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UNIVERSITY
OF TURKU

ENTREPRENEURIAL FORESIGHT AS ENTREPRENEURS' TRANSFORMATIVE POWER

Inducing contextual change through
opportunity formation

Ksenija Djuricic



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For my son

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ABSTRACT

In future-making activity, such as entrepreneurship, entrepreneurial agency is viewed as the transformative power to change the socio-economic structure on which it depends. Shaped by socio-economic circumstances, entrepreneurial agency is also highly contingent on the agency of other humans, both of which create high complexity and a wide array of indeterminate possibilities for entrepreneurial agency to change the existing socio-economic structure. Therefore, entrepreneurial agency should be observed through entrepreneurs' capacity to engage in structural transformation by acting upon complex relationships between structure and human agents and facing simultaneously the openness of the future. Yet, a lack of knowledge about how entrepreneurs tame such complexity and indeterminacy as well as differing perspectives on entrepreneurial agency deriving from a longstanding debate around how entrepreneurs form opportunities require a deeper understanding of how entrepreneurs employ their transformative power to change their operating structure.

Therefore, this dissertation addresses the phenomenon of entrepreneurial agency in opportunity formation by proposing that entrepreneurs' transformative power lies in their capacity for foresight in considering the complexity of their operating environment and anticipating the future. Drawing upon the foresight literature, this dissertation frames entrepreneurial foresight as individual entrepreneurs' capacity to structure knowledge of the temporal-spatial aspects of the contexts in which they move and operate and to process such knowledge based on their own experience of time. While acknowledging that entrepreneurs ultimately induce structural transformation, this dissertation argues that the change entrepreneurs create begins within their operating contexts. Moreover, this dissertation argues that change emerges in entrepreneurial opportunities, which are entrepreneurs' visions of novel contexts.

However, due to a number of underdeveloped concepts in the entrepreneurship research, such as knowledge, time and temporality in entrepreneurial activity and opportunity formation, interchangeable views of entrepreneurial opportunities as ideas or visions, and the unclarified concept of entrepreneurial foresight, a more

synthesized approach to these concepts is needed. Therefore, to address this complex phenomenon and to synthesize and clarify a number of incoherencies and missing points, this dissertation relies on Giddens' concepts of agency, contexts and time-space.

Based on the theoretical knowledge and empirical findings, I have summarized my key findings into three subpropositions. First, I argue that entrepreneurial opportunities represent entrepreneurs' subjective visions of the novel contexts. In these visions, structural properties and agents' activities from previously known existing contexts are processed and combined in such a way that they produce a change in the agents' behaviour. Second, I state that in opportunity formation knowledge is always spatial first, but once it leads entrepreneurs to frame their contexts, knowledge reveals its temporal aspects that when processed feed entrepreneurs' subjective perceptions of the opportunities' future existence. Third, I contend that entrepreneurial foresight represents the cognitive capacity of entrepreneurs that allows the structuring of operating contexts as systems, the envisioning of future contexts and the subjective and objective evaluations of the potential of newly envisioned contexts' existence in the future. These three subpropositions jointly illustrate the building blocks of entrepreneurial foresight as entrepreneurs' transformative power to induce contextual change through opportunity formation. Accordingly, to answer the main research question and fulfil the main aim of this dissertation, my main proposition is that when forming opportunities, entrepreneurs employ foresight to cognitively process and systemically structure their acquired knowledge of the contexts and then subjectively experience temporal and spatial aspects to create futures knowledge.

This interdisciplinary research brings new insights to the entrepreneurship and foresight research. In uncovering entrepreneurs' agentic power in inducing change within the contexts throughout which they move, this dissertation provides deeper topical knowledge of the relevant concepts in the entrepreneurship and foresight literature. Moreover, this research provides some practical implications for entrepreneurs, entrepreneurship educators and advisers and other actors who support entrepreneurship.

KEYWORDS: entrepreneurial foresight, entrepreneurial opportunity, opportunity formation, knowledge, cognition, entrepreneurial contexts, time-space, temporality

TURUN YLIOPISTO

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TIIVISTELMÄ

Tulevaisuutta luovassa toiminnassa, kuten yrittäjyydessä, yrittäjämäinen toimijuus nähdään muutosvoimana, joka muokkaa sosioekonomista rakennetta, josta yrittäjyys on riippuvainen. Sosioekonomisten olosuhteiden muovaama yrittäjämäinen toimijuus on myös erittäin riippuvainen muiden ihmisten toiminnasta. Yhdessä nämä luovat monimutkaisuutta ja laajan valikoiman määrittelemättömiä mahdollisuuksia yrittäjämäiselle toimijuudelle muuttaa vallitsevaa rakennetta. Yrittäjämäistä toimijuutta tulisikin tarkastella yrittäjien kykynä osallistua rakenteelliseen muokkaamiseen, kun he hyödyntävät rakenteiden ja inhimillisten tekijöiden monimutkaisia suhteita kohdatessaan avoimen tulevaisuuden tarjoamia mahdollisuuksia. Puutteellinen tieto yrittäjien tavoista ottaa haltuun tällaista monimutkaisuutta ja epämääräisyyttä sekä pitkään jatkuneen keskustelun synnyttämät erilaiset näkemykset yrittäjien tavoista muodostaa mahdollisuuksia edellyttävät tarkempaa ymmärrystä siitä, kuinka yrittäjät käyttävät muutosvoimaansa muuttaakseen toimintaympäristöään.

