation partly aligns with the ideas of social constructionism (Berger & Luckmann, 1966). Social constructionism can be depicted as a broad and multi-faceted philosophy of science that has emerged as an alternative to positivism and neorealism (Alvesson & Sköldberg, 2018, 29). Social constructionism offers another perspective instead of the production of true and objective knowledge believed to be found in empirical data mirroring the truth about reality. It views social reality

as not external to the consciousness and language of people. (Alvesson & Sköldberg, 2018, 14.) Berger and Luckmann (1966, 27) refer to "the fabric of meanings without which no society could exist". The individual, for Husserl, constitutes a node in a net of meanings, which then forms his or her world, lifeworld (Alvesson & Sköldberg, 2018, 149). Berger and Luckmann (1966) suggest that society is built up by activity that expresses subjective meaning. Society from that perspective consists of objective facticity on the one hand, and subjective meaning, on the other hand. However, subjective meanings may be latent or tacit (cf. Polanyi, 1966).

Berger and Luckmann (1966, 34) admit that they cannot completely by-pass the philosophical problem, the foundations on which data is built. For the authors, "the objectivations of subjective processes (and meanings)" construct "the intersubjective common-sense world". Consequently, the phenomenological analysis of everyday life, or rather of the subjective experience of everyday life, refrains from any causal or genetic hypotheses, as well as from assertions about the ontological status of the phenomena analysed (Berger & Luckmann, 1966, 34), a feature that has been criticized.

This everyday life becomes normal and self-evident and it leads to the *natural attitude* in the subject, thus the everyday life phenomena appear objectified, are imposed on the subject who is then intensely activated by them. From this perspective "the reality of everyday life appears already objectified, that is, constituted by an order of objects that have been designated as objects before my appearance on the scene". Language provides necessary objectifications and order to make sense through which everyday life gains meaning for the subject. The "here and now" presence is the dominating and closest zone of experience. The subject's interest in the far zones is less intense and less urgent. The geographic coordination is one aspect, yet other realities exist when the authors explain: "I experience everyday life in terms of differing degrees of closeness and remoteness, both spatially and temporally" (Berger & Luckmann, 1966, 34–36). This dissertation borrows these ideas and develops understandings on a design space consisting of different aspects, that the designer views as realities and as material for making things and making sense, often for others or with others.

In the context of designers' everyday lives, the natural attitude is assumed in this research to be conveyed in language that has become a normal part of the designers' expression. Even the embodied, material and other non-verbal aspects of their designing are, out of necessity, at least to some extent, translated into verbal language when designers explain, and make sense of their organizational existence.

To bridge the interdisciplinary gap, with the aim of discovering new horizons through a dialogue, sensemaking makes sense. In this dissertation theories often form the conversation partner with the author. The dissertation itself becomes a dialogue.

4.1.4. The author´s sensemaking position

Empirical material and theories are cues for the author´s sensemaking cycles that have led to writing the three sub-studies in this dissertation. On the one hand, the author tries to understand how the design managers make sense of their organizational lives. On the other hand, the author is making sense of the broader industrial and organizational context and assumptions behind and beyond the design managers´ situation. The author´s philosophical mind seeks to continue thinking where, following Arendt´s line of thought, science tends to produce answers and then stop (Himanka, 2002, 25). It is the answers that create new doubts. A doubtful attitude towards one´s own findings during a longitudinal research process is both fruitful and necessary for avoiding self-evident and surface level interpretations. Sensemaking is triggered when something unusual or ambiguous is noticed (Weick, 2011). Becoming acquainted with Weick´s sometimes confusing work has been an ongoing journey itself enriched with other perspectives. Detecting surprises and a doubtful attitude have led to an iterative approach in which the data has been observed from different stances. A journey from preunderstandings towards understanding involves the sensemaker´s own identity construction (Weick, 1995), as well. Alethic hermeneutics encompasses the interpreting subject, the author, as part of the whole; there is a connection between preunderstanding and understanding (cf. Alvesson & Sköldberg, 2018) evolving during and between the three sub-studies.

Iteration enables flexibility, reflexive and creative rigour (cf. Alvesson & Sköldberg, 2018; Hernes, 2014) during the research journey. Iteration is what a designer often utilizes when designing; the research is being modified underway. Here, the author, although not a designer in a conventional sense, advances through reflecting, doubting, and reframing perspectives. As Berger and Luckmann (1966, 14) propose, the philosopher is professionally obligated to take nothing as granted. In the initial stages (pre-understandings) there was a commonly assumed search for designers´ strategic value, such as the advantage they might bring to a successful business. However, although a possible direction to take, this may have resulted in reproducing some beliefs and assumptions that are not novel, representing rather the natural attitude, however desirable they may be for both the design and management communities. Later, the philosophical doubt thus lays the foundation on which the research proceeds. Rather than producing scientific "facts", there was the need to reflect on the deeper meaning, broader consequences or contexts of some interpretations or perceptions, thus frames that have become everyday organizational language and life depicting "facts" (cf. Alvesson & Sköldberg, 2018; Cunliffe, 2009).

The author´s own sensemaking has been triggered by the discrepant understandings of design, designers and businesses. Much the way Cunliffe (2009) reflects on her teaching from the perspective of critical management, philosophy and ethics, the twenty years in higher education in business and across other disciplines

have created the need for the author´s own interdisciplinary sensemaking: what makes sense, for whom or why? The author additionally has a personal attraction to understanding past, current and future designers, having some personal affiliation and an urge to do basic research in this direction. Critical reflexivity encourages organizational members to question assumptions and actions and the impact on the organization and the community at large (Cunliffe, 2009). Concerning self-reflexivity, this dissertation may shape but is also shaped by social experience and involves a dialogue-with-self about personal fundamental assumptions, values, and ways of interacting (cf. Cunliffe, 2009). Whether, for example, technology contributes to a good life (van den Hoven, 2007) or causes harm is one of the conversations that second-order understanding (second-order cybernetics) deems as necessary (Dubberly & Pangaro, 2015; Krippendorff, 2007). By broader framing (van der Bijl-Brouwer and Dorst, 2017), a more holistic understanding may become possible. This strive for a second-order understanding, beyond recipes for successful design tools, systems or managerial goals, has led to asking what for the author seem more relevant questions about professional and organizational beliefs, including one´s own. Individual or collective taken-for-granted "facts" or frames, such as "the innovation imperative", at times, puzzle the author and an effort to see through them (Durchsicht) is made. Therefore, what the design managers themselves have expressed become interpretations made sense of in a broader context. The methodological consequences of this will be discussed next.

4.2. Methodological considerations

4.2.1. The three cycles of sensemaking

The overarching research design consists of three cycles of sensemaking, each presented in one of the sub-studies. A sensemaking frame has been suggested as a general framework for understanding organizational phenomena, although it can be used as an analytical tool (Aromaa, Eriksson, Helms Mills, Hiltunen, Lammassaari, & Mills, 2019; Helms Mills, Thurlow and Mills, 2010). In this dissertation, the author has used the term rather as an umbrella concept for the three cycles of sensemaking which were not mutually exclusive and partly co-evolved. These can be related to reflexivity; reflexive research can consist of different sub-projects each taking a different perspective (Alvesson & Sköldberg, 2018, 394).

Helms Mills and others (2010) have enriched Weickian sensemaking by adding more critical perspectives (Aromaa et al.,2019; Helms Mills et al., 2010). This dissertation has traits of both streams, and other perspectives. Some aspects of the framework serve as a critical lens to enrich theoretical discussions (Aromaa et al., 2019) on strategy and design relations. In papers enriching theoretical viewpoints, the focus has been on researchers' rather than participants' CSM.

(Aromaa & al., 2019.) Maitlis and Christianson (2014) further identify and suggest an emergent focus on the embodied nature of sensemaking and work related to sociomateriality and sensemaking. *Sub-study I* uses sensemaking for combining strategy and design perspectives while challenging a siloed view on separated organizational functions. *Sub-study II* studies the role of language and frames influencing participants´ sensemaking. *Sub-study III* takes a more critical approach and broadens the scope of sensemaking. Design research does not aim at establishing the truth but suggests changes in things that could be improved (cf. Fallman 2008; Simon, 1969).

The roots of sensemaking can be traced back to the early twentieth century; Maitlis and Cristianson (2014) identify Dewey (1922) and James (1890) as the founding fathers, likewise important for design research. There is no single theory of sensemaking although sensemaking has pervaded much of the organizational literature. Moreover, there is considerable variation in its use. Some speak of Weick's "sensemaking framework", often referring to its seven properties of sensemaking. (Maitlis & Christianson, 2014; Weick, 1995.) Weick (1995), as Aromaa et al. (2019, 357) summarize, "sets out a series of social-psychological properties that allow the researcher to understand how organizational reality is produced as an outcome of individual (and collective) sensemaking. The properties include the identity construction of the sensemaker; the cues that people draw on to enact a particular sense of a situation by making sensemaking utterances plausible; and the retrospective (attaching a sense to something after the event), ongoing (feeling the need to constantly make sense of the environment) and social (drawing on the relevant sensemaking of others) influences on how sense is made." Maitlis and Christianson (2014), building on work of others, define sensemaking as: "a process, prompted by violated expectations, that involves attending to and bracketing cues in the environment, creating intersubjective meaning through cycles of interpretation and action, and thereby enacting a more ordered environment from which further cues can be drawn." (Maitlis and Christianson, 2014, 67). The sensemakers are thus involved in reframing and making the world of which they make sense much the way designers design and, consequently, the world becomes that of which further sense is made.

The Weickian sensemaking frame works as an overarching background of this longitudinal research. Each sensemaking cycle moves in iterations as sensemaking is continuous. Sensemaking occurs while trying to understand what prior research has to say and current analysis suggests. It pays attention to "sufficient cues" (Weick, 1995, 42) and discusses frames among organizational actors. Sensemaking is contextual. An individual experience can be viewed as being grounded in the context of pre-existing rules that influence the way a situation is viewed: Helms Mills (2003) suggested that structural and discursive factors or power may influence sensemaking. Without using all the seven elements of Weick´s sensemaking properties in each of

the articles and all the time, critical and other sensemaking aspects nevertheless are recognized in the author´s efforts of making sense of the issues central to the design managers´ situation.

Cues and frames, ongoing social interaction as well as context and power are the underlying recurring perspectives in the sub-studies. These are enriched with other perspectives. On one level of sensemaking, the author thus aims to make sense of the evolving nature of the design manager´s situation, the designers holding managerial positions in Silicon Valley´s organizational settings. On another level, the author is also making sense of the evasive and opaque idea of organization (cf. Weick, 2011). Therefore, the situated micro-level understandings of individual designers and their work context are, at times, interwoven with higher macro level considerations possibly influencing the designers and vice versa.

On an individual participant level of sensemaking, the research aims at understanding how the designers in managerial lives themselves make sense of their situated professional issues. The former is then combined, through reflexivity (Alvesson & Sköldberg, 2018) and iteration, with a selection of theoretical insights from sensemaking, strategy-related organization and management literature and research on design.

Each cycle of sensemaking in the three sub-studies takes a stance: as Schön (1983) puts it, also researchers can, as professionals, make moves, take a stance and reframe issues. The attention to and reframing (cf. Dorst, 2011; Van der Bijl-Brouwer and Dorst, 2017) of contextual issues is a recurring theme. Harley and Cornelissen (2020) suggest understanding rigour as something that is established in and through a researcher's reasoning processes. Sensemaking in this research has affinity with such reasoning.

By suggesting the idea of sensemaking in the design space, without defining it strictly, allows one to develop the idea of an interdisciplinary sensemaking space in which new understandings could be cultivated between micro and macro levels, and across disciplinary (sub)fields (cf. Alvesson & Sköldberg, 2018).

4.2.2. Argumentation of methodological choices

This research avoids rather positivist well-adopted orientations such as the Eisenhardt method (1989, 546) aiming at testable hypotheses and theory which could be generalizable across settings. The dissertation at hand does not aim at generalizations or presenting and testing hypotheses. Searching for "factual" data, as Langley & Abdallah (2011, 116) put it, does not align with the philosophical assumptions discussed earlier. Neither was case study research (Yin, 2009) chosen, aiming at replication through verification and elaboration of theoretical relationships developed from previous cases. While well-respected and widely adopted, these approaches might lead to a template-type of orientation (Harley & Cornelissen, 2020; Langley & Abdallah, 2011). This research avoided ´fixing´ results by forcing

reality into categories (cf. Hernes, 2014). Grounded theory methodology has been criticized for decontextualization (Langley and Abdallah, 2011, 121–122) due to coding and categorizing. Alvesson and Skölberg, (2018) problematize the way grounded theory is based on "dataism" and prefer to use the term empirical material to stress that what is said (in an interview) does not necessarily mirror the truth (cf. Van de Ven & Poole, 2005).

