Summary

The worldwide increase in societal challenges, such as climate change, political instability, and economic volatility, puts pressure on institutions, organisations, and individuals to develop means to address social problems (OECD, 2011; Ramalingam *et al.*, 2015; Eichler and Schwarz, 2019). Following the assumption that social problems are difficult to solve due to their complex nature (Kirschke and Newig, 2017), this dissertation adopts a 'complexity lens' to interpret the intertwined forces driving social problems within organisational and environmental contexts. Problem complexity requires different governance modes, as solutions cannot be developed in the typical hierarchical way that commercial products follow (Felin and Zenger, 2014; Kirschke and Newig, 2017). This dissertation entails two studies that explore how the complexity of social problems can be managed at the organisational and individual level.

In particular, study 1 explores the link between social problems and complexity at the organizational level in the humanitarian sector. In the humanitarian sector, problems are complex, because they are highly local, context-bound, time-specific and path-dependent (Ramalingam *et al.*, 2008). Further, the knowledge that is required to successfully solve these complex problems is usually local and therefore hard to find and to then transfer to humanitarian organizations, because it is often hidden and informally bound in local communities (Shaw, Sharma and Takeuchi, 2009). Organizational search theory advocates the application of search processes for social problems with mentioned conditions that are not only *bottom-up* but also *guided by theory* (Felin and Zenger, 2014). Therefore, study 1 employs Procedural Action Research and mixed methods together with a humanitarian organisation to qualitatively develop and quantitatively validate a theory-guided bottom-up search process for surfacing solutions to reoccurring floods in Indonesia.

Building on this knowledge, study 2 investigates the sensemaking and sensegiving activities of individuals in their attempt to address complex social problems. To this end, study 2 involves a series of 20 qualitative narrative interviews with social entrepreneurs in Ethiopia and Germany. Study 2 revealed several important findings. First, the sensemaking and sensegiving activities of social entrepreneurs resemble two different types of understandings of social justice, namely arrangement and realization, which shed light on how they interpret the 'social' of their social problem and its solution differently. Second, these sensemaking and sensegiving activities are underpinned by different sets of innovation search processes that predominantly differ with regard to how they govern problem complexity, either top-down or bottom-up. Third, in their attempt to solve social problems, the social entrepreneurs in this study adopt different cognitive frames when resolving paradoxical tensions, either they hold a business case frame, which predominantly implements instrumental strategies to resolve paradoxical tensions, or they hold a paradox frame, which predominantly implements integrative strategies to resolve paradoxical tensions.

Chapter One
Overall introduction

This dissertation explores how the complexity of social problems can be managed at the organizational and individual level using two studies. In this chapter, the research motivation and its overall theme, the research problem, its relevance and objective are outlined.

1.1 Research motivation and overall theme

Philosopher of science Karl Popper once pointed out that "[a]ll life is problem solving" (Jonassen, 2004, p. 1). In general, a problem occurs when an individual, team or organisation wants to achieve a certain goal without immediately knowing how to achieve it (Baron, 1988). Thus, problem solving is "any goal-directed sequence of cognitive operations directed at finding that unknown" (Jonassen, 2004, p. 7). Unfortunately, many organisations fail to adequately formulate their problems and even solve the wrong ones (Enders, Andreas and Barsoux, 2016). This failure is often caused by the inherent complexity of many problems (Fernandes and Simon, 1999), which leads us to the overall guiding question of this dissertation: How can organisations and individuals manage the inherent complexity of social problems?

Along the way of my quest to answer this question, I found a loyal companion. His name is Albert Einstein. As a common theme over the course of the last four years, I stumbled upon a number of his insightful quotes in a broad range of research papers I read. What might come as a surprise to some – given his background as a physicist – Einstein spent much time thinking about how to solve problems. I was able to learn from his insights on several occasions. For instance, when I looked into how to solve complex social problems in the humanitarian sector, I stumbled upon Einstein's claim that "the formulation of a problem is often more essential than its solution [...]", as cited in different papers on strategic management (Baer, Dirks and Nickerson, 2013; Jordi, Diego and Gine, 2014). This insight underlies the organisational search process that was developed to identify social innovations to address the problem of reoccurring floods in Indonesia in study 1. Or, another example, when I looked into participation of affected users or communities as one of the central tenets to successfully solve complex social problems, Einstein had another insight to share. He explained that this bottom-up approach is necessary to understand the social nuances of complex problems, which an expert-driven top-down approach might overlook: "[W]e should be on our guard not to overestimate science and scientific methods when it is a question of human problems, and we should not assume that experts are the only ones who have the right to express themselves on questions affecting the organisation of society." (Dawson and Daniel, 2010, p. 12).