Tämä väitöskirja käsittelee yrittäjämäisen toimijuuden ilmiötä mahdollisuuksien muodostamisessa ja ehdottaa, että yrittäjien muutosvoima piilee heidän kyvyssään ennakoida toimintaympäristönsä monimutkaisuutta ja tulevaisuutta. Ennakointia käsittelevään kirjallisuuteen pohjautuen väitöskirja muotoilee yrittäjämäisen ennakkoinnin yksittäisten yrittäjien kykynä jäsentää tietoa toimintakontekstinsa aika-avaruudellisista näkökohdista ja käsitellä tätä tietoa oman aikakokemuksensa perusteella. Vaikka aiemmin on tunnustettu, että yrittäjät saavat lopulta aikaan rakenteellisia muutoksia, tässä väitöskirjassa esitetään, että yrittäjien aikaansaama muutos alkaa heidän toimintaympäristöstään. Lisäksi väitöskirjassa väitetään, että muutos syntyy yrittäjämäisinä mahdollisuuksina, jotka ovat yrittäjien visioita uusista konteksteista.

Useat yrittäjyystutkimuksissa käytettävät käsitteet ovat kuitenkin kehittymättömiä, kuten yrittäjämäistä toimintaa ja mahdollisuuksia koskeva tieto, aika ja ajallisuus, vaihtelevat näkemykset yrittäjämäisestä mahdollisuudesta ideana tai visiona sekä yrittäjämäisen ennakkoinnin epäselvä käsite, ja niiden tarkasteluun on vaadittu aiempaa syntetisoidumpaa lähestymistä. Tällaisen

monimutkaisen ilmiön käsittelemiseksi sekä useiden epäjohdonmukaisuuksien ja puuttuvien kohtien selkiyttämiseksi ja syntetisoimiseksi tämä väitöskirja tukeutuu Giddensin toimija-, konteksti-, ja aika-avaruuskäsitteisiin.

Olen tiivistänyt teoriaan ja empiirisiin havaintoihin perustuen keskeiset tulokseni kolmeen osaväittämään. Ensinnäkin väitän, että yrittäjämäinen mahdollisuus edustaa yrittäjän subjektiivista näkemystä uudesta kontekstista, jossa aiemmin tunnistettuja rakenteellisia ominaisuuksia ja toimijoiden toimintaa käsitellään ja yhdistellään siten, että ne muuttavat toimijoiden toimintaa. Toiseksi väitän, että mahdollisuuksien muodostuksessa tieto on aina ensin avaruudellista, kunnes yrittäjät muodostavat tiedosta omia kontekstejaan, jolloin tiedon ajallinen ominaisuus paljastuu. Tämä muokkaa yrittäjien subjektiivisia näkemyksiä mahdollisuuksien olemassaolosta tulevaisuudessa. Kolmanneksi väitän, että yrittäjämäinen ennakointi edustaa yrittäjien kognitiivista kykyä, joka mahdollistaa toimintakontekstien jäsentämisen järjestelmiksi, tulevaisuuden kontekstien visioinnin sekä visioitujen kontekstien potentiaalinen objektiivisen ja subjektiivisten arvioinnin. Yhdessä nämä kolme osaväittämää havainnollistavat yrittäjämäisen ennakkoinnin roolia yrittäjien muutosvoimana, joka mahdollisuuksia muodostamalla saa aikaan muutoksia yrittäjämäisen toiminnan kontekstissa. Täten keskeisin väittämäni väitöskirjan päätutkimuskysymykseen ja tavoitteen saavuttamiseksi on, että muodostaessaan mahdollisuuksia yrittäjät hyödyntävät ennakointia, jolla he prosessoivat kognitiivisesti ja jäsentävät systemaattisesti konteksteista hankittua tietoa, ja joka tarjoaa subjektiivisen kokemuksen tiedon ajallisista ja avaruudellisista ominaisuuksista, joilla yrittäjät luovat uutta tietoa tulevaisuutta varten.

Tämän tutkimuksen poikkitieteellinen ote tuo uusia näkemyksiä yrittäjyyden ja ennakkoinnin aloille. Väitöskirja osoittaa yrittäjämäisen toimijuuden voiman muutosten aikaansaamisessa konteksteissa joissa yrittäjät liikkuvat, ja tarjoaa uutta syvempää tietoa yrittäjyys- ja ennakointikirjallisuuden keskeisistä käsitteistä. Väitöstyö tarjoaa myös käytännön tietoa yrittäjille, yrittäjyyskasvattajille sekä yrittäjiä ja yrittäjyyttä tukeville toimijoille.

AVAINSANAT: yrittäjämäinen ennakointi, yrittäjämäinen mahdollisuus, mahdollisuuksien muodostaminen, tieto, kognitio, yrittäjämäiset kontekstit, aika-avaruus, ajallisuus

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Belgrade, 29.07.2022

Ksenija Djuricic



KSENIJA DJURICIC

A philologist turned academic in entrepreneurship and futures studies, Ksenija Djuricic works as a researcher and teacher at the EM Strasbourg Business School. Her research and teaching cover entrepreneurial complex and future-oriented cognition and the way entrepreneurs create futures knowledge, process temporal and spatial aspects of their operating contexts and act upon the unknown and unknowable future. Alongside her academic and pedagogical work, Ksenija feeds her passion for creative expression by writing poetry and short stories.