Langley and Abdallah (2011, 107) pay attention to the nascent "practice turn" and the "discursive turn" in qualitative analysis of strategy processes that merit greater attention and inspired the author. The discursive turn in strategizing (Mantere & Vaara, 2008) served as an inspiration for incorporating multiple viewpoints, and contextual factors, to understand the micro or meso level interactions of actors and connect them with macro level social constructions. This led, however, this research to the use of hermeneutic interpretations (Tomkins & Eatough, 2018) with some critical perspectives. It utilizes the opportunity to examine text in detail as well as studying how texts are used in context (Langley and Abdallah, 2011, 122; Tomkins & Eatough, 2018), thus the cues and frames that lead to or influence such texts and how sense is made. Taking the nature of designing, texts incorporate multiple dimensions beyond pure text, such as action. The focus shifts to why something is said in a particular context, and how power issues or general historical situatedness (Malpas, 2018, para 3) may become produced or reproduced (Helms Mills et al., 2010; Knights and Morgan, 1991).

Participation in doctoral organization and management theory courses enhanced the author´s insights and ability to incorporate diverse perspectives. Critical theory approaches have not reached design management research in great numbers (cf. Johansson and Woodilla, 2017). Hermeneutic approaches contribute to a more critical and reflexive apprehension of design management issues in organizational strategic settings. They may reveal how the designer is part of the business play, as Gadamer might suggest. The question is not as much about design methods as it is about *why* and *to which end* they might be used, even unintentionally.

Monological research leading to single-voiced versions of events has been criticized (Boje, 2001, 9). The way the researcher chooses to make sense and articulates issues capturing organizational phenomena may give direction to future changes and interpretations (Buchanan & Dawson, 2007). Although this research is not about process theories it aims to offer "meta-theoretical perspectives, which do not directly generate hypotheses, but which might provide, instead, lenses which reveal "the contextualized, complex, iterative and politicized nature" (Buchanan and Dawson, 2007, 683) of design, instead of a single perspective. Buchanan and Dawson (2007) distinguish consensus and dissensus with respect to dominant social discourses. For them, interpretative discourse regards individuals in sensemaking, as engaged participants and co-creators of social structures, and is based on ethnographic and hermeneutic methods designed to establish local meanings and interpretations,

grounded in social and organizational practices. Conflicting accounts are given attention as there is no one correct account. Although this dissertation is not focused on change and process research in the way Buchanan and Dawson (2007) explain (by using episodes, sequences and narratives), sensemaking and reflexivity (Alvesson & Sköldberg, 2018) are used for incorporating aspects of contextual and multiple perspectives. Research may even reveal attempts "to frame, plot, manipulate and direct" participant action "along the preferred trajectories of competing narrators" (cf. Buchanan and Dawson, 2007, 683). The sub-studies contribute to a more critical and reflexive apprehension of design management issues in organizational strategic settings that form an evolving phenomenon.

Too normative of an approach might have led to a limited view. As this dissertation seeks a longer term pluralistic understanding of what organizations and designers are up to, a partly critical approach is necessary for incorporating multiple understandings and uncovering discrepancies and similarities in the basic assumptions between design and business related thinking. This dissertation uses literature review, theory elaboration and hermeneutics with reflexivity as discussion partners with empirical material. Thus, triangulation is reached by multiple theories and methodologies (Denzin, 1978, 292).

4.2.3. Data considerations

Relationship to "data" is discussed by Alvesson & Sköldberg (2018) who prefer to refer to "empirical material" when reality and its representation through research is discussed. Without rejecting "empiricism" totally, the authors seek to openly consider the doubts that traditional science of positivism produces as facts out of data that is assumed to represent reality. These facts might then be utilized for generalizations and theory-building. This dissertation rather seeks to stay open to a broader conception of reality, which combines the inspiration from the philosophy of science with empirical material (Alvesson & Sköldberg, 2018, 1–3). In doing so, this dissertation diverts from mainstream conventional and more secure positions. Empirical material has served rather as an inspiration for thinking which has driven this dissertation further. Perhaps a more comprehensive and different view on reality can be reached. However, Bohm (2003) admits: the fact is that we cannot see the fact. Rather, there is the hope of capturing something that is worth noticing and bracketing (Weick, 2011; Stigliani & Ravasi, 2012) and thus triggers sensemaking.

The longitudinal research focuses on experienced professional designers in middle or senior management positions in companies ranging from large technology driven international manufacturers to some specialized renowned design consultancies. The participants represent a range of design disciplines linked to fields such as service design, interaction, industrial, graphic, HCI, UX and experience design. The interviews in the respective organizations took place between 2013 and 2016 in Silicon Valley.

The in-depth interviews (Johnson, 2002) were conducted during benchmarking visits to professional designers holding middle or senior managerial positions in Silicon Valley-based organisations (Table 1). Most of the interview participants worked with or within large technology-driven international manufacturers or design consultancies. The term 'design manager' or 'designer' refers to these participants who had 10 to 20 years of experience. Snowball sampling (Saunders & Townsend, 2018) was utilised through existing University of Lapland's networks and partners who, in turn, provided access to sufficient relevant contacts in Silicon Valley. The participants were selected from organisations that had acknowledged a role for design in their innovation processes.

Table 2. Interviews from 2013 to 2016.

Code organisation field	Position	Date
C1 design consultancy	Design Manager	17.10.2013
C2 Design consultancy	Head of Operations	26.4.2016
	Lead Designer	26.4.2016
S1 Start-up healthcare	Service Design Lead	17.10.2013
S2 Start-up IT	Chief Design Officer	25.4.2016
IT1 Information technology	Senior Design Manager	26.4.2016
IT2a	Senior Design Manager	18.10.2013
IT2b	CEO	18.4.2016
IT3	Senior Design Researcher	28.4.2016
IT4a	Innovation Lead, Design Strategist	16.10.2013
IT4b	Principal XD Researcher	27.4.2016
IT5	Strategic Project Director	25.4.2016
IT6	Design Researcher	25.4.2016
IT7	Designer	23.6.2016
M Manufacturing	Innovation Manager	23.6.2016
E Education	Design Lead	02.05.2015
U UX analysis workshop, manufacturing	Head of UX Design	02.05.2015

Altogether, 16 interviews between the years 2013 and 2016 with one analysis workshop form the data covering various domains such as service, interaction, industrial, graphic, HCI, UX and experience design. These interviews form a corpus

of secondary data being data collected by others or some time ago, perhaps for a different purpose (Tight, 2019). Primary data collected by the researcher personally or, as in this research, by other researchers can become secondary data if it is analyzed later (Tight 2019).

Heaton defines secondary (data) analysis as "a research strategy making use of pre-existing quantitative or qualitative data for the purposes of investigating new questions or verifying prior studies" (Heaton, 2004, 16, as cited in Tight, 2019). Secondary qualitative data analysis when taken manually, as in this research, is time consuming. On the other hand, time is saved as collecting the data by conducting interviews and transcribing them into text have been carried out earlier (Tight, 2019). Secondary data, when available, is a feasible alternative for a researcher with limited budget or time and Tight (2019) recommends the use of secondary data when possible. In his view, there are more advantages than disadvantages. Other researchers may have noticed issues that the author might have neglected.

Formal data sharing occurs when the researcher accesses datasets in institutional archives, re-using the data for analysis (Heaton, 2004, 2008, as cited in Tight, 2019). Such data are likely to be well-archived for documentary purposes meeting ethical and legal requirements for sharing with other researchers (Tight, 2019). Although qualitative secondary data analysis is rather seldom utilized in social sciences Tight (2019) finds it useful suggesting that there is little if any difference between secondary data analysis and documentary analysis. The approaches taken in this dissertation will be discussed under Chapter 4.3.

The author had full access to the recordings and the transcribed interviews in the archives of the University of Lapland. The participants and organizations have been anonymized for the purposes of this dissertation. The participants had given their informed consent for utilization of the interview data for research and publication purposes. The University of Lapland carried out the formal data protection processes and the author of this dissertation was not involved at the time. A user experience analysis workshop recording enabled following how the participants of the benchmarking visits together discuss the observations made during their activities and can be viewed as a form of investigator triangulation (Berg, 2001, 4–5; Denzin, 1978). In addition, the author has been able to clarify issues in conversations with Professor Miettinen whose research visits to Silicon Valley in 2013 and, later, as visiting professor between 2015 and 2016, made data collection possible. Business Finland (former Tekes) funded the projects MediPro (2012–2013), HumanSee (2015–2016) and N4S (2014–2017) enabling the data collection with the research group.

The author has been able to start the analysis of the empirical data from a "tabula rasa" in the sense that the author has had no involvement in the funding process nor in the progress of the interviews at the time they were conducted. This causes both limitations and advantages. In the interview situations, triangulation (Berg,

2001, 4–5; Denzin, 1978) of researchers including University of Lapland Faculty of Art and Design staff and doctoral students offers potential for a richer insight in the issues at hand; most interviews were conducted in group format, including two university members. The author of this dissertation has not been able to steer the research questions at the time the interviews were conducted. Rather, the interviews served as triggers for further sensemaking and elaboration of theoretical insights instead of being used for verifying "facts" (Alvesson & Sköldberg, 2018).

The author had an opportunity to take a more neutral stance compared to situations in which the presence and background of the researcher influences the whole research design. Now the subjective influence of the author has been limited to the following steps of the analysis of the interviews, not the situations themselves. However, the aims and contexts of the interviews were given in the sense that the author has not been able to ask further questions in situ. Originally, the opportunity to ask more specifically about the issues important in this dissertation was planned to be carried out in October 2020. However, this proved impossible due to the global pandemic although some of the interview participants were contacted during March 2020.

4.3. Sub-studies and research approaches

4.3.1. Literature review

The term literature review is ambiguous, and as a method in its infancy (Jesson, Matheson, & Lacey, 2011). As this dissertation uses a relatively large body of literature underpinning the articles, it is worth considering the use of various streams of literature. However, the author does not consider literature review a method in the strict more recent sense of the term. Instead, the literature is used for an interdisciplinary triangulation (Alvesson & Sköldberg, 2018; Denzin, 1978).

This dissertation is based on literature review in the more traditional mode. Jesson et al. (2011) make a distinction between systematic and traditional literature reviews. A traditional review usually adopts a critical approach and it is possible to conduct in many ways. A scoping review (Jesson et al., 2011, 14–15) is one of the traditional literature review modes and was conducted for the needs of this dissertation. A systematic literature review was not chosen due to the strict selection processes forcing systematic inclusion and exclusion with the aim of arriving at the state-of-the-art type of outcomes in one particular subject field. Further, the term ´design´ is extremely general and vague due to high variety of different subject domains using it, thus making it difficult to limit the number of results in scientific database searches through subject terms, abstracts or titles. For each sub-study, relevant sufficient literature across the domains it concerned was scoped.

A scoping review often sets the scene for a new research agenda. It can often use critical analysis for finding a gap in the knowledge, help to refine the research questions, concepts and theories and point the way to future research (Jesson et al., 2011, 14–15). However, gap-spotting, (Alvesson & Sandberg, 2013) is not the only way of exploring possibilities for interesting research. Identifying alternative theoretical stances is another opportunity, although demanding regarding the extent of readings required to understand another field than one´s own. The author has been involved in theory exploration, a creative rather than a systematic approach, in which intuition and *overlapping areas of interest in the fields of design research and organization and management studies with an interest in strategies*, including critical insights, become interwoven. A guiding principle, after initially interesting perspectives and theories, has been the emergent nature described in some theories: strategy as emergent, designing and sensemaking, all three in the chosen theoretical perspectives, share the idea of an open development which the author found to have ”theoretical and empirical fit”. Moreover, organizational becoming (Tsoukas and Chia, 2002) was found to be in alignment with these three domains. From the point of view of ”aesthetics”, there was some beauty in the alignment of such seemingly discrepant theories next to the intuitive assumption or recognition that they contained similarities. There seemed to be one phenomenon behind these different theories. This led to writing sub-study I and later emerges as the more visible use of the concept of design space as a site and mode of broader sensemaking beyond local interpretations.

The scoping review is ”based on personal selection because the writer believes that the original authors have a contribution to make to current knowledge” (Jesson et al. 2011, 15). In this dissertation, as Jesson et al. (2011, 15), describe, the author ”weaves those contributions together in a logical systematic way to develop an argument or tell a story.” However, they warn that this approach offers the scope to be reflective, but it may produce a one-sided or biased argument. However, one of its advantages is that it provides insights that can be neglected or passed over in the steps towards exclusion and quality control that are required in systematic literature reviews (Jesson et al. 2011). Rather than building an argument solely on the basis of literature reviews, this dissertation has used the literature for building an interdisciplinary area of understanding organizations from a somewhat novel perspective (and even avoids the term organizations when possible). Literature review is a discussion partner for the issues that one comes by in empirical material. In the following, some examples of theories that were considered (and rejected) or provided inspiration for this dissertation are mentioned.