At times, I felt like the hare in Grimm's fairy tale 'The hare and the hedgehog'. The moment I exhaustedly reached another milestone on my journey to finish this dissertation, another

quote of Einstein appeared in a research paper I read, as if he cried: "I am already here". Unlike the hare in the fairy tale, I was not appalled or disgraced by his appearance but rather felt the warm comfort of his companionship. As a consequence, it is only appropriate to echo his wisdom in the title of this dissertation:

> "It is the theory which decides what can be observed" – Managing the complexity of social problems at the organisational and individual level.

This quote is taken from a conversation between Einstein and Werner Heisenberg. When Heisenberg had to give a talk about quantum mechanics in Berlin in 1926, Einstein was among the audience members. After the talk, he invited Heisenberg to his apartment to discuss the matters with him. Their conversation focused on the epistemology that underlies Heisenberg's theory. Initially, Heisenberg had followed the notion that theory comes from observable magnitudes alone. During their conversation, Einstein convinced him of the opposite: "whether you can observe a thing or not depends on the theory which you use. It is the theory which decides what can be observed." (Salam, 2005, p. 99).

This insight elegantly resembles one of the key themes in both studies of this dissertation: theory-guided search for knowledge to solve complex social problems (Felin and Zenger, 2009, 2014). In the literature on organisational search, the nature of searching for knowledge as an 'unknown unknown' to solve a complex problem is often illustrated using the metaphor of knowledge landscapes (Nickerson and Silverman, 2007). These landscapes consist of an infinite number of knowledge bits that could potentially be combined for a solution (Nickerson and Zenger, 2004). In this perspective, the knowledge search should be guided by a theoretical representation of the solution landscape in order to avoid a costly recombination of knowledge bits in a trial and error manner (Felin and Zenger, 2014). In other words, when looking for the knowledge combination that constitutes the solution to a complex social problem, it is often the theory that decides what can be found. This insight has been essential in framing the findings of both studies in this dissertation.

1.2 Research problem, relevance, and objective

The worldwide increase in societal challenges, such as climate change, political instability, and economic volatility, puts pressure on institutions, organisations, and individuals to develop means to address social problems (OECD, 2011; Ramalingam *et al.*, 2015; Eichler and Schwarz, 2019). As social problems are often rooted in environmental challenges, they are conceptually closely linked to sustainability (Dangelico, Pontrandolfo and Pujari, 2013; Howard-Grenville *et al.*, 2014). In this regard, the 17 Sustainable Development Goals (SDG) of the United Nations represent a list of universally applicable social problems that have been composed systematically through a consultation process involving 5 million people from 88 countries (Eichler & Schwartz 2019; Angelini et al 2016).

However, social problems are difficult to solve due to their complex nature (Kirschke and Newig, 2017). This has been highlighted by researchers from various related environmental fields such as climate change (Amelung and Funke, 2013) the management of

fresh waters (Patterson, Smith and Bellamy, 2013; Metz and Ingold, 2014), or food and agriculture (Durant and Legge Jr, 2006; Head, 2014). This complexity of social problems requires different governance modes, as solutions cannot be developed in the typical hierarchical way that commercial products follow (Felin and Zenger, 2014; Kirschke and Newig, 2017). The underlying challenge is that "[m]any social problems defy linear, top-down policy responses, because complex problems, by definition, do not have a single 'end' or a 'solution'" (Duit and Galaz, 2008; Underdal, 2010; Tepsie, 2014, p. 22). Indeed, public authorities face various uncertainties forcing them to constantly integrate feedback and learning loops in their processes to address these complex problems (Kirschke and Newig, 2017). Against this background, this dissertation will explore two concepts that have been brought forward to address social problems: social innovation and social entrepreneurship. Both social entrepreneurship and social innovation have certain overlaps, most meaningfully in their shared raison d'être of identifying solutions for unmet social problems (Phillips *et al*., 2015).

The concept of social innovation has increasingly gained interest and attention among stakeholders from different sectors of society in recent years (The Young Foundation, 2012; Van der Have and Rubalcaba, 2016; Portales, 2019). In particular, social innovation has emerged as one important part of the search for novel means to address those social problems that are reflected in the SDG (Angelini *et al*., 2016; Eichler and Schwarz, 2019; Portales, 2019). To this end, social innovations are expected to transform society by solving environmental, social, economic, and institutional problems (Portales, 2019). Consequently, the definition most often referred to describes social innovation as "a novel solution to a social problem that is more effective, efficient, or just than existing solutions and for which the value created accrues primarily to society as a whole rather than private individuals" (Phills, Deiglmeier and Miller, 2008, p. 39). This conceptualisation of social innovation as novel responses to social problems is a common if not the most prominent theme in a large part of the academic and institutional literature (Phills, Deiglmeier and Miller, 2008; Goldenberg, 2010; Unceta, Castro-Spila and García Fronti, 2017).