Table of Contents

Acknowledgements	8
Table of Contents	10
List of Original Publications	13
1 Introduction	14
1.1 Key concepts	16
1.2 Research objectives and positioning	19
1.3 Structure of the dissertation	26
2 Locating entrepreneurial opportunities within the time-space of entrepreneurial contexts	28
2.1 From a dichotomous to a dual view of entrepreneurial opportunities	29
2.2 Opportunities as ideas or visions: A matter of contextual knowledgeability and reflexive monitoring	31
2.3 The temporal-spatial contextualization of entrepreneurial opportunities	35
2.3.1 The spatial aspects in entrepreneurial contexts	36
2.3.2 The temporal aspects in entrepreneurial contexts	37
2.3.3 Giddens' temporal triad in entrepreneurial opportunities	38
3 Entrepreneurial foresight: Entrepreneurs'-agents' power to envision change within entrepreneurial contexts	40
3.1 Temporal-spatial aspects of knowledge in foresight and entrepreneurial opportunities	41
3.1.1 Codified (objective) knowledge	43
3.1.2 Embodied (expert) knowledge	44
3.1.3 Articulated knowledge	45
3.1.4 Future-oriented (new) knowledge	46
3.2 Building theoretical framework	48
4 Methodology	50
4.1 Reflections on epistemological and methodological approaches	50
4.2 Research design and methods	52

4.3 Collection of empirical material and selection of participants.....	54
4.4 Methods of data analysis	55
4.5 Reflections on the conceptual article (Article 4).....	58
5 Overview of the research articles _____	59
5.1 The writing and development process of the research articles	59
5.2 Summary of research article 1	62
5.3 Summary of research article 2	63
5.4 Summary of research article 3	64
5.5 Summary of research article 4	65
6 Discussion and conclusions _____	67
6.1 Main findings and propositions.....	67
6.2 Theoretical implications.....	80
6.3 Methodological implications	83
6.4 Practical implications.....	84
6.5 Limitations and future directions	85
Abbreviations _____	89
List of References _____	90
Original Publications _____	99

Tables

Table 1.	Research questions, studies, empirical material, methods	21
Table 2.	Characteristics and temporal and spatial aspects of knowledge in foresight and entrepreneurial opportunities	42
Table 3.	Material collection, participants, research design and methods	52
Table 4.	Overview of the focus, units and methods of analysis of the articles	57
Table 5.	The authors' contributions in the research articles	60
Table 6.	Development of the articles	61
Table 7.	Overview of the dissertation	69

Figures

Figure 1.	Giddens' temporal triad in entrepreneurial opportunities	39
Figure 2.	Theoretical framework	49

List of Original Publications

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

- I Djuricic Ksenija & Bootz Jean-Philippe. Effectuation and foresight – An exploratory study of the implicit links between the two concepts. *Technological Forecasting and Social Change*, 2019; 140: 115-128.

- II Djuricic Ksenija. Knowledge dynamics in opportunity-vision (trans)formation. The earlier versions of this research article were presented at the *Futures Conference 2021* and the *RENT Conference 2021*.

- III Djuricic Ksenija, Stenholm Pekka & Krueger Norris F. Thinking Over the Horizon: Entrepreneurial Cognition in Complex, Far-off Tasks. The earlier version of this research article was presented at the *RENT Conference 2020*.

- IV Djuricic Ksenija, Stenholm Pekka & Krueger Norris F. Entrepreneurial Foresight in Opportunity Formation: Toward Operationalization of Entrepreneurial Expertise. The earlier versions of this research article were presented at the *EURAM Conference 2021* and at the *AOM Symposium on Neuroentrepreneurship 2021*.

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1 Introduction

Future-oriented (Gartner, Bird, and Srarr 1992; Shane and Venkataraman 2000; Sarasvathy 2001; McMullen and Dimov 2013; Thompson and Byrne 2022) entrepreneurship is viewed as transformative activity that induces change in social and economic structure (Sarason, Dean, and Dillard 2006; Dimov 2020; McMullen, Brownell, and Adams 2021). In such activity, which may result in new venture creation (Gartner 1985) or more generally in new value creation (Bruyat and Julien 2001), entrepreneurs as agents act upon the structure that may enable or constrain their action (Davidsson, Recker, and Von Briel 2020). In addition to the aggregate dimension of various economic–social–political–technological conditions that constitute its structure (Shane 2012; Davidsson, Recker, and Von Briel 2020), entrepreneurial activity is highly contingent on the agency of other humans (Sarasvathy 2001; Alvarez, Barney, and Anderson 2013; Goss and Sadler-Smith 2018), both of which create complexity and produce different degrees of uncertainty for entrepreneurs (Milliken 1987; McKelvie, Haynie, and Gustavsson 2011; Packard, Clark, and Klein 2017). There is a growing consensus that the operating environment in which entrepreneurial activity unfolds should be observed in terms of its duality (Davidsson 2021; McMullen, Brownell, and Adams 2021); that is, it encompasses the interplay between structure and other human agents. However, we still lack a deeper understanding of what underlies entrepreneurs' transformative power and how entrepreneurs use it. This issue derives from a longstanding debate around the nature of entrepreneurial opportunities as a central phenomenon and concept in the entrepreneurship literature (Krueger 2003; Dimov 2011; Berglund and Korsgaard 2017; Alvarez and Barney 2020) and the way they are formed (Chiasson and Saunders 2005; Barreto 2012).