4.3.2. Theory elaboration
Sub-study I uses theory elaboration (Lee, Mitchell, & Sablynski, 1999) to ground the literature of the dissertation through a reframing effort. Several authors have

mitigated the claims of building new theory by legitimating their research methods as "theory elaboration" rather than "theory development" (Langley & Abdallah, 2011; Lee et al. 1999). This seems to be "a more realistic and yet valuable research enterprise, because it involves explicitly building on previous work while developing it in new directions" (Langley and Abdallah, 116). Fisher and Aguinis (2017, 455) refer to horizontal theory borrowing as a form of theory elaboration, in which an existing theory can be adapted in new contexts by crossing disciplinary fields, as suggested in sub-study I. Alvesson and Sandberg further refer to dialectical interrogation when recognizing the home theoretical stance and alternative theoretical stances that together form the literature domain behind research questions (Alvesson and Sandberg, 2013, 49). In this dissertation, the literature used is interdisciplinary and yields possibilities for supplementary as well as contrasting viewpoints for further elaboration across the domains of designing, sensemaking and (aspects of) organization and management studies. Instead of speaking of a home theoretical stance, this dissertation rather has been occupied with triangulation (Denzin, 1978) of three rather separated theoretical areas.

In the beginning, the idea of design space was not very clear. Nevertheless, the Model of Positive Strategic Sensemaking for Meaningfulness (2019) does merge areas of separated research streams as one phenomenon in an effort to reflect on what is going on in organizational life when design is involved in design-driven organizations. Management research faces fragmentation and lack of novelty which could be alleviated through theory elaboration (Fisher and Aguinis, 2017; Hernes, 2014). Inevitably, due to the vast array of different streams of research in design, management and organization research making choices was difficult. Another guiding principle has been to look for strategy-related research that would show alignment with design involvement which has become popular in organizations that claim to be design-driven. While some depth of scholarship is lost in an interdisciplinary pursuit, some gains are made through broader and novel insights and more creativity (Alvesson & Sköldberg, 2018) enabled through reading and combining overlapping areas of mutual interest. Theory elaboration supported moving on to sub-studies II and III.

4.3.3. Hermeneutics and reflexivity

Hermeneutics can be applied in many ways and has its roots in the interpretation of texts. The hermeneutic circle refers to the mutual interdependence of the part for understanding the whole. One cannot do without the other. (Crotty, 1998; see Alvesson & Sköldberg, 2018.) Different interpretations of the phenomenon under investigation (in this case design managers and their context) are brought together through dialogue to produce a "fusion of horizons" (Malpas, 2018; see Paterson & Higgs, 2005, 343). Knowledge is constructed through a dialogue with the text. "The researcher becomes part of this circle moving repeatedly between

interpretations of parts of the text and interpretations of the whole text, representing an emerging understanding of the phenomenon" (Paterson & Higgs, 2005, 343). The empirical part and the theories support each other for gaining a more holistic understanding.

The research starts at one point and "delves further and further in the matter by alternating between part and whole" bringing about progressively deeper understanding on both towards transformation to solve a contradiction between parts and whole (Alvesson & Sköldberg, 2018, 116–117). Hermeneutics with its tradition of understanding differs from explanation-oriented scientific theorizing. Yet, Riceur´s ´hermeneutic arc´ oscillated between scientific explanation and humanistic understanding merging both (Alvesson & Sköldberg, 2018, 116–117; Thompson, 1981). Alethic hermeneutics uses a circle between *pre-understanding and understanding* and aims at disclosing something instead of verifying. The common trait of the hermeneutic circles, which can be many, is that "they present a processual, dialectic solution, alternating between the poles in contradiction...by successive acrobatic jumps" between the poles (Alvesson & Sköldberg, 2018, 117). Such interpretations of polarities are proposed in the research on denormalizing and normalizing language in sub-study II.

Empathy and intuition have been linked with hermeneutics. With the help of imagination, one might even try to put oneself in the agent´s place. As understanding cannot be reached through reason, intuition is needed. Alvesson and Sköldberg (2018, 118) continue:

"In sofar as this empathy is complemented by the interpreter´s *broader or at least different stock of knowledge*, it is even possible – and this constitutes one of the main theses of hermeneutics – for interpreters to understand agents better than the agents understand themselves". (Italics by the author of this dissertation).

The researcher is historically bound in context, there is never a tabula rasa in this sense. The same empirical material and theories could have led to a different result with different vocabularies, had the research been produced in another faculty, time or context. Personal frames (Alvesson & Sköldberg, 2018, 133) matter, for example, in the selection of the problem definition and perspectives. The evasive concept of design space ("the whole") in this dissertation shows the attempts of dealing with framing and reframing in and between the three sub-studies. The dissertation is the product of emerging understanding, much the way a design process might start in the fuzzy front end of product design (cf. Sanders & Stappers, 2008). The goal of the design explorations in the front end is to determine what is to be designed as well as what not to design and manufacture. Understanding is not a linear process, nor a project with a clear end in sight. This dissertation does not seek one static interpretation (Alvesson & Sköldberg, 2018, 169) or objective hermeneutic understanding, its shifting emphases between the sub-studies rather enrich the disclosure of alternative perspectives.

Rules for interpretation are rejected by both the objectivist and alethic school (Alvesson & Sköldberg, 2018, 123) although some methodological principles exist, (see those by Madison (1988, 29–30, as cited in Alvesson & Sköldberg, 2018,122; see Paterson and Higgs, 2005). Nevertheless, the very process of understanding is more important than the result itself (Alvesson & Sköldberg 2018, 123) and the results are perhaps better expressed by speaking of uncovering or discovering, seeing through. For example, by merging harmful consequences of locally designed IT devices with a global context (Sub-study III), new insights become visible. The interpretation is not the only possible one, rather an invitation for the reader to a dialogue (Alvesson & Sköldberg, 2018, 132.) But prior to this, the researcher has entered a dialogue with the text to be interpreted. Alvesson and Sköldberg (2018, 151) mention "knocking on the text" which does not mean splitting it into parts, as in grounded theory. The text is not the basis for "facts". Asking is more important than answers. The experiences gained during the journey of asking what the text says does not aim at a final answer. Important is the hidden basic question of the text: "what basic unspoken question that lies beneath, and therefore generates" a particular text. (Alvesson & Sköldberg, 2018, 152, italics original). One may ask why the design managers articulated what they did, for example.

Rather than choosing narratives or metaphors, interest in language and its pervasiveness is observed in this research. Hermeneutics is a historically situated approach: "giving of an account that is sensible in the way it addresses current interests and concerns, not a search for timeless and ahistorical laws and formal structures" (Packer, 1985, 1088). It involves "becoming more aware of some of the interests, habits, and practices that form the background against which the phenomena appear and take form" (Packer, 1985, 1089). Packer continues: "The resulting interpretation has the potential to be what Giddens (1976) called "revelatory": It can go beyond what our original, unreflective understanding showed us and also beyond what the agents report they were doing." (Packer, 1985, 1089). Latent underlying issues do not surface at first sight in the interviews. The analysis aims to transcend that which is obvious and normal, such as the expectation that design is to improve the competitiveness and innovativeness of the businesses. The hermeneutics of suspicion, takes a more general, skeptical, distanced and critical view (Riceur, 2006). Alvesson and Sköldberg (2018) find that the bridge-building hermeneutics by Riceur should alternate with a closer, more Gadamerian view of interpreting (Tomkins & Eatough, 2018). In this dissertation, the critical notions are partly derived from critical theory, which is sometimes called critical hermeneutics (Alvesson & Sköldberg, 2018, 173). In this respect, the dissertation has used a variety of sources for inspiration, such as Constantinides, Chiasson, & Introna (2012) whose work reflects on the aims of research in information systems and the possibilities of transformation towards the highest good.

Sub-study II

In Sub-study II, the qualitative analysis (Berg, 2001) of empirical material focused on the language use of design managers. The hermeneutic analysis (Alvesson & Sköldberg, 2018; Tomkins & Eatough, 2018) focused on uncovering features and assumptions in the designers´ language for understanding their historically determined situatedness (Malpas, 2018, para. 3). The analysis, firstly, extracted normalising language conveying ideas behind critical success factors in business (see literature review by Saleh & Watson, 2017, 710–711) and the historically developed strategy concept (Knights & Morgan, 1991). Secondly, the analysis identified denormalizing language use differing from normalizing language; both in verbal forms, and in linguistic-material forms of designers´ language. The hermeneutic approach studies the designer in a mostly commercial-industrial setting in which the situated aspects of not only the interviews, but the general corporate life and its aims, form a background for the way language constitutes the corporate designers´ world, in the Gadamerian sense. Language is thus constitutive of the professional situation of the designers in many ways, leading additionally to some critical questioning as to which ends language might work.

Sub-study III

Sub-study III incorporates qualitative analysis by focusing on latent content (Graneheim, Lindgren & Lundman, 2017) by seeking themes related to potentially harmful consequences of design in the context of information technology (IT). As Packer explains (1985, 1091) hermeneutics also "attends to discrepancies between intended and unintended consequences of action: What we intend when we act is often not what actually happens" due to "unanticipated or ambiguous aspects of a situation" such as local designing which, at times, can lead to global harmful consequences.

Hermeneutics thus encourages deeper interpretations, such as considering presences and absences in the data. The absence and presence of themes in the interviews were suited to a hermeneutic approach; what was said or unsaid, and why, was of interest. The research focused on whether, how and to what extent potentially harmful issues were present or absent in the data and contrasted this with the theoretical insights.

The sub-study discloses what is relatively absent (harmful consequences) and thus, less manifest in business innovation contexts (Sveiby et al., 2012). Resembling Packer´s (1985) analysis, also this sub-study increased sensitivity to the concerns related to the work of design managers. An initial understanding becomes refined and corrected; fresh questions are raised that can be answered only by returning to the material studied and revising the interpretation. Developing a new interpretation will often change the very form of the "facts" we are dealing with. (Packer, 1985, 1091.)

Reflexivity focuses on the context of design in the face of digitalization of human lives and organisational sensemaking in industrial contexts. Sub-study III reframes the domain of IT related designing (parts), by broadening the scope towards issues of transparency and responsibility (whole). It is another step forward in reframing (Dorst, 2011; van der Bijl-Brouwer and Dorst, 2017) the design space by incorporation of potential consequences. By intertwining micro (parts) and macro (whole) levels the article points out not only what seems to be present in the interview data, but also what is not present while important from the point of view of the cultivation of design ethics and responsible organizational decision making. The third cycle of sensemaking then moves towards prompting action, design being a change-oriented discipline aiming at change towards the highest good (cf. Constantinides et al., 2012). Through the three sensemaking cycles in the three sub-studies, the dissertation suggests a more interdisciplinary understanding of sensemaking in the design space, in which both managerial, strategic and design issues form part of organizational becoming. Choosing an interdisciplinary vocabulary across the theoretical fields has been challenging. By taking a more reflexive approach, this research seeks to establish a dialogue between paradigms and disciplines (Gioia & Pitre, 1990).

Reflexivity (Sub-studies I, II, III)
The research has partly utilized ideas of what Alvesson and Sköldberg (2018, 380) refer to as reflexive research. In its R-reflexivity form, the R refers to reconstruction, re-presentation and rethinking, while another D-reflexivity form emphasizes avoidance of problematic things rather than discovering something new. The authors encourage to increase ´reflexive rigour´ and reflexive imagination to work more creatively. This shows resemblance with broader framing (Dorst, 2011; Van der Bijl-Brouwer and Dorst, 2017) as well as ideas supported by Buchanan (2015) and designerly ways of knowing (Cross, 2001). This has turned out to be possible in the current dissertation which started as a more careful attempt to minimize problematic issues. However, progress towards sub-studies II and III shows a more suspicious kind of questioning. In addition, one might find that the ideas of participatory design are manifest in the way the author gives voice to different interpretations. Design managers´ voices in interviews, on the other hand, are creatively combined with other perspectives to broaden the frame with contextual issues. The analysis follows Alvesson and Skölberg (2018, 388–389) in using empirical material such that it encourages critical reflection to challenge or rethink theory. This may even work well for problematizing dominant thinking. In addition, one´s own paradigmatic, political, theoretical, methodological and social predispositions should be self-critically interpreted through a reflexive approach. In sub-study III, the concept of meaning innovation is redefined to encompass a broader critical understanding compared to prevailing understandings in technology innovation research. Mainstream

managerial thinking, including streams of design management, is challenged by treating IT related innovative devices in a broader ethical context.