Social entrepreneurship is one intellectual cluster of the research field of social innovation (Van der Have and Rubalcaba, 2016). Consequently, similar to social innovation, the primary mission of the social entrepreneur is to create social value by developing solutions to social problems (Dacin, Dacin and Tracey, 2011). This understanding of putting the social problem being addressed as the central driver for social value creation is shared by a substantial part of studies on social entrepreneurship (Korosec and Berman, 2006; Sud, Vansandt and Baugous, 2009; Acs, Boardman and McNeely, 2013; Robinson, 2014). For instance, Drayton (2002) defines social entrepreneurs as protagonists who "focus their entrepreneurial talent on solving social problems" (p. 123), while Alvord et al. (2004) define a social entrepreneur as someone who "creates innovative solutions to immediate social problems and mobilizes the ideas, capacities, resources, and social arrangements required for sustainable social transformations." (p. 262). To this end, social entrepreneurship seeks to holistically address the triple bottom line of sustainable development (Tilley and Young, 2009). As a consequence, and similar to social innovation, most conceptualizations of

social entrepreneurship highlight the complexity of these social problems (Dacin, Dacin and Matear, 2010; Dorado and Ventresca, 2013). For instance, Zahra and others (2009) define social entrepreneurs as people who "make significant and diverse contributions to their communities and societies, adopting business models to offer creative solutions to complex and persistent social problems." (p. 519).

1.2.1 What does complexity mean?

As both concepts seek to create means to address social problems, the complex nature of these problems is a reoccurring challenge during this endeavour that needs further attention. Despite its relevance, complexity has become a popular buzzword that is often used only to gain attention but is increasingly at risk of producing empty statements (Vicsek, 2002). T. Irene Sanders, founder of the Washington Center for Complexity & Public Policy, observes that despite the daily usage of the term complexity to describe very different situations, "very few people, the news media and policy-makers included, have stopped to ask what the words really mean and what the new science of complex systems might contribute to our understanding" (Sanders, 2003, p. 1). This lack of conception is seemingly also present among management scholars. For instance, Townsend et al (2018) showed in a recent review of research on entrepreneurship that many studies consistently and errantly subsume the differing concepts of complexity, ambiguity and equivocality under the umbrella term uncertainty.

This dissertation seeks to offer clarification in this regard. A common way to explain complexity is to differentiate it from complicatedness (Andersson, Törnberg and Törnberg, 2014). In this understanding, complicatedness represents top-down governed systems in which each component of the system obtains certain functions in relation to the whole system and in which each component follows a distinct logic (e.g. as for a car or for a computer) (Törnberg, 2017). In contrast, complexity is linked to bottom-up self-organization, which is present, for example, in a flock of birds (Baldwin et al. 2011). No matter how comprehensively we investigate the individual birds in a flock and the features of each of their components such as their wings, we will never be able to accurately infer the behaviour of a flock of birds (Törnberg, 2017). Thus, although those single components might be in themselves simple, they are irreducibly intertwined with each other comprising a complex system that is "more than the sum of its parts" (Simon, 1962, p. 468). In other words, it is not about the parts that comprise a complex system, rather "*the magic resides in their interactions*" (Törnberg, 2017, p. 32). In fact, this understanding of complex systems reflects directly the original meaning of the Latin term complectere: what is intertwined (Mitchell, 2009).

In more detail, according to Funke (2012), complexity typically includes five features: (1) a vast number of involved variables; (2) irreducible interdependencies between involved variables; (3) changing dynamics that reflect the role of time and change within a system; (4) intransparency with regard to the involved variables and their current values; and (5) polytely (greek term for 'many goals'), representing goal conflicts at different levels of anal-

ysis. This blend of features is comparable to the acronym VUCA (volatility, uncertainty, complexity, ambiguity) which is used in modern approaches to management (Bennett and Lemoine, 2014).

1.2.2 How to manage complexity?

In order to study how people solve complex social problems, Dietrich Dörner initiated the so called Tanaland experiment (Dörner, 1996). This experiment was based on a computer simulation of a fictitious region in West Africa. Twelve participants were given the task and dictatorial means to enhance the well-being of Tanaland's population and the entire region during six sessions of intervention over the course of the experiment that simulated a time period of 20 years (Dörner, 1996). Thereby, the computer simulation contained all the defining characteristics of a complex system reflected in 50 tightly interconnected variables (e.g. the implementation of artificial fertilizers were linked to the overall food supply, which was linked to population growth that was linked to the threat of a famine) (Funke, 1991; Dörner, 1996). At each intervention point, the participants could collect information and use it for their decision-making. In the end, only one of the participants was successful in sustaining the resources at the appropriate level to uphold the population. While the decisions of the average participant initially improved the well-being of the population in the region, they eventually all led on different paths to the same catastrophe of famine (Dörner, 1996).