The multifaceted, umbrella concept of entrepreneurial opportunities (Wood and McKinley 2020), points to three things: 1) the structural properties and circumstances that frame entrepreneurial activity and action, 2) entrepreneurial agency, which understands both the way entrepreneurs use their cognition in complex and uncertain contexts, and their intentions and efforts to bring about change, and finally, 3) the process they undergo from imagining change through reaching a transformed future, which is the final outcome of all these elements (Sergeeva, Bhardwaj, and Dimov 2021). Yet, despite the relevance of the concept of entrepreneurial opportunities for entrepreneurship and other research fields (Alvarez and Barney 2020), the divergent perspectives on how opportunities are formed have led some scholars to reconsider the concept and even dismantle it (Foss and Klein 2020; Davidsson 2021).

Prior research has investigated opportunity formation from different perspectives.

Initially, it was suggested that entrepreneurial opportunities are created by exogenous shocks in the external environment, that is, structure in the form of political or societal change (Schumpeter 1939) or technological advancements (Tushman and Anderson 1986), for example. Known as discovery theory (Venkataraman 1997; Shane and Venkataraman 2000), this view focuses on the transformational nature of structure, while reducing the transformative role of entrepreneurs as agents to their capacity to discover these changes due to their alertness (Kirzner 1973). In response to discovery theory, creation theory conceptualizes opportunities as the outcomes of entrepreneurs' interactions with other agents, while neglecting the relevance of the afore-mentioned structural properties (Saravathy 2001; Alvarez, Barney, and Anderson 2013). These two approaches to entrepreneurial opportunities have generated a dichotomous view of the concept, thus fragmenting knowledge and rendering conceptualizing opportunities ineffective (Foss and Klein 2017, 2020; Davidsson 2021). Unified in the objective to synthesize knowledge about entrepreneurial activity and therefore about entrepreneurial opportunities, scholars in the field have converged towards embracing the dual nature of entrepreneurship, thus recognizing the relevance of both structure and agency in entrepreneurial activity (Davidsson 2021). With reference to Giddens' structuration theory, entrepreneurship scholars call to embrace the co-dependency of structure and agency but with the specific aim of uncovering the transformative power of entrepreneurs as agents in bringing structural change (McMullen, Brownell, and Adams 2021; Sarason, Dean, and Dillard 2006; Sarason, Dillard, and Dean 2010).

The alternative theory of entrepreneurial opportunities called the idiosyncrasy view (Davidsson 2015, 2021) appears to be one of the promising ways not only to look at the phenomenon of entrepreneurial opportunities but also to understand what underlies entrepreneurs' transformative power in the opportunity formation process. In looking at entrepreneurial opportunities as products of the interplay between structure and agency, the idiosyncrasy view grants a relevant place to the uniqueness of the cognition of entrepreneurs as agents (Dimov 2007, 2020; Wood and McKinley 2010; Sarason, Dean, and Dillard 2006; Berglund, Bousfiha, and Mansoori 2020). It is the uniqueness of entrepreneurs' cognition in terms of their imagination and future orientation that has led proponents of the idiosyncrasy view to conceptualize entrepreneurial opportunities as ideas and/or visions (Sarason, Dean, and Dillard 2006; Dimov 2007, 2020; Wood and McKinley 2010; Berglund, Bousfiha, and Mansoori 2020). According to this view, structural transformation is the process of refining an entrepreneur's initial idea or vision that happens when the entrepreneur dives deep into the complexity created by the environmental structure and human agency. The complexity in which entrepreneurs operate stems from a multitude of possible interactions between the elements (Clarysse, Tartari, and Salter 2011) and creates indeterminacy that relates to a multitude of possible outcomes of these interactions, which cannot be known

in advance (Hoffman, Klein, and Miller 2011; Mill 1882). Therefore, entrepreneurs engage in structural transformation by acting upon complex relationships between structure and human agents, while facing the openness of the future.

Considering the complexity of the operating environment and anticipating the future have been viewed as the underlying elements of individuals' capacity for foresight (Whitehead 1967; Tsoukas and Shepherd 2004). However, while foresight has mainly been viewed as an organization's capacity to transform itself while interpreting and reacting to the external environment (Tsoukas and Shepherd 2004), little is known about individual entrepreneurs' foresight and how they use that capacity to transform the structure in which they operate (Fuller, Argyle, and Moran 2004; Fuller and Warren 2006). The scarce literature discussing entrepreneurial foresight connects it with entrepreneurs' activity of discovering opportunities (Jafari-Sadeghi, Kimiagari, and Biancone 2019; Hajizadeh and Valliere 2022), thus viewing entrepreneurial foresight as the capacity to respond to the transformational nature of structure, while neglecting to observe its transformative side. Yet, in considering foresight as the capacity entrepreneurs tap into while acting upon structural complexity and the complexity of other human agents with the aim of transforming structure, we will be able to understand in depth entrepreneurs' transformative power and shed light on some aspects that have remained incoherent and underdeveloped in the idiosyncrasy view of entrepreneurial opportunities and their formation. Thus, this dissertation helps explain these incoherencies and insufficiently clarified links by bringing foresight into the dual perspective of opportunity formation.