All the sub-studies utilized some of the ideas by Alvesson and Sköldberg (2018, 331) who suggest four levels of interpretation for reflexive methodology, in which the ability to see different aspects is crucial. These were the following *(example from this research)*:

1.Interaction with empirical material; *(design manager interviews; utilizing empirical material to trigger sensemaking between theories)*

2.Interpretation of the underlying meaning of what was said by the participants; *(setting the interdisciplinary scene for the design space in sub-study I; underlying, latent or absent themes in sub-studies II and III)*

3.Critical Interpretation seeking traces of ideology, power or social reproduction *(language and frames in sub-study II, harmful consequences and decision making in sub-study III)*

4. Reflection on text production and language use which refers to own text, claims to authority, selectivity of the voices represented in the text *(the author's own sensemaking and reflexivity, the choices made; Chapter 4, see also Evaluation and ethical questions in 6.3.)*

The breath and variety of the interpretive repertoire are important aspects the researcher needs to take into account. A dominant theoretical stance can limit creative research possibilities (Alvesson & Sköldberg, 2018, 331–332) and an attempt to avoid this was made.

This dissertation made an attempt to use the surprise potential in the empirical material by not seeking to arrive at a one-dimensional finding based on interview contents mirroring "facts" or only positive outcomes (Alvesson and Sköldberg 2018, 336.) Hermeneutics avoids the subjectivism that could result from building an explanation entirely upon agents' own accounts of their actions (Packer, 2005, 1089). Packer (2005) explains, leaning on Giddens (1976), that the analysis can go beyond what the original, unreflective understanding shows and beyond what the agents report they were doing. Reflexivity is thus part of qualitative research (Lee et al., 1999, 163).

The three sub-studies provide a more interdisciplinary understanding of sensemaking in the design space, in which both managerial, strategic and design issues form part of organizational becoming. While taking a critical stance at times, this is not meant as a criticism to the design or other communities of researchers or practitioners; rather, it is meant as an opportunity to become involved in what is going on, on a second-order level of understanding. In this, the researcher is involved as a co-creator of potential future understandings, not someone defining ethics or any truth above others.

5. TOWARDS UNDERSTANDING THE INTERDISCIPLINARY DESIGN SPACE: STRATEGIZING, LANGUAGE AND POTENTIAL CONSEQUENCES

The three sub-studies below make sense of the main research question from different perspectives. The idea of organization and strategizing is addressed from multiple perspectives related to design involvement in chapter 5.1. Chapter 5.2. explores frames, language and tradition in sensemaking and strategizing in design contexts. Chapter 5.3. addresses potential harmful consequences of design related to organizational becoming and decision-making.

5.1. Design involvement in the evolving strategic design space (Sub-study I)

5.1.1. An emerging understanding of an interdisciplinary design space

Triangulation and elaboration of theoretical insights from the selected fields of design, sensemaking and strategizing led to the construction of a preliminary interdisciplinary Model of Positive Strategic Sensemaking. It is a thinking experiment (Östman, 2005) in which the overarching concept of design space has been developing gradually and was used to gain a more balanced interpretation on what is going on with designers and the organizations with which they are involved as in-house designers or as consultants. The main contribution is to turn the taken-for-granted ideas of organization under reframing by adopting viewpoints on intertwined organizational phenomena, including more than one single-disciplinary interpretation. Sub-study I suggests a step towards capturing design and managing in the context of strategizing. It suggests an iterative ongoing sensemaking among actors through which strategies unfold and can be characterized as emergent rather than planned (cf. Mintzberg, 1987; Mintzberg & Waters, 1985). It questions some of the very assumptions about organizations and their aims; organizations, as such, do not necessarily exist in the sense of positivist managerial and linear thinking, rather they are believed to exist. Thus, another perspective to interpreting phenomena is suggested for further elaboration.

Sub-study I views the actors in a joint design space, including stakeholders and those affected by design outcomes (such as production and its consequences) on a more equal footing. Design is thus not regarded nor articulated as one of the sub-functions in the traditional managerial view of organization in which controlling the production factors such as human workforce, including designers, forms the aim of optimizing financial gains. Rather, a broader landscape of designers´ professional

often positive approach is illuminated leading to a richer understanding of managerial and organizational perspectives. Sub-study I elaborates on disciplinary fields and layers of organizational perspectives in which individual and collective insights coevolve. Organizational issues and theoretical silos become intertwined when design managers "orchestrate" issues across disciplinary fields with other actors while framing and reframing strategic direction towards meaning change. Strategies evolve through social construction among participating actors who, through sensemaking, co-create the actions of which they continuously draw cues for further sensemaking that can be supported by designers. The model avoids linear thinking with fixed endings and entities.

5.1.2. Strategizing in the light of design and critical theory

The research diverts away from the mainstream managerial and design management research such as measuring the efficiency of design for business or innovation purposes (Kotler and Rath, 1984; Norman & Verganti, 2014). Sub-study I shifts the attention towards the responsibility for broader consequences (Alvesson & Willmott, 2012, 30) of the decisions in organizations concerning their meaning for users, employees, citizens and the environment and is linked with Critical Theory (Burrell &Morgan, 1980). Johansson and Woodilla (2017) have encouraged more diversity in the approaches to design management research that this model proposes.

The Model of Positive Strategic Sensemaking views designers as strategic players, as co-strategists, in organizational becoming (Tsoukas & Chia, 2002). Instead of describing a controlled managerial process, the perspective embraces positive aspects of design in meaning exploration. The model builds on prior research which has pointed out that design involvement is becoming more important in addressing strategic questions (Åman, Andersson, & Hobday, 2017; Brown, 2009; de Mozota, 2017; Liedtka, 2015; Muratovski, 2015). However, sub-study I reaches beyond the firm-centric strategic importance of design such as improving user or customer experience, although inclusion of users can be a step towards better user experiences. However, designers may have strategic influence on issues that have consequences for environments, natural resources, society and people in a broader sense. From the point of view of critical management, considering the higher status of designers in managerial positions, not only business opportunities but also potential harmful consequences are to be taken into account (cf. Alvesson & Wilmott, 2012).

By viewing strategizing as a socially constructed evolving phenomenon sub-study I adopts sensemaking as a "glue" to find mutual ground between designing and strategizing. Designers may support or challenge an existing strategic direction resulting in incremental or more radical meaning changes among those affected by, and affecting, the emergence of strategies. There is an ongoing search for cues that are meaningful enough for actors to change course and, at times, challenge an existing strategy or clarify its content. The strategy is in a constant state of

becoming and evolving in an iterative fashion. This preliminary theory elaboration in The Model of Positive Strategic Sensemaking forms a preliminary attempt to link sensemaking, strategizing and streams of design into one interdisciplinary theoretical model.

5.1.3. Material and embodied sensemaking in strategizing

The Model of Positive Strategic Sensemaking is meant to serve as inspiration and insight for further exploration and elaboration for designers; it additionally contributes to sensemaking and strategy research as follows.

Firstly, sensemaking research thus far has seldom addressed the material or embodied aspects of sensemaking (Maitlis & Cristianson, 2014) with rare exceptions (cf. Bakke & Bean, 2006; Stigliani and Ravasi, 2012). In the context of sensemaking supported by design, materiality presents itself in specific design units, creative spaces or labs. Materiality, however, is not limited to such spaces devoted to creative activities. The material and the cognitive are interlaced and can be suggested to form a design space, both mental and material. The material and the embodied are embedded in the social and the cognitive and vice versa. If what Elsbach and Stigliani (2018) suggest is true – design thinking tools supporting the development of the values, norms and assumptions that form an organizational culture – then the impact of design managers on strategizing and organizational becoming can be strong. As co-strategists and facilitators, the dissemination of diverse ideas through design methods has potential power. Such possibility of power requires careful reflection on what is being co-created or disseminated.

Secondly, the model intersects with streams of literature on strategizing supporting the views on emergence and social construction. Strategy can be viewed as situated, socially accomplished activity through the actions and interactions of actors (Vaara & Whittington, 2012). Design managers act as co-strategists by embedding design into organizational and inter-organizational contexts. Spee and Jarzablowski (2011, 1219) reconceptualized strategic planning as a communication process. Design as part of the Model of Positive Strategic Sensemaking, however, is not limited to text and talk (Spee & Jarzablowski, 2011, 1238); it essentially incorporates the rich embodied and material engagement with actors who make sense through strategizing. What emerges on a continuous basis, is a momentary understanding based on selection of cues and frames (Weick, 1995) in reframing, much the way Mintzberg and Waters (1985) speak of strategy as crafting and emergent. Strategizing as a verb and continuous activity enables learning by empowering organizational members to experiment and reinterpret unfolding events. Reframing can be viewed as a central design activity (cf. Dorst, 2015; van der Bijl-Brouwer & Dorst, 2017) supporting strategizing.

The model may inspire new research with other streams of organization and management studies, such as strategy as practice (SAP) or critical management

studies. Understanding interprofessional interactions and reactions to material and embodied forms of sensemaking may be beneficial not only for the design discipline.

5.1.4. Design supporting organizational learning

Although organizational learning as axiomatic can be questioned it is often considered to be beneficial (Argyris, 1999, 9–14). Organizations could benefit from learning about themselves in situated micro-level events, such as through design sprints and other forms of design facilitation. Core assumptions about the meaning of strategies can be connected to broader questions through design supported sensemaking among actors. For example, becoming a service company entails understanding and supporting the crucial role of the employees who provide services to others. Some organizations transform the core of their strategy from being a supplier of home technology towards enhancing health and well-being at home. What begins as a clearly defined design brief for a construction project, becomes game-changing re-branding within an international industry. However, it is not clear whether or how meaning changes addressing customer or user situations might support environmental protection, use of sustainable materials or ethically sound production site conditions and action. Meaningfulness in all its aspects may not be visible or articulated in local and momentary design situations. Yet, designers may use their facilitation and visualization skills for such purposes. Any design stream has the new challenge of coping with broader strategic issues (Buchanan, 2019). Buehring and Bishop (2020) recently suggested that strategic foresight and design can complement each other to improve longer-term forecasting and inform strategic decision making. This is in line with sub-study III which stresses potential harmful consequences as opportunities for designers to make a difference. In a same vein, Dewulf, Klenk, Wyborn and Lemos (2020) suggest the logic of meaningfulness to be taken into consideration in decision-making.

5.1.5. Design space: challenging the basic idea of organization

In sum, sub-study I both borrows from and contributes to the fields of sensemaking and strategizing while bringing design research closer to organization and management studies. The suggested model is a bridging interdisciplinary effort and presents a more balanced theoretical view of organizational activities that avoid descriptions of organizations as fixed entities or categories with clear boundaries and goals. The taken-for-granted idea of organization could be challenged. Dorst (2019), much in line with this dissertation, points out that selection and framing of the very design problem incorporates assumptions that should be questioned regularly; otherwise, adoption of a specific framework (terminology) limits the design space. Sub-study I laid the basis for understanding the evolving interdisciplinary nature of design space

in which sensemaking and action are ongoing. Sub-studies II and III shift from this preliminary understanding towards deeper understanding.

5.2. Language in the design space (Sub-study II)

Sub-study II leans largely on the Gadamerian perspective by suggesting that language is omnipresent and influences the world we live in. Language constitutes what is and what may become. The historical situatedness of language, such as commonly adopted understandings of what words mean, may become self-evident and automatically "true" over time. The second sub-study explores the nature of language among the design managers. Language suggests and passes on cues and frames through which strategizing and designing co-evolve. In the design space, diverse actors are immersed in language and materiality in their ongoing sensemaking.

5.2.1. Normalizing and denormalizing language: in-betweenness

Strategy as a concept and other concepts related to it have become means of getting organizations to win competitions in market battles. Speaking about ideas such as those promoted by critical success factors have become normalizing language that prevails in organizations as a belief system. However, interpretive and critical perspectives on strategizing have come up with several other schools of strategic thinking. Sub-study II juxtaposes the denormalizing language use of design to normalizing language by illuminating the continuous ongoing nature of strategic emergence and its possibilities for changing course or reframing organizational situations and aims. It is this potential of changing course, that aligns with design and management thinking oriented to alternative futures. Yet, the aims of such transformation seem at least opaque. Traditionally, for the design community, the aim of transformation is very much human-centered and clearly towards thinking of making things better for people and the society (cf. Buchanan, 2015; Manzini, 2009; Papanek, 1973; Simon, 1969). Although change is welcomed, the kind of change is a key issue placing the designers in managerial positions under a contradicting in-between position. One might suggest that another traditional managerial idea expressed in normalizing language is the limited view of design as a strategic tool.