In one case, a well-intended endeavour to eliminate the monkeys and rodents which were eating the crops deprived the local leopards of their normal food supply, which led them hunt the farmers' cattle instead (Dörner, 1996). In another case, crop yield improved significantly due to artificial fertilizer and motorized plows, with the unfortunate consequence that the population outgrew the capacity of the food supply (Dörner, 1996). When Dörner analysed the logic behind the participant's failure to effectively manage the problem complexity, he found out that the participants' efforts to reflect on the consequences of their decisions and to ask critical questions lessened, while the number of their decisions increased (Dörner, 1996). Drawing on this study as well as several other similar laboratory experiments and real life cases one has to come to the conclusion that people and therefore organisations as well by large fail to anticipate unintended consequences of their actions and continue with actions without adequate prior analysis and reflection. Consequently, they regularly mismanage complex problems (Dörner and Funke, 2017; Kirschke and Newig, 2017). This is an alarming finding given its central importance as a competence to succeed in the 21st century (Mainzer, 2009; Dörner and Funke, 2017). To illustrate why this is alarming, I refer to the following excerpt from an article published on the website of The Guardian in 2016 on the seductiveness of reducing complexity to solve social problems:

> "[…] There is real fallout when well-intentioned people attempt to solve problems without acknowledging the underlying complexity. […] One classic example: in 2006, the US government, the Clinton Foundation, the Case Foundation, and others pledged millions of dollars

> to Playpump, essentially a merry-go-round pump that produced safe drinking water. Despite being touted as the (fun!) answer to the developing world's water woes, by 2007, a quarter of the pumps in Zambia alone were in disrepair. It was estimated that children would need to "play" for 27 hours a day to produce the water Playpump promised. The Playpump was supposed to be an improvement on old-fashioned pumps like this one in Uganda, but delivered far less water than originally promised. […]" (Martin, 2016)

In summary, the overall research objective of this dissertation is to explore how the inherent complexity of social problems can be managed in an attempt to develop appropriate solutions.

Chapter Two
The two studies of this dissertation

To this end, this dissertation adopts a 'complexity lens' to interpret the intertwined forces driving social problems within organisational and environmental contexts. To better understand and to learn how to manage complexity, this dissertation builds on blending complementary concepts taken from complexity theory (Anderson, 1999; Mumford *et al.*, 2000; Burnes, 2004), specifically its application in the field of organisational studies (Nickerson and Zenger, 2004; Baer, Dirks and Nickerson, 2013; Felin and Zenger, 2014) and individual problem solving (Fernandes and Simon, 1999; Maggitti, Smith and Katila, 2013). By acknowledging that it is inevitable for researchers to study complexity, this dissertation joins in what has been called the 'complexity turn' (Urry, 2005). Thereby, this dissertation seeks to pave the way for using complexity as a useful lens through which social problems can be systematically categorized and analysed (Quesaday, Kintschy and Gomez, 2005). Although such a systematic approach to complex problem solving has frequently been called for (Ingraham, 1987; Head and Alford, 2015), it still lacks in-depth research (Chalmers, 2013; Kirschke and Newig, 2017).

In particular, this dissertation contains two studies, which both investigate different units of analysis to explore how complex social problems can be managed. Whereas study 1 adopts a humanitarian organisation as its unit of analysis, study 2 investigates individual social entrepreneurs in their attempt to solve social problems. For a comparative overview see Table 1.

Distinction feature	**Study1**	**Study 2**
Location:	Indonesia	Ethiopia / Germany
Unit of analysis:	Organisational level: Humanitarian organisation	Individual level: Social entrepreneurs
Types of data:	Qualitative / quantitative	Qualitative
Methods:	Procedural Action Research	Narrative interviews
Main research fields:	Social innovation, organisational search	Social entrepreneurship, individual search, social justice, paradox theory

Table 1: Overview of the differences and similarities of the two studies in this dissertation

2.1 Introduction to research study 1

Study 1 explores the link between social innovation and complexity at the organizational level in the humanitarian sector. In the humanitarian sector, problems are complex, because they are highly local, context-bound, time-specific and path-dependent (Ramalingam *et al.*, 2008). Further, the knowledge that is required to successfully solve these complex