1.1 Key concepts

One incoherency is related to the conceptualization of entrepreneurial opportunities. The idiosyncrasy approach views entrepreneurial opportunities interchangeably as entrepreneurs' evolving ideas and/or visions. However, the literature on these concepts indicates that ideas are related to problem solving (Runco and Chand 1994; Verganti 2010). Additionally, entrepreneurship scholars highlight that ideas are relevant in understanding entrepreneurial opportunities (Hill and Birkinshaw 2010)—that an opportunity may begin with an idea but that an idea is not an opportunity per se (Vogel 2017). Conversely, visions appear to translate into imaginings of a future evolution of a system (Strange and Mumford 2002, 2005). The literature on foresight argues that visions hold knowledge about the future, which is subjective and interpretative (Dufva and Ahlqvist 2015b). Therefore, to fully grasp the transformative power of entrepreneurs, we need to understand the interplay between the conceptualizations of opportunities—ideas and opportunities—visions, which appears to be no mere language play.

Another underdeveloped element is related to the relevance of knowledge in opportunity formation (Dimov 2007; Erikson and Korsgaard 2016). One of the main

focuses in terms of knowledge in entrepreneurial opportunities is on entrepreneurs' prior knowledge related to the industry and markets in which they operate (Shane 2000; Ardichvili, Cardozo, and Ray 2003) and their knowledge of the structural properties as a more objective kind of knowledge (Sarason, Dean, and Dillard 2006; Alvarez, Barney, and Anderson 2013). Both entrepreneurs' prior domain-specific knowledge and their knowledge of entrepreneurial practice are relevant in forming opportunities–ideas (Dimov 2007; Wood and McKinely 2010). However, if such knowledge allows the initial conception of opportunities–ideas, it is argued that heterogeneous knowledge sought among other agents, including different stakeholders or peers, contributes to further evaluation and shaping of the initially generated ideas (Dimov 2007; Wood and McKinely 2010; Berglund, Bousfiha, and Mansoori 2020). It has also been argued that opportunities hold entrepreneurs' future-looking knowledge (Erikson and Korsgaard 2016), which is frequently equated with beliefs (Shepherd, McMullen, and Jennings 2007; McMullen and Shepherd 2006) and subjective judgments about the unknown and unknowable future (Knight 1921), and that opportunities are associated with a certain degree of confidence about their potential in the future (Dimov 2010). While the dual view of opportunities expressed in the idiosyncrasy approach assumes the existence and relevance of all these 'types' of knowledge, it remains unclear (1) what the underlying properties of knowledge entrepreneurs rely on are and (2) how entrepreneurs make use of such knowledge in opportunity formation. In studying the knowledge problem entrepreneurs face (Townsend et al. 2018) and the unknowable nature of entrepreneurial opportunities (Ramoglou 2021), the current entrepreneurship literature has failed to address the aforementioned questions. However, in observing how different types of knowledge lead to the emergence of knowledge about the future (Dufva and Ahlqvist 2015b), the literature on foresight allows us to shed light on the 'unknowability' of entrepreneurial opportunities.

The last and equally relevant element that requires further development is related to time and temporality in entrepreneurial opportunities and the opportunity formation process. Time in entrepreneurial opportunities is reflected in the temporal dimensions of the past, present and future. As Sergeeva, Bhardwaj, and Dimov argue 'navigating the entrepreneurial journey entails looking ahead to decide what to do next as well as looking back to take stock and learn' (2021, 1). Additionally, time is related to entrepreneurs'–agents' time perceptions expressed in their imagination or judgment (Klein 2008; Davidsson 2015; Dimov 2010, 2020). In terms of opportunities as visions (Dimov 2020), opportunities as part of the entrepreneurial journey unfold in time, that is, towards the future (McMullen and Dimov 2013), which indicates the opportunities' emergent nature (Lichtenstein and Kurjanowicz 2010; Selden and Fletcher 2015). However, operating within the entrepreneurial contexts (Welter 2011) also means operating within the historical time permeating these contexts and understanding an individual entrepreneur's capacity to experience (Welter and Baker 2021; Johnsen and Holt 2021) or calibrate time (Wood, Bakker, and Fisher 2021). Yet, while these studies

have advanced our understanding of the temporality of entrepreneurial action and therefore of entrepreneurial opportunities, they have neglected to bring to the fore the temporality of other agents also involved in opportunity formation, which is implicit in creation theory (Alvarez, Barney, and Anderson 2013). Therefore, we should strive to thoroughly understand entrepreneurs' power to transform structure; however, we cannot do so without examining the time and temporality of structure, other agents and entrepreneurs themselves. Here again, foresight with its quality of temporal reflexivity, which means synthesizing different temporal landscapes (Cunha 2004), can help us elucidate how entrepreneurs rely on these temporal aspects to transform structure.