A more pluralistic way of thinking of the designers in managerial positions is to suggest they are *hybrid co-strategists* whose professional obligations and ethos alternate between that of the design tradition, aiming at the higher good (Constantinides et al., 2012; cf. Buchanan, 2015) and the expectations laid on them by assumed organizational aims that remain under reframing. This intertwinement of the position of the design managers, referred to as their in-betweenness, is not only about internal tensions between the organizational actors and their aims. There is movement from society and policy making that places organizations under

pressures. The fourth order of design broadens the scope of design from products to systems, environments and organizations (Buchanan, 2015) in which language, in its many forms, influences all action.

5.2.2. The design space of sensemaking: between frame adoption and frame extension

Sub-study II views strategising as ongoing sensemaking in a design space of entangled material–linguistic elaborations influenced by languages and facilitated by designers. It is based on the suggestion that cues are filtered through individual and collective frames (Goffman, 1974) evolving into meanings (cf. Benford & Snow, 2000, 614) not only through concepts but additionally through denormalising design languages. The design space is suggested to entail the phenomenon in which strategising, designing and sensemaking unfold through languages.

The design space of sensemaking entails both normalizing and denormalizing language. Following Weick (2011) sensemaking is based on a cue, a frame and a connection between them, thus causing meanings to be relational and momentary. Language and materiality merge in framing and reframing strategic issues through normalising and denormalising languages. These languages which shape sensemaking can broadly be considered as languages working either towards normalising or denormalising current understandings. Buchanan's (2015) design perspective as an example of ideas behind denormalising language prompts design to advance organizational culture reform movement by including "those who are affected by the internal and external operations of the organization and by those in society at large who are ultimately affected by the vision and strategies of the organization"(Buchanan, 2015, 17). Power, on the other hand, may reside in normalizing language that is taken for granted, such as the understanding of strategy as set from the top of the organization (Knights and Morgan, 1991; cf. Mintzberg, 1987).

The language of design is often intertwined with design approaches and materials beyond verbal expressions. Design languages are rich, produced in situations where design facilitates dialogical interaction (cf. Tsoukas & Dooley, 2011) and the inclusion of participants with social, material and embodied means. It is a productive language open for interpretations and modifications based on iteration. It is potentially powerful in involving people with their bodies, senses and minds that all work towards more intensive participation than with verbal means such as routine meetings with bullet points and speech.

When stakeholders are surprised, sensemaking is triggered (Maitlis & Cristianson, 2014; Weick, 1995). Gadamer (1970/2006, 14) agreed: "So, all efforts at trying to understand something begin when one comes up against something that is strange, challenging, disorienting". A common situated language develops when people seek understanding. Yet, Gadamer argued, human beings are played by the ritual structures of the past (Malpas, 2018). The language of organizations

evolves over time and influences the generations to come. The sensemaking processes of designers entailed traits of using normalising and denormalising language that supported frame adoption or frame extension (cf. Dorst, 2015; van der Bijl-Brouwer & Dorst, 2017) depending on the degree of alignment with or challenging of existing strategies.

5.2.3. Material–linguistic elaboration: the language of designers

The designers used material–linguistic elaborations for sensemaking by involving diverse stakeholders. Beyond the verbal means, the language that the Silicon Valley design managers drew on may be characterised by three features: embodiment and materiality, social interaction and enthusiasm.

Embodiment and materiality occurred by inviting participants, for example, to use their hands, or boundary objects (Carlile, 2002; Hargadon & Sutton, 1997), rapidly co-created (cf. Sanders & Stappers, 2008) for provisional understandings or experiential learning (cf. Elsbach & Stigliani, 2018). Specific spaces were built and modified, and camps for exposing employees to design were organised. Materials might encourage playfulness, crafting and improvising for articulation and reflection. However, much is dependent on the way such events become framed. The strategy frame as usual might entail different premises (Weick, 1995) than an open frame. Early phase premises shape consequent sensemaking.

Design is *social and interactive*, yet aiming at empowerment or transformation. For some design managers, design is a mission to transform others:

"We've always had a philosophy about teaching these new skills, that it needs to be experiential. It needs to be immersive. You need to have gone through the experience in order to be transformed." (Participant IT4a, 2013)

The interviews confirmed the impression of designers' optimism (Brown, 2009; Desmet & Pohlmeyer, 2013; Michlewski, 2008) and *enthusiasm*. However, empathy (Haag & Marsden, 2019; Holmlid et al., 2015) seemed to focus on users and (business) stakeholders. In addition, some designers paid attention to the work conditions of employees.

By taking different stances and reframing (Dorst, 2015; Paton & Dorst, 2011) designers may exercise power by filtering frames and cues, even unconsciously. Design languages stretch beyond dialogical or virtual communication (Baralou, & Tsoukas, 2015) strengthened by *material–linguistic means that may filter or direct attention*. However, all organisational actors may protect occupational or career interests; even identities can be at stake (Carlile, 2002, 446, Carlile, 2004, 556; Orr, 1996). What was specific to the designers in Silicon Valley was the mandate they felt for design, built over decades of business–design cooperation in the area (cf. Katz, 2014) supporting the design community.

5.2.4. Normalising and denormalising verbal language

Five in-between contexts in verbal language were identified in the interviews passing on ideas behind frames.

Strategic language in general

The designers had adopted conventional strategic language in general. They tended to be involved in framing the organisation's strategic future, mediating between a pre-existing strategic frame and potential reframing. Yet, when explaining their ideas, the designers referred to normalised business concepts. Despite the urge to transform and reframe strategies, their verbal language repeated the assumptions behind critical success factors that aim at surviving competition by enhancing competitiveness, value, the bottom line and similar factors.

Visualisations and storytelling served rather as communication methods for a set strategy. While multiple methods were mentioned, the strategic frame seemed to remain largely intact. Some designers explained they had learned business language so they would be able to work professionally. Core beliefs of organisational strategies were not directly challenged; rather, they were concretised or discovered. Sensemaking through material–linguistic elaborations thus crafts and "talks events and organizations into existence" (Weick, Sutcliffe, & Obstfeld, 2005, 413). Yet, normalising language and frames (cf. Knights & Morgan, 1991) were common, such as talk about "the market that is full of potential", and users who might be looking at "competitive landscapes".

Thus, normalising language maintained the status quo (Burrell & Morgan, 1980) supporting frames that were believed to be professional, appropriate or justified.

Organisational language

More denormalizing language use was discovered in the context of organizational issues. Design managers´ in-betweenness meant crossing cultural, functional or other domains such as navigating and orchestrating amongst diverse groups (engineering, management, various stakeholders and customer-users) for an enhanced understanding of the issues at hand.

Beyond business or engineering language, the designers used denormalising language towards change by speaking about breaking silos, teaching design, enhancing employee experience or:

"...transforming the language, mindset and the mission to include passion." (Participant S2, 2016)

Some designers stressed management support and worked closely with their boards. Their offices were located next to the board members' offices. In this way, organisational power supported the designers' identities (cf. Knights and Morgan, 1991).

Sub-study II supports views by Beck and Plowman (2009) suggesting that, as middle managers, designers mediate between the managerial and other frames and may enrich the interpretations due to their proximity with both strategic and frontline managers. Some designers use the word enlightened managers.

One might interpret transformation by design either as increasing participation (cf. Sanders & Stappers, 2008; Elsbach & Stigliani, 2018) or as a means of managerial regulation (Burrell & Morgan, 1980); often, it was noted by participants, the transformation was initiated within a high level of hierarchy.

User-related language
The designers often felt connected with users with a genuine desire to improve their lives. Business and design languages merge in vague concepts such as value. However, business value differs from user value. Many designers referred to people or human beings, rather than customers, as profit factors (cf. Cunliffe, 2009).

While, for example, brands suggested values and behaviours, one might have expected more reflection on the use of customer data or storytelling contents. Customer experience as a business concept seemed to be adopted (cf. Saleh & Watson, 2017) rather than doubting whether pleasure would lead to enhanced quality of life (cf. Desmet & Pohlmeyer, 2013; Sanders & Stappers, 2008). The user/customer focus is in alignment with recent developments in mainstream management to control customers and their lives through digital tracking, which has been problematized and discussed elsewhere (cf. Royakkers, Timmer, Kool, & Rinie, 2018) as an ethical problem.

Technology-related language
While transcending complex material–cognitive spaces, the designers needed to simplify and orchestrate between customer interactions and backstage services. The ideas behind language show a concern for users by, for example, considering the cognitive load caused by devices and environments.

Some claimed that human aspects were more important than hardware and software:

"It's more for like innovating social relationships of people, not about technology or engineering." (Participant IT7, 2016)

A seamless fit emerged when the core company brought in technology and aligned this with other aspects of the final offering. Users' lives were eagerly traced through technology:

"We analyse that person's tweets and social media, and because we have their e-mail address, we can link it to other social media." (Participant IT5, 2016)

Yet, framing and justification of choices and the responsibilities following them (cf. Dubberly & Pangaro, 2015) were not discussed.

Ecosystem and society-related language
Designers navigated in the design space of organisations, networks and social actors. Some looked beyond their own industry for extracting new cues. Normalising language largely prevailed focusing on a business ecosystem separated from consequences elsewhere. Stakeholders were often business clients, sometimes end-users.

5.2.5. Conclusions on Sub-study II

In sub-study II, the designers' language throughout the interviews related to material–linguistic elaboration methods. Critical success factors formed part of the verbal language the designers had adopted. The underlying core ideas of strategic frames were seldom questioned or reframed (cf. van der Bijl-Brouwer & Dorst, 2017). Surprisingly, ethics, a critical success factor in business (Saleh & Watson, 2017) was barely mentioned. On the other hand, concepts such as experimentation and creativity, which were often mentioned, had become part of business vocabularies.

The sensemaking processes of designers entailed traits of using normalising and denormalising language that supported frame adoption or frame extension (cf. Dorst, 2015; van der Bijl-Brouwer & Dorst, 2017). In frame adoption, core assumptions behind strategies remain easily unchanged even when design methods are used.

Variation in the designers' language use was natural due to their occupational in-betweenness. The design principles (Buchanan, 2015; Fayard et al., 2016) guiding the designers include empathy (Suri, 2000), ethics (Chan, 2018; Sweeting, 2018) and designing for human flourishing or sustainability (cf. Desmet & Pohlmeyer, 2013). The relative silence around values and ethics was therefore surprising. The designers barely mentioned the harmful consequences for the natural environment or issues such as user data transparency (cf. Betzing et al., 2019; Introna, 2007, 22–23; Introna & Pouloudi, 1999) or doubtful consequences of digitalisation (cf. Morley, Widdicks, & Hazas, 2018; WEEE forum, 2017). Instead, there was enthusiasm (cf. Majchrzak, More, & Faraj, 2012) about the possibilities of design. However, questions about the consequences of automation and AI would have required more serious debate (cf. Dubberly & Pangaro, 2015).

The concept of value reflects a business-as-usual perspective where users turn into profits and digitalisation becomes a cost-cutting measure. In a business-as-usual frame, genuine radical innovations are hardly likely. Sensemaking enabled by design facilitation risks reproducing (Knights & Morgan, 1991) the prevailing order. However, understood as an ongoing conversation, design and ethics could inform each other (Pangaro, 2017; Sweeting, 2018). Designers may create possibilities for others to have conversations, to learn and to act, while being explicit about values (Dubberly & Pangaro, 2015).

Designers have gained some power in strategising. As co-strategists, they might receive support from top management for critical reflection on consequences. Designers embedded in historically situated frames remain limited in the very sensemaking that is required for change. There have been signs of denormalising language where designers have managed to broaden not only their own but some existing frames (cf. Baldassarre, Calabretta, Bocken, & Jaskiewicz., 2017; Bocken, de Pauw, Bakker, & van der Grinten, 2016). Gaining legitimation has been suggested to be about talking new ideas and interests into being (Vaara & Tienari, 2011). Designers additionally have material–linguistic strengths. By using design languages in micro sensemaking events, designers could select cues to concretise harmful consequences at early stages. They might initiate more critical reflection on strategic frames and, by doing so, broaden horizons.

5.3. Harmful consequences in the context of IT (Sub-study III)

5.3.1. Four paths towards meaningfulness

The fourth order of design (Buchanan, 2001, 2015) has led to a shift towards more communicative and interactive solutions in larger systems and environments, leading to new questions and concerns. These include recycling, new technologies, elaborate simulation environments, "smart" products, virtual reality, artificial life, and the ethical, political, and legal dimensions of design (Maguire, 2014). Yet, innovation research has barely studied the undesirable or unintended consequences of innovations (Sveiby, Gripenberg, & Segercrantz, 2012; Lindell, 2016) while designers often work in innovation contexts (Hernández, Cooper, Tether, & Murphy, 2018). By contrast, the design community has been concerned about potential harmful consequences for some time (Papanek, 1973; Penty, 2019).

Given the increasingly strategic role of design (Brown, 2009; Buehring & Liedtka, 2018; de Mozota, 2017; Liedtka, 2015), sub-study III suggests incorporating the logic of meaningfulness (Dewulf et al., 2020) into the dialogue that design managers might initiate and support with other actors in industrial settings.

Designers as participants and facilitators in design-supported events can support organisational actors in finding meaningfulness through the exploration of possibly unintended, yet harmful, consequences. In software engineering and systems development, "value sensitive design" (van den Hoven, 2007) studies how accepted moral values could be incorporated into IT design which has become a constitutive technology that shapes discourses, practices, institutions and experiences. Other design approaches such as service design (Miettinen, 2017) or interaction design (Maguire, 2014) strive to accommodate co-creation and joint sensemaking which offer possibilities for meaning exploration beyond narrow technology focus.

Four areas of fuzzy, potentially harmful consequences of digital design environments were scoped and identified in literature as opportunities for organizations towards more sustainable and responsible decision-making. These four paths towards designing meaningfulness are summarized as follows:

Harmful Electronic Devices
Physical touchpoints for third-party exposure can be mapped early on in new product development and improve existing conditions of workers in remote production locations. Harmful aspects include toxic materials, poor labour conditions, health effects or illegal dumping during material journeys. Highly toxic, rapidly increasing e-waste requires immediate attention (Ikhlayel, 2018).

Harmful Digital Content
Designers might examine suggested lifestyles in digital content that do not support health or well-being (Lau, Gabarron,, Fernandez-Luque, & Armayones, 2012). Rather than increasing consumption, design models could concretise the harmful consequences of consumption. Moreover, loading and streaming digital content radically increases global energy consumption (Morley et al., 2018).

Content with adverse effects on users could be problematised, thus preventing people from being influenced (Gunter, 2016). Non-digital solutions might increase well-being, such as face-to-face contact instead of "apps". Humans need human interaction. Rather than adopting, unconsciously, ways of thinking in bubbles produced by codes, transparency of how codes produce what information is displayed to readers should be improved.

Algorithm Decisions
Digital self-service increases and more work is taken over by customers. A digital service may imply the absence of personal service, yet sometimes be promoted as "service improvement", such as at the airports.

Automated decisions may occur unnoticed, between algorithms, creating ethical problems. The ethics of innovations should be opened for discussions such as the idea of robots improving social interaction skills with children (Huijnen, Lexis, Jansens, & de Witte, 2019). AI will replace human tasks when it performs tasks "better" to meet a firm's strategic goal, such as profit (Huang & Rust, 2018).

Design Transparency
Transparency of data requires clarity. New systems often contain hidden dangers which are very difficult to overcome later (Schaar, 2010). Relying on siloed expertise might ignore important issues. Awareness and ease of personal data control require improvement. Exploitation of user data could be problematized jointly by concretizing and visualizing situations in which privacy issues are obscure.

Pre-use, use and post-use stages are equally important areas to be considered. Figure 1 in sub-study III illustrates possibilities for such local, global and digital aspects.

However, the interviews focused on user or customer viewpoints in the use stage or some efforts to improve conditions for employees. The environmental problems created by material waste or other aspects mentioned in the four paths (Figure 1) were barely mentioned. Mostly, positive aspects were stressed.

5.3.2. Broadening the concept of meaning innovation

All those affected by design outcomes should be considered (Buchanan, 2015; Manzini, 2009), also in new technology developments. Sub-study III suggests a broader conceptualisation of meaning innovation as "designing for increased responsibility and design transparency with the help of extracting cues from existing or potential harmful consequences in local, global or digital lives of people involved in the production, use or disposal of what organisations produce in terms of materials, services or digital content". Meaning innovation in this sense differs from the notions of meanings that are innovated in the technology innovation management frame (cf. Norman & Verganti, 2014) because the broader scope incorporates the potentially harmful consequences of innovations in the meaning exploration stages. Meaning innovations thus expand beyond customer experiences or technologies towards responsibility and transparency.

5.3.3. Triggering meaning innovations in organizational becoming

Through exploration of potentially harmful consequences supported by design approaches, the actors may use the logics of meaningfulness (Dewulf et al., 2020) in their sensemaking and collectively arrive at meaning innovations that could become more transparent and sustainable. This, in turn, may lead to improved organizational becoming (Tsoukas & Chia, 2002).

Sub-study III (Figure 2) illustrates the potential that design may offer in the context of becoming in line with Tsoukas & Chia (2002). Following Weick (2011), early stages of sensemaking on micro level have potential for changing macro level outcomes through broader framing (van der Bijl-Brouwer and Dorst, 2017). Dewulf & al. (2020) suggested meaningfulness as an alternative logic of decision-making. Design managers, creating and having tools and approaches for concretizing and visualizing futures with other actors, are potentially in the position to trigger conversations in the context of IT design. The model can be applied to other domains outside the exemplified IT field.

Designers could initiate conversations (Dubberly & Pangaro, 2015; Penty, 2019) on meaningfulness not only concerning situated and commercial contexts but also concerning local and global transparency and responsibility throughout the product and service lifecycles. The ethics of design does not have definitive

answers (cf. Chan, 2018; Floridi, 2016; Santoni di Sio & van den Hoeven, 2018) but requires those who start the conversation. Chan (2018) stressed the need for ethics in the Anthropocene through three categories commonly encountered in design: technology, sustainability and responsibility. For Sweeting (2018), design and ethics can be mutually supportive and inform each other. Without conversation, taken-for-granted developments in the IT field may lead to humans becoming servants of algorithms limiting spontaneous behavior, thus human life. IT as constitutive of the way people live all over the planet could be problematized and alternatives created. Designing mediates between paradigms that can be conceived of as transition zones (Gioia & Pitre, 1990). Design, organisation and management research might enhance meaningfulness through creation of interdisciplinary understandings on existing harm, leading practitioners and management to proactively consider harmful consequences.

6.   DISCUSSION

Being interdisciplinary, this dissertation contributes to intersecting research fields as follows. The three sub-studies shift from preunderstanding towards understanding design and designers in organizational strategizing in a broader sense.

6.1. Contribution to design management and design

A contribution to *design management research* is made by incorporation of multiple theoretical insights (Johansson & Woodilla, 2017) that can enrich design research but potentially be interesting for sensemaking research, and management and organization studies in the context of strategizing, as well. As the scope of design broadens (Buchanan, 2015) it is important to extend the scope of the design space being cognitive and socially constructed from local to global and digital spheres. Such a broad design space is interdisciplinary by nature and potentially a fruitful way of replacing the idea of a concrete fixed organization, a building or matrix, under planned control. Although ideas of evolving organization (cf. Tsoukas & Chia, 2002) have been developing earlier, their connection to the nature of designing in industrial times, has rarely been presented in an overarching theoretical form in the context of strategizing (cf. van der Bijl-Brouwer & Dorst, 2017) including reflexivity concerning potential harmful consequences of early phases of sensemaking. The first sub-study allows researchers to intersect disciplinary interpretations for gaining a more holistic view while avoiding traditionally grounded fixed and linear management concepts and categories which do not always capture the nature of coping with complex environments. Society is an integral part of the design space thus expanding firm-centric thinking. Even customer-centric thinking can be studied critically and forms just one step on a journey towards a more inclusive view. These have implications for cultivation of design ethics, practices and education across all sub-fields of design. Early awareness of assumptions behind framing has wide-ranging consequences that require critical judgement. Designers, as interdisciplinary facilitators may well have a key role in *initiating* more critical concrete and visual sensemaking, despite the difficulty of the task. One major issue is the limited time allocated which may not seem productive in terms of short-term objectives nor has a budget.

However, *designing* itself is undergoing continuous change as to how to deal with complexity. This research, by illuminating some issues in organizational design settings, is supported by recent views of the need to shift approaches to designing

away from the problem solving model of design towards what Dorst (2019) refers to as design reasoning, an ongoing design process that redesigns itself. In addition, the view on the social construction of the design space (van Amstel et al., 2016) resonates well with the proposed understandings of this dissertation. Further, *the evolving and emergent idea of design space,* suggested in this dissertation, aligns with some key ideas suggested by Buchanan (2019, 21): "the need for a richer understanding of the environment of interactions and the need to explore the larger platforms, organizations, and systems that allow for and support collective interactions". For Buchanan (2019) design should support, not oppress, the individual and his or her experience of action, freedom, and thought. This is especially important in decisions concerning strategies and design in the context of digitalization that intrudes everyday lives of people and controls, not only enables, their daily activities. Highly contested situations with conflicting opinions lead to the need for conversation, facilitation, and participation. This dissertation made efforts to integrate insights not only across design sub-disciplines but also the organizational and strategic aspects that all are entangled in micro-situations of sensemaking in which designers´ awareness can increase general awareness and have influence on decision making. Strategizing is sensemaking in the design space, beyond the local situations, concerning ultimately the whole society, not only customers, although the customer-centric view seems to be prevailing. Awareness of ethics and a conversation on issues related to consequences is encouraged across fragmented disciplinary fields.

6.2. Interdisciplinary contribution

A contribution is made to sensemaking studies by illuminating how designers make sense with other actors through material–linguistic elaboration; the language designers gladly teach to non-designers is an embodied co-creative experience. The iterative approaches of design show similarities to processes of sensemaking, yet by a richer repertoire of means for engaging with sensemaking participants and facilitating such events. From the critical sensemaking point of view, such collective facilitation does not always consider consequences further away or cover the pre- or post-use stages of products and services. Through incorporation of critical aspects to sensemaking, a more balanced view may enable avoiding positive bias, which has been found in innovation research (Hasu, Leitner, Solitander, & Varblane, 2012). Such a positive bias may also hamper progress in design research due to the limited view on design principles only in service of profitability in managerial terms (cf. Cuncliffe, 2009). Awareness of frames, cues and language leading to collective justification adds to understanding sensemaking through creative approaches. More research is suggested, for example, in the context of identity construction of designers and, on the other hand, the influence they may have on identities of others.

A contribution to streams of qualitative and critical strategy research (cf. Vaara & Whittington, 2012; Spee & Jarzablowski, 2011, Minzberg & Waters, 1985) broadens the view through design managers´ involvement in strategizing with other organizational actors. Next to utilizing verbal language their participation is anchored in the material–linguistic and social interaction spheres in which participation and involvement form intense experiences, perhaps surprising non-designers. Liedka (2020) refers to design thinking as a social technology encouraging strategic conversations. However, the role design managers as co-strategists and facilitators can play is to activate sensemaking across separated domains, reminding actors of the potential consequences of decisions (cf. Gergen, 2001). Intensified embodied and materially conveyed meanings may raise questions about power and context. Power may serve for liberation through creativity, but just as well serve as a modern means for imposing managerial or particular views of sense on others thus potentially supporting status quo. In this research, the design space is suggested to incorporate strategizing and its consequences for society and environment locally, globally and digitally, thus questioning the idea of internal and external borders or an organization isolated from society. Whether such design involvement leads to positive or potentially harmful consequences requires more empirical research. Nor is it clear to which extent especially designers do influence decision-making despite the close ties with top executives in some organizations studied in this dissertation.

The popularity of design approaches invites more interdisciplinary empirical research concerning possibilities of inclusion or exclusion of actors in decision making, or strategy participation, for example. With increased design involvement in strategizing, it is important to encourage actors across disciplines and educational specializations to allocate attention to potential harmful consequences and self-evident ideas (cf. Cunliffe, 2009; Knights & Morgan, 1991). This suggests an additional dimension to recent developments among innovation scholars who have discussed the possibilities of "Foresight by Design" as part of strategic planning processes (Bühring, & Liedtka, 2018; Buehring & Bishop, 2020). In addition to emphasis on the imagination and creation of desirable future scenarios, customers represent only one group of human-beings influenced by decision-making. Designers might also become the "reflexive breaks" needed for considering innovation goals and traditions (Hasu et al., 2012) such as those related to the ethics of technology (Santoni de Sio & van den Hoven, 2018; van den Hoven, 2007).

Although the empirical material suggests a lack of attention to harmful consequences, more research is needed prior to any truth claims. If harmful consequences result from strategic choices and historically reproduced ideas, however, such ideas could become disseminated in modern forms, such as through facilitation and design workshops. How and to which extent organizational actors go with the (designerly) flow, and how design is understood, forms thus an interesting area for further inquiry in the context of strategizing. Sub-study II illustrates the

importance of "seeing through" language use which fluctuates between normalizing and denormalizing ideas. Sub-study III, by using the IT field as an example, provides designers with paths for exploring potential problems and involving other actors in conversations about local, global and digital ethics. Such questions are key issues in strategizing and potentially influence the way alternative futures are being framed and disseminated or contested by means of design facilitation or other design methods.