To clarify these underdeveloped yet central elements of entrepreneurial (transformative) agency in opportunity formation, this dissertation focuses on entrepreneurial foresight in shaping opportunity formation. Theoretically, the synthesis part of this dissertation relies on Giddens' structuration theory (Giddens 1976, 1984) that has previously been employed in the literature on entrepreneurial opportunities (Sarason, Dean, and Dillard 2006; Sarason, Dillard, and Dean 2010; Chiasson and Saunders 2005). In its intention to extend the view on entrepreneurs' transformative power that induces change in the existing structure (Dimov 2020; McMullen, Brownell, and Adams 2021) by creating new value (Bruyat and Julien 2001), this dissertation employs three concepts in Giddens' theory that are entwined and equally relevant in the entrepreneurship literature: (1) agency that relates to agents' cognition discussed as knowledgeable and reflexive monitoring in relation to (2) contexts and the situated interactions between agents, encompassing both institutionalized structure and agents' behaviour (Giddens 1984, 139–144) and as such always positioned in (3) time and space, treated in Giddens' ontology of time (Giddens 1981). These three concepts are taken as crucial in elucidating the phenomenon of structural change in opportunity formation and with it entrepreneurs' transformative power. Using Giddens' structuration theory and ontology of time, this dissertation sheds light on the contextual temporal–spatial nature of knowledge that entrepreneurs acquire and subjectively process to bring new value and thus change the existing structure of the contexts in which entrepreneurs operate. Therefore, I view entrepreneurial opportunities as contextual changes. However, prior to become a part of the structure, I view these contextual changes as entrepreneurs' anticipated construals that underlie their purposiveness as transformative agents.. Throughout this dissertation, I argue that in acquiring, structuring and processing such temporal–spatial knowledge, entrepreneurs employ foresight. I define foresight as a futures knowledge-building activity (Pirainen and Gonzalez 2015; Dufva and Ahlqvist 2015b) that unfolds through entrepreneurs' capacity to structure and process both knowledge and time (Fuller, Argyle, and Moran 2004; Fontela et al. 2006; Karlsen, Øverland, and Karlsen 2010; Cunha 2004). Furthermore, I elaborate on four types of knowledge that constitute futures knowledge—codified, embodied, articulated and future-oriented knowledge (Dufva and Ahlqvist 2015b)—that entrepreneurs employ in opportunity formation.

Additionally, I complement these types of knowledge by elucidating their spatial (Welter 2011) and temporal aspects (Giddens 1981), thus arguing for the temporal-spatial contextuality of knowledge in opportunity formation. By examining how entrepreneurs structure such temporal-spatial knowledge and process it based on their own temporal experience, I argue that their transformative power lies in foresight, which allows them, prior to creating novel contexts, to envision them as opportunities.

1.2 Research objectives and positioning

This dissertation focuses on entrepreneurial foresight in opportunity formation and in the synthesis part relies on Giddens' structuration theory and ontology of time (Giddens 1976, 1981, 1984). Despite different conceptualizations of entrepreneurial opportunities, there is a broad consensus among entrepreneurship scholars that entrepreneurial opportunity represents societal change (Dimov 2020; McBride and Wuebker 2022; Sergeeva, Bhardwaj, and Dimov 2021). At the same time, entrepreneurs' transformative power, in reference to Giddens' thought, has been seen as the capacity to induce change in the existing structure (McMullen, Brownell, and Adams 2021; Sarason, Dean, and Dillard 2006). Before I outline the aim and positioning of this dissertation, I wish to reflect briefly on the concepts of structure and structural (social) change in Giddens' work and their use in the entrepreneurship literature. Giddens developed his structuration theory in response to a dualistic view of the relationship between the social structure and agents, whereby the social structure was viewed as external to human action (Giddens 1984, 16). It is noteworthy that the objective of structuration theory is to explain the constitution of human society and how social systems are produced and reproduced through human agency, which is guided by the very structural properties of the social systems that agency reproduces. All social systems are regulated by structure—sets of rules and resources (*ibid.*, 25). However, structure can only be observed in social systems through the structural properties that guide agents' conduct through the principles of signification, legitimation and domination. Legitimation and domination refer to the institutional order. The legitimation principle derives from legal institutions, while the domination principle stems from the political and economic institutions of social systems (*ibid.*, 31). The domination principle in social systems is based on resources, both material and social, in terms of agents' organization in time and space. These resources and the rules that routinize agents' behaviour (*ibid.*, 19) are governed by the legitimation principle. This is conveyed to agents through the signification principle, which gives meaning to agents regarding the rules and resources, thus regulating their behaviour. It is through the order of signification that refers to modes of discourse (i.e. communication) that agents reproduce the structural properties of their social systems through their social practices. These social practices are produced and reproduced in the interactions between knowledgeable agents who encounter each other in the temporal-spatial situated settings of a social system,

labelled as contexts (ibid., 85). These are the main tenets of Giddens' duality of structure.

In addition to explaining the production and reproduction of structural properties through human agency, structuration theory also tackles the question of social change. For Giddens, social change rests in the time–space connections between social systems of different structural types that hold different resources. Further, social change can only be observed through world time, which 'concerns the varying conjunctures in history that may affect the conditions and outcomes of seemingly similar episodes' (ibid., xxix). Therefore, a social change may only be observed through time. However, change that entrepreneurs bring into existence through opportunity formation is viewed not as social change but as change in a socio-economic system in which entrepreneurs operate (Sarason, Dean, and Dillard 2006; Dimov 2020). According to Giddens, within such systems all human agents and therefore entrepreneurs move and live within the contexts, the time–spaces of human interactions (ibid., 70–71). As such, contexts provide agents both their dependence on regularized practices and allow them some degree of freedom to exert their power (ibid., 16).

Giddens' view of change as the outcome of individuals' power to store knowledge about resources and disseminate it through social interactions (Giddens 1984, 258–261) indicates that change emerges as agents move and encounter each other within contexts. Therefore, should we wish to understand entrepreneurs' power to bring change through opportunity formation, we need to observe entrepreneurs' agency within the context(s) in which they move and operate. Furthermore, Giddens' contention that agents' power lies in their knowledgeability and reflexive monitoring, the constitutive elements of their agency, and that these elements are always related to contexts renders the concept of contexts crucial in understanding entrepreneurial agency and its capacity to induce change. Therefore, this dissertation does not aspire to empirically apply the tenets of Giddens' structuration theory but to make use of some of the crucial concepts of the theory such as agency, contexts, time-space, as an alternative conceptual framework to articulate, synthesize and clarify existing concepts in the literature on entrepreneurship and foresight, thus providing a coherent picture of the studied phenomenon.

The main objective of this dissertation is to propose **entrepreneurial foresight as entrepreneurs' transformative power in inducing contextual change**. While the term "to induce" understands bringing something into existence, thus indicating the action of causing an outcome, I would like to draw the attention to the idea that, prior to bringing contextual changes into existence, these contextual changes represent entrepreneurs' anticipated construals of novel contexts. In that sense, before they become a part of the structure, entrepreneurs' anticipated construals of contextual changes are their 'projects' (Giddens 1976) that underlie their purposiveness as transformative agents. With this in mind, to achieve the objective, it is relevant to understand **how entrepreneurs employ foresight in opportunity formation**, which is the main question of this dissertation. This overarching question is addressed using three subquestions that are elaborated in detail below. The research questions, empirical material and methods are divided across

the synthesis part of this dissertation and the original articles, as illustrated in Table 1.

Table 1. Research questions, studies, empirical material, methods

Main research question	How do entrepreneurs employ foresight in opportunity formation?		
	Study	Empirical material	Method
<i>How can entrepreneurial opportunities be (re) conceptualized from the dual perspective?</i>	Synthesis 2 3	Literature Interviews Interviews	Literature review Critical decision-making method Cognitive task analysis combined with foresight scenario method
<i>How are the knowledge and temporal-spatial aspects of entrepreneurial contexts entwined in the opportunity formation process?</i>	Synthesis 2 3	Literature Interviews Interviews	Literature review Critical decision-making method Cognitive task analysis combined with foresight scenario method
<i>What are the structuring dimensions of entrepreneurial foresight?</i>	1 2 3 4	Interviews Interviews Interviews Literature	Semi-structured interviews Critical decision-making method Cognitive task analysis combined with foresight scenario method Literature review

Given the complex, multifaceted and even elusive nature of both entrepreneurial opportunities (Dimov 2011) and foresight (Minkkinen, Auffermann, and Ahokas 2019; Major, Asch, and Cordey-Hayes 2001), it is necessary to identify and clarify these concepts' building blocks. Therefore, the first question is related to the conceptualization of entrepreneurial opportunities. To reconcile the issue of whether entrepreneurial opportunities represent exogenous shocks from the environment and are therefore independent of entrepreneurs (Shane and Venkataraman 2000; Shane 2012) or whether they are products of entrepreneurs' actions and their social interactions (Saravathy 2001; Alvarez and Barney 2007), a number of entrepreneurship scholars have used Giddens' structuration theory to argue for the dual nature of entrepreneurial opportunities. Chiasson and Saunders (2005) suggest examining different approaches to opportunity formation that have the underlying assumption of opportunities as discovered (or recognized) or created from the perspective of structuration theory (Giddens 1976, 1984). Although their overall conclusion was that opportunities are both discovered and created, (i.e. dependent on structure and entrepreneurs' agency), they did not propose any formal conceptualization of entrepreneurial opportunities. In the same vein, using structuration theory, Sarason, Dean, and Dillard (2006) propose an amendment to discovery theory by contending that opportunities are not merely discovered but 'are created by the entrepreneur through recursive processes of interpretation and influence' (Sarason, Dean, and Dillard 2006, 294). Their initial conceptualization of opportunities as entrepreneurs' ideas is echoed in other researchers' work that (even implicitly) embraced the dual nature of opportunities.

Thus, since Sarason, Dean, and Dillard's work, entrepreneurial opportunities have been conceptualized interchangeably as ideas and visions, emphasizing the idiosyncratic nature of entrepreneurs' interpretative and imaginative capacity (Sarason, Dean, and Dillard 2006; Dimov 2007; Berglund, Bousfiha, and Mansoori 2020; Dimov 2020).