In sum, a theoretical contribution to both design and organization and management studies is achieved through theory elaboration (sub-study I) and hermeneutics and reflexivity that allow discovering phenomena beyond surface level (sub-studies II and III). The influence of language and what is absent or present in actors´ sensemaking offers an alternative way for understanding organizational becoming in which designers are not isolated actors. Through incorporation of critical aspects to sensemaking, a more balanced view may enable avoiding a positive bias, which has been suggested to prevail in innovation research (Hasu et al., 2012). Such a positive bias may hamper progress in design research and practice, partly due to the popularity of design in management press, representing positivist assumptions, possibly unconsciously. Verganti (2017) fears that design thinking in business contexts has become simplified into a surface process and lost its rich core while designers have grown closer to management, rather than management learning to understand design (see Johansson & Woodilla, 2017). In such a case, conversation becomes essential. This research ended up suggesting a perhaps more diversified definition of meaning innovation, extending the earlier suggested ideas of innovation (e.g. Norman & Verganti, 2014) by inclusion of potential harmful consequences for human beings and environment. Through incorporation of critical aspects to such sensemaking, a more human view is opened for interdisciplinary progress. Especially the increasing intersections of business, design and technology invite a critical and conscious open discussion on the frames through which decisions, leading to consequences, evolve.

With increased design involvement in strategizing, it is important to encourage actors across disciplines and educational specializations to allocate attention to potential harmful consequences and possibly reproduced ideas or frames. The idea of a broader design space offers paths towards inclusion of other actors in conversations about local, global and digital ethics in the face of interdisciplinary re-framing needs.

The design space is the space and the consequence of sensemaking
In conclusion, the design space as a social construction and as an interdisciplinary site and space for sensemaking, as suggested in this dissertation, provides affordances and an alternative language to the idea of organization: one *escapes speaking about organizations* as fixed entities with boundaries. Moreover, the consequences of

decision making, positive or negative, form part of and influence the design space and require research and action that is not external to the disciplinary specializations.

Instead of assuming that designers are embedded in organizations in the traditional sense of forming a design function limited to existing organization and management structures, this pre-assumption could even be turned upside down. This move (Schön, 1983), a thinking experiment (Östman, 2005), allows one to suggest bridging disciplinary borders. The idea of organization can go (cf. Burrell & Morgan, 1980). Management among multiple other organizational activities, such as strategizing, can be suggested to form part of the design space in which sensemaking is ongoing. Designers, managers and other actors *are* thus this socially constructed design space since design, and much of organizational phenomena, including strategizing, are *interdisciplinary, emergent and social rather than managerial*, by nature. By suggesting sensemaking as the core of interaction and activity in the evolving design space in becoming, the dissertation deliberately avoids the fixed and limited idea of the organization as a managerial concept or a planned system. The design space as a living idea, local, global, digital or beyond, is the interdisciplinary fluid space for all actors to make and remake language, and communicate ideas (cf. Boland and Tenkashi, 1995) at times enabled by facilitation and design approaches; such a space in all its forms is aimed at enhancing the inclusion of different perspectives and their dialogue. New knowledge emerges through ever-changing situated activities; knowing through design becomes constructed within social contexts (cf. Bechky, 2003). Any future product, service or digital activity needs to deserve its right to be produced, which requires overarching interdisciplinary sensemaking, conversation beyond fragmented disciplinary understandings, as well as timely awareness of consequences of decisions.

6.3. Evaluation and ethical questions

Each discipline and paradigm struggles with defining how to judge quality, rigour and relevance. For example, the American Education Research Association, (AERA 2006) requires adequate evidence that is credible for justifying conclusions. It has been suggested that reports should be transparent and make explicit the logic of inquiry and the method should produce data with external validity, reliability, confirmability or objectivity (cf. Denzin, 2009). Both qualitative and quantitative researchers may have an influence on the collection, analysis and interpretation of their research themselves, as well. However, the vocabularies and requirements of interdisciplinary research are confusing, especially in this dissertation which combines design research and does not seek evidence (cf. Mantere & Ketokivi, 2013). Tracy (2010, 840) proposes that high quality qualitative methodological research is marked by: a worthy topic, rich rigour, sincerity, credibility, resonance, significant

contribution, ethics, and meaningful coherence. These more general suggestions are partly overlapping with the following considerations.

Design research as a young discipline requires rigour and relevance discussions, while more clearly established criteria may exist in positivist traditions (cf. Fallman, Stolterman, 2010; Lee and Baskerville, 2003). Rheinhardt, Kreiner, Gioia and Corley (2018) contend that even established scholars differ in their views on how to conduct rigorous qualitative research. Chia (2014) calls for an alternative understanding of academic rigour and diversity of perspectives believing that artistic rigour, much more than technical rigour is needed. In addition, for example "...the varied conceptualizations...of information technology as a variable..." are "incapable of supporting theoretical generalizations (Lee and Baskerville, 2003, 238). Rather, this research has been a dialogue (cf. Gadamer, 2004) between theories and the empirical phenomena in which the researcher judgment plays a crucial role in the interpretation. Such a dialogical process should not be understood as aiming at a "final explanation"; rather, it is an outcome in and of itself. (cf. Mantere & Ketokivi, 2013, 75.) Interpretive scholars do not always use elaborate coding frameworks. They begin with a pre-understanding as the starting point for their dialogue with the data (cf. Gadamer, 2004; Mantere & Ketokivi, 2013.) For gaining more preunderstanding and for sensitizing with the data initial overarching themes identified through a thematic analysis led to the need for theory elaboration across disciplinary borders. This enabled adopting multiple perspectives in the three sub-studies (cf. Harley & Cornelissen, 2020) and avoiding a one-dimensional perspective which might have meant observing design managers in a kind of vacuum. Harley and Cornelissen (2020) refer to Ravasi who suggested that "...qualitative research is rigorous if it is transparent about the unexpected, surprising observations that led you to reorient your focus, the twists and turns your project took as your observations challenged initial research interests and working assumptions" (see Reinhardt et al., 2018, 519). A major twist in this research occurred when the author ended up reapproaching the data from other less formulaic perspectives.

This dissertation carried out theory elaboration which occurs when pre-existing conceptual ideas or producing a preliminary model is the driving factor. Theory elaboration does not produce hypotheses or testing (Lee et al., 1999). Interesting research addresses problems, challenges, or themes that are important to professionals (Fallman & Stolterman, 2010); this research considered it important to create interdisciplinary understandings, since separated fields contribute jointly to design and production outcomes. Fallman and Stolterman (2010) suggest rigour and relevance to be defined and measured in relation to what the intention and outcome of the activity is. In this research, instead of focusing on clients, markets, and organizations, relevance became tied to the impact design managers might have on society in a more general sense. The notion of relevance becomes much more complex; Fallman and Stolterman (2010) pose the question for what purposes

and for whom the research takes place. This research includes society as integral to organizational becoming, takes strategizing with and through design approaches largely as a social construction, and does not seek to define nor measure variables. Rather, the research points to what can be deemed as relevant or even problematic in global and digital times in terms of organizations and their aims and frames (cf. Gergen, 2001) and proposes to include design as a discussion partner. For Tracy (2010, 840) research that is counterintuitive, questions taken-for-granted assumptions, or challenges well-accepted ideas is often worthwhile. As Chia (2014) puts it, something unnoticed, overlooked or unattended becomes increasingly pertinent and relevant to research considerations; such are the possible frames behind designing and producing goods, services or digital experiences affecting daily behaviors of people.

Fallman and Stolterman (2010) find that an important but often overlooked aspect of rigour in design studies is, among other things, acknowledging existing literature and knowledge and choosing suitable methods and analysis techniques. This research relies on an extensive body of literature relevant to the sub-studies chosen as important for organizations, designers and the strategic context. It is concerned with how human beings and environment will cope in the future, the higher good and more holistic understandings. Yet, other streams of research could have been chosen. The fit between the theories guided the choices, being a creative rather than a rational process. Inevitably, the broad scholarship has led to limitations in capturing richness and depth in more specific issues. Such broadness, however, has enabled observing connections between parts and whole as well as between micro and macro levels, suggesting perhaps some common ground between disciplinary knowledge areas.

Coherence
This interdisciplinary dissertation has utilized multiple philosophical and methodological approaches (Chapter 4) and made an attempt to produce more creative qualitative research (Hernes, 2014) by merging design research perspectives with qualitative research. Through this combination, the author has become more aware of underlying issues such as language and its influence. Generalizations have not been the aim, neither are truth claims made (Alvesson & Sköldberg, 2018). The interparadigmatic situation (Gioia & Pitre, 1990) in the form of theory triangulation and elaboration has led this research to synthesize rather than analyze by splitting data. The Eisenhard method searching "factual" data and developing "generalizable nomothetic causal laws about objectively observable phenomena in the real world" (Eisenhard, 1989; see Langley & Abdallah, 2011, 116), does not align with the philosophical assumptions chosen for this dissertation. The dissertation has thus sought to build coherence (Harley & Cornelissen, 2020) between the philosophical assumptions and the three sub-studies despite the contrasting elements between

different domains of literature. Reflexivity and (critical) sensemaking were favoured instead of linear strict processes which might serve well for more functionalist purposes. For example, the Gioia method might have led to early closure (Langley & Abdallah, 2011). Cassell, Cunliffe and Grandy (2018, 5) go as far as to propose that reflexivity within qualitative organizational research is "moving towards being seen as standard practice". Design research is often concerned with changing things that it considers could be improved (cf. Fallman, 2008). Thus, a dissertation that reflects on such possibilities is suggested; action is achieved through reframing (cf. Dorst, 2019, Buchanan, 2019) and making sense, rather than by making final factual statements.

Trustworthiness and potential bias
Criteria for qualitative research often include trustworthiness (Lincoln and Guba, 1985), which in this research was enhanced by researcher triangulation due to multiple researchers being involved in the interviews, longitudinal data, and data triangulation with a diversity of participants. Theory triangulation can be considered both an advantage but also a risk for losing focus or delivering biased outcomes. Hermeneutic approaches can be criticized for not being data-driven or strongly inductive. This research iterated between data and theory to find interesting and broader perspectives to designers´ situated sensemaking. However, there is always the possibility of bias in the interpretations and understandings that the researcher has produced. After all, subjective interpretations cannot be eliminated from reflexive research (Alvesson & Sköldberg, 2018) and even quantitative research may include interpretations. Neither has the author been present in the interview situations, causing more distance to judge how the research situation might have influenced the participants. Direct observation was not possible, for example, leaving space for improvement and later inquiries. Being part of the interview situation would have made it possible to ask more specific questions and clarifications while developing the research. However, the research setting enabled taking fresh perspectives, including critical insights. The author has not influenced the interview participants in any way, which can be considered an advantage. The author has not been employed nor funded by the university at the time of the data collection although the project fundings originally have enabled the data collection for the university. Without critical insights and reflexivity, the results would be different and could perhaps have led to a single perspective with another kind of bias or a more limited view. This would have been the case, had the research been conducted from a clearly positivist perspective of qualitative research, for example. The same text can be interpreted in many ways.

Snowball sampling may lead to bias in the selection of participants and the author cannot guarantee the interpretations as being the correct ones, if such correctness even exists at all. The author´s extensive experience in higher education in business

and across some design and IT fields, has inevitably influenced the choice of research perspectives and their outcomes, perhaps even led to the hermeneutics of suspicion, further triggered by doctoral school Kataja´s management and organization theory courses in two other universities with visiting professors from other countries. Cultural differences across disciplines and nations are unavoidable, as well. The interview situations may have been such that the design managers felt a need to represent the organizationally desired views of their work context. The spirit of Silicon Valley forms a specific perhaps rather extreme case as such, but might be recognizable in recent developments elsewhere.

The first sub-study can be criticized for a positive design bias, due to the selection of positive design and related design streams in the model. In the early phases of sensitizing with the interview data, the author was impressed by the positive attitude of the designers (cf. Michlewski, 2008) which was evident in the data. Prior to the first sub-study, a more data-driven inductive approach would have meant an early closure, although a possible route to take. Such a study might have stressed the importance of design for implementing strategies from a more positivist perspective much the way design is often framed in business press. Later, the relationship to data changed due to the author´s more critical stance, deeper reflexivity, and increased awareness of freedom to think and write independently. Towards sub-studies II and III the author seeks a more balanced view. Avoiding strong arguments and using sensemaking as an umbrella term throughout the research is a strategic choice that supported the aim of creating a conversation rather than pushing strong claims. However, any critical suggestion made is not for downplaying the design communities, individuals or organizations; the reflexivity is aimed at the contextual situation or general frames. What is presented is a momentary glimpse rather than a sign of stable conditions (cf. Tsoukas & Chia, 2002). The cues that one notices and selects are unavoidably subjective, yet influenced by collective social phenomena, such as other theories: therefore, broader scholarship might mitigate some biases.