The first issue with such conceptualizations is the initial meaning these two concepts hold. While ideas represent the outcomes of one's creativity based on domain-specific knowledge (Amabile 1996), visions appear to hold not only a deep knowledge of a system but also imagination regarding its future evolution (Strange and Mumford 2002, 2005). Furthermore, while visions are argued to hold knowledge about the future (Dufva and Ahlqvist 2015b) and are products of the anticipatory capacity of individuals (Shipman, Byrne, and Mumford 2010), ideas are related to problem solving (Runco and Chand 1994), and scholars have remained silent on the future-oriented nature of ideas. Additionally, entrepreneurship scholars consider ideas as a crucial (Hill and Birkinshaw 2010) but not sufficient step in forming opportunities (Dimov 2007; Vogel 2017), serving as a trigger to collect more knowledge (Vogel 2017; Berglund, Bousfiha, and Mansoori 2020). Conversely, an entrepreneurial vision is viewed as a 'future-oriented image of the new venture, intended to motivate both the entrepreneurs and their followers toward this desirable future' (Ruvio, Rosenblatt, and Hertz-Lazarowitz 2010, 145, cited in Preller, Patzelt, and Breugst 2020). Thusly defined, entrepreneurial vision is related to the future evolution of an existing business venture. However, opportunities are claimed to be visions of the potential business ventures that are still 'not there' but exist in the future (Dimov 2020), thus differing from the conceptualization of entrepreneurial vision. Therefore, it is necessary to understand what lies behind the conceptualizations of opportunities—ideas and opportunities—visions.

The second issue with such conceptualizations is the focus on the idiosyncratic nature of entrepreneurs' knowledge and cognition, which appears to somehow isolate entrepreneurs by putting too much emphasis on their individual cognitions while neglecting a multi-stakeholder view of entrepreneurship (Davidsson 2021, 8). However, this suggestion can be justified only if we believe that an individual entrepreneur has generated an idea or a vision independently of other humans' agency, which does not hold ground. Even if entrepreneurs' cognitions have an embodied dimension, they are also socially situated (Sassetti et al. 2018; Mitchell and Mitchell 2011). This 'social situatedness' is notably expressed in Giddens' view of contexts, whereby contexts, in a wider sense, represent the situated interactions between agents and encompass both institutionalized structure (political and economic structure) and agents' behaviour (Giddens 1984, 139–144). As such, duality is reflected in contexts. Sarason, Dean, and Dillard (2006) neglect this element; rather, they focus on change within the (institutionalized) structure that begins with an entrepreneur's idea or vision and do not elaborate on how this idea or vision comes into being. Therefore, conceptualizing entrepreneurial opportunities from the perspective of entrepreneurs' knowledgeability and reflexivity as Sarason, Dean, and Dillard suggest needs to be refined by situating entrepreneurs' agency in

their operating contexts, which not only includes the institutional dimension but also spatial (regional), social and business dimensions (Welter 2011; Welter and Baker 2021). Given these two missing elements, the first subquestion of this dissertation is: ***How can entrepreneurial opportunities be (re)conceptualized from the dual perspective?***

As we may see, embracing entrepreneurs' knowledgeability and reflexivity in conceptualizing entrepreneurial opportunities from the dual perspective requires situating entrepreneurs in the contexts in which they operate, for all agents' knowledge is limited to the contexts in which they move (Giddens 1984, 91–92). This means that we need to view entrepreneurs' knowledge in relation to entrepreneurial contexts (Welter 2011). Yet, if entrepreneurial contexts have spatial aspects, they also have temporal ones (Welter 2011; Welter and Baker 2021), which makes entrepreneurs' knowledge dependent on both space and time (Fritsch and Wyrwich 2018). Existing research on entrepreneurs' knowledge in opportunity formation has provided relevant insights into the different types of knowledge they use in that regard. Therefore, proponents of the assumption that opportunities are discovered have shed light on the influence of prior knowledge and experience on opportunity formation (Shane 2000; Ardichvili, Cardozo, and Ray 2003; Baron 2006). However, scholars who view opportunities as created point at the relevance of heterogeneous knowledge coming from other agents (Venkataraman et al. 2012; Alvarez, Barney, and Anderson 2013). Finally, with a growing view of the relevance of entrepreneurs' imaginative capacity, a particular place has also been given to entrepreneurs' future-looking knowledge (Erikson and Korsgaard 2016). Nevertheless, in line with the dual perspective on entrepreneurial opportunities and therefore entrepreneurs' situatedness in their contexts, it is necessary to examine these different types of entrepreneurs' knowledge as contextual, situated in time and space. Therefore, the second subquestion of this dissertation is: ***How are the knowledge and temporal-spatial aspects of entrepreneurial contexts entwined in the opportunity formation process?***

Finally, to fully address the overarching question of this dissertation, it is necessary to frame the concept of entrepreneurial foresight in opportunity formation. This requires a deeper examination of the concept in general, as foresight is a multifaceted concept that has been theorized about from different perspectives (Minkkinen, Auffermann, and Ahokas 2019; Major, Asch, and Cordey-Hayes 2001). Thus, the futures and foresight literature simultaneously views foresight as a process (Miles 2010), a set of methods (EFILWC 2003) and an organizational competence and capability (Rhisiart, Miller, and Brooks 2015; Jafari-Sadeghi, Kimiagari, and Biancone 2019) that allows exploration of