Neglected aspects, scope and context
The Weickian (1995, 2011) sensemaking properties have been used throughout the research selectively and not all of them were included. Identity construction, due to a need for limitation of research scope and relative distance to the participants has been left out, although important for future research (cf. Tracey & Hutchinson, 2018). A critical lens to enrich theoretical discussions (Aromaa et al., 2018) has been used selectively in combination with reflexivity (Alvesson &Sköldberg, 2018) and hermeneutic approaches (Chapter 4) along with sensemaking. For reasons of clarity and overall management of the research process choosing one approach instead of many might have been a wise decision. However, sensemaking is also retrospective, and the journey made is not in vain from the point of view of subjective learning. In addition, multiple perspectives are partly the result from multiple approaches.

The empirical material remains somewhat limited in scope and further data collection plans ceased due to the pandemic. Transferability, not attempted, would probably be limited as Silicon Valley forms its own community of designers with longstanding cooperation with businesses (Katz, 2014) and is considered unique (Cooper, Junginger, & Lockwood, 2009). However, design approaches have gained popularity and new research could relate to some of the considerations presented in the current one. The interview situations may have caused the participants to refrain from difficult or critical insights as designers may not articulate problematic issues but rather, perhaps, act in ways to improve situations. An example of this could be the inclusion of new stakeholders. Internal struggles do no surface easily and designers may protect themselves or feel the need to confirm organizational beliefs rather than personal ones. An interview itself can be considered to be a momentary social construction living its own life, as well.

However, a hermeneutic approach to the commercial, industrial and digital contexts might enable seeing through some aspects of designing in strategic contexts irrespective of geographic location. The empirical material was utilized for sensemaking across paradigmatic fields and different frames combining the author´s and the participants´ sensemaking. Nevertheless, incorporating experiences of non-designers, such as other (top) managers and organizational actors would have given a richer and more balanced view on organizational issues and strategic sensemaking. This is a further opportunity worth the effort especially when combined with sustainability and transparency issues. This dissertation focused on design managers who are surprisingly seldom the object of organizational or design research while most of the surroundings we live in are design outcomes.

Broad versus shallow scholarship
The use of broad scholarship leads easily to the risk of shallow scholarship in specific fields (Alvesson & Sköldberg, 2018) which is clearly the case for the reader coming from a specific subfield, such as engineering design or specific streams of organization or strategy research. The choice of literature can admittedly be criticized for being biased, not sufficient or too broad. The topic could have been limited in the early stages, but the author was keen on finding common ground between disciplines rather than choosing one of them. "Once you have seen, you cannot not see" applies. The author has not accepted nor provided a final definition of design space, although it is evolving throughout the dissertation. That is the suggested nature of the design space, it alters all the time in meaning and scope. It is not a variable for measuring or verification. The design space as an idea has driven the research further, but giving a final definition would not do justice to its fluid interpretations from micro to macro levels. The phenomena forming parts of it are not stable, thus one static interpretation would not be desirable (cf. Alvesson & Sköldberg, 2018, 169). The language in the dissertation may not be clear, accessible or acceptable to specialists in

other areas, the concepts being diverse and vaguely defined, especially in design that represents a rather novel discipline (cf. Fallman & Stolterman, 2010) with numerous new emerging fields. However, the aim is to *bridge* such distances for reaching more understanding for the future. An overarching whole (the design space) is emergent through the three sub-studies as an *emergent understanding* rather than a fact, well defined and readily fixed. The process was more intuitive than planned and the result can be confusing. However, it may lead to curiosity and questioning the obvious, and if so, the research may become more relevant than a deep research with a narrow focus and "fixed facts".

The research across disciplinary areas has led to "kaleidoscopic tapestry" (cf. Buchanan and Dawson, 2007, 679) in the perspectives taken in an attempt to avoid "early closure". Too normative of an approach might have led to a limited view stressing parts, but missing the overall understanding of how ideas of organizational strategy and decision making could be influenced by design, consciously or not. The aim has been to come up with interesting research (Davis, 1971) by pointing to broader horizons and underlying issues in design managers´ situated work. Absent themes proved to be salient cues, despite the severe limitations related to any truth claims. Absent themes provide understanding on what is dominant and self-evidently absorbed in normal lives leading to ignoring such absent issues, that as such, influence people´s lives. How will next generation designers and managers make sense of their interdisciplinary blind areas offers avenues for further inquiry. How can such a gap, from the very beginning, be avoided without losing deepness in scholarship of specific fields? What is worth teaching to management and design students in times of climate change, digitalized lives and health threats? Admittedly, this research, being philosophical, asks more questions than it can answer.

As to design communities, that are many: what applies to a UX designer may not be relevant for another designer. Yet, the purpose is to create intersecting conversations for capturing broader horizons across contexts, such as the business imperative potentially framing sensemaking events. Hernes (2014) suggests a move away from the incommensurate demands of scientific rigour and relevance and calls for finding the soul for management research. Perhaps bringing design perspectives to critical management and strategy research and practice will aid such a development.

The author has made an attempt to pay attention to "sufficient cues" (Weick, 1995, 42) and made sense of some frames in which designing, strategizing and sensemaking co-evolve. Such subjective noticing and selection of cues and limited awareness of one´s own frames has no doubt an influence on the outcomes. Other choices could have been made, including a more limited scope of the research aims, consideration of other research approaches with potential additional sources of empirical material. Yet, the researcher´s own preunderstandings shifted from more positivist to more integrated and diverse understandings during the process this dissertation forms. The world now looks more like a design space in which every move makes a tiny

difference: "We design the world for us, including consequences" and a dissertation can be the action that moves minds towards conversations (Dubberly & Pangaro, 2015), without being able to give a recipe or a method, or a solution. Yet, some suggestions both for an interdisciplinary theory, alternative ways of understanding, and future practice were articulated. Despite the efforts of finding an equal balance between managerial, organizational and design perspectives, the beauty of the fit is in the eye of the beholder. The author has chosen relevance over traditional rigour suggesting it to be more important for the issues studied. A concern of fragmented expertise has implications both for research and practice. What is presented in this dissertation is the shifting possibility of preunderstandings towards broader or *different* understandings. From the point of view of sensemaking, if the reader is puzzled, the aim is reached, since then sensemaking is triggered. The frames one might interpret on the basis of this dissertation can be many. They are not meant to be; they are possibilities of becoming.

6.4. Further research

Exploring issues such as the role of language and materiality, interaction and facilitation of sensemaking in organizational settings have enabled discovering the need and possibilities for continuing interdisciplinary conversation. Especially critical management theories together with design offer future possibilities for critical research on design involvement in the context of the prevailing rapidly evolving business and technology frames. Work produced from the perspective of other paradigms might also profit from such connections. The interparadigmatic situation (Gioia & Pitre, 1990) potentially enables new perspectives to emerge, crossing some of the paths taken during this research. As a young discipline in development, the future of design research will hopefully continue showing more proliferation into other paradigms while simultaneously and importantly advancing its own sub-fields. This research addressed design on a more comprehensive level yet discussed issues deemed to be relevant for many subfields of design.

There is ample space for analyzing design outcomes, especially those that might have the potential to improve existing issues and things, beyond the commercial products or services with a relatively narrow focus on user pleasure or increasing emotional bonding. Many issues cannot be addressed adequately from just one disciplinary perspective. Therefore, overlapping areas of interest are provided for further elaboration, such as how to recognize and support responsible and transparent decision making. A source of inspiration for both design and organization and management research could be looking into organizational becoming (Tsoukas & Chia, 2002) in more detail, in other contexts and over a longer period of time (cf. Salmi & Mattelmäki, 2019). There are possibilities for exploring the role of design

and sustainability, transparency and responsibility further, although initiatives in specific sub-fields already exist (cf. Baldassare et al., 2017, Bocken et al., 2016). By modifying some ideas presented by Aguinis and Glavas (2017) one could explore whether and how designers might be able to create meaningfulness at work for other actors by engagement in corporate social responsibility (CSR) through designerly, embodied and materially supported behaviors that matter, are significant for others near and far away, and can also serve the greater good. This could support development of education in and across various disciplinary fields next to supporting responsible action concerning the future. The role of prospective sensemaking with design approaches is a promising path for future studies in general.

Practical design work could proliferate further into the fruitful areas of pre- and post-use stages of design, taking a broad spectrum of potential harmful consequences into early consideration in each new project (cf. van den Hoven, 2007). Methodologically, there are possibilities for more nuanced practice-based (design) research or ethnographic approaches as well as quantitative research on designers in organizational settings. The impact of design and strategic decisions as outcomes for third parties, such as for people engaged in the daily practices of producing consumer goods or extracting raw materials for such items, is another valuable direction, beyond the user pleasure focus. In addition, the outcomes for users could be examined in more detail; users are not necessarily the beneficiaries of organizational action after all. Sub-study III offers preliminary insights for further research and could be utilized beyond the example of the IT field. New digital means, such as the possibilities of IoT (Internet of things) designs are not necessarily beneficial for people and the environment and require further consideration by various kinds of designers, among other actors. One of the key questions could be to find out how and at which stage potential consequences, ethics or sustainability issues are discussed and how decisions are made. Could time pressure or as suggested by Majchrzak et al. (2012) enthusiasm (also found among the participants in this research) or other issues supporting speed and efficient project delivery work negatively in terms of deeper consideration of more serious issues? The social nature of decision making and designers´ participation in such issues require more clarity.

Identity construction, one of the seven sensemaking properties Weick considered as important remained beyond the scope of this research. Future research could look deeper into the personal aspects of designers or design managers´ identity construction in organizational settings (cf. Tracey & Hutchinson, 2018) from the point of view of professional or personal identities, empowerment, or critical theory perspectives. One suggestion is to look at service and interaction designers´ identity construction building on earlier work on nascent occupations (cf. Fayard et al., 2016). In addition, the role of education as a production site of desirable identities and forms of living in general could enrich critical design and management research.

How designers struggle with value conflicts and other constraints or paradoxes (Dorst, 2011) with other actors is an intriguing area for further elaboration. Awareness of ethical and professional contradictions deserves more attention (Dubberly & Pangaro, 2015; Chan, 2018; Sweeting, 2018) and is considered to be an underdeveloped area of design research. Such discussions are not limited to designers only, but are of interdisciplinary concern and may offer insights for research on (design) teams and the way collective interactions shape or are shaped by participating actors and decisions (Weick and Roberts, 1993). The potential discrepancies between micro level design activities and macro level desirable organizational outcomes as published in corporate communications offer another possible direction enabling discussion on what is worth producing or promoting. Language use in these contexts is ambiguous and could be an area of interest.

Some organization and management or design scholars may be intrigued by designerly ways of thinking and find interest in examining potential value conflicts in strategizing when designers work with other actors. Thus far, design management research seems to have focused on the assumed benefits of design for business success. Whether design approaches are helpful in value conflict mitigation is one of the questions that could be asked and could provide more insights into the kind of facilitation or other methods that might be beneficial. Such inquiries would perhaps support understanding longer term macro level consequences of organizational action. Critical streams of discourse analysis, sensemaking and SAP approaches as well as the developments of open strategy provided inspiration for this research and, indeed, would yield possibilities for researchers interested in the combination of strategic, design and critical approaches, for example from the point of view of participation, power and designers´ possible influence on decision making. The increased number of designers in managerial positions requires further research due to designers´ in-betweenness between design teams, occupations and management. The use of design approaches in connection with social, material and embodied sensemaking requires further clarification and conversation on the direction and aims of such activities.

The design space as a site of interdisciplinary sensemaking and action in which design, business and technology intersect offers thus multiple avenues for future research beyond the preliminary insights suggested in this dissertation.

List of Original Articles

The thesis is based on the following original articles, which will be referred to in the text by their Roman numerals I–III.

I. Pääkkönen, T., Miettinen, S., & Sarantou, M. (2019). A Model of Positive Strategic Sensemaking for Meaningfulness. Conference Proceedings of the Academy for Design Innovation Management, 2(1), 710–721. https://doi.org/10.33114/adim.2019.03.217

II. Pääkkönen, T., Sarantou, M. & Miettinen, S. (2020). Design Languages in the Design Space: Silicon Valley. Proceedings of DRS 2020 International Conference: Synergy. S. Boess, M. Cheung and R. Cain (eds.). Vol 1, 4–22. https://doi.org/10.21606/drs.2020.148

III. Pääkkönen, T., Sarantou, M. & Miettinen, S. (2020). Meaning Innovations with Design Support: Towards Transparency and Sustainability in the IT field. The 22nd dmi: Academic Design Management Conference Proceedings, 741–752. Design Management Institute, MA: USA.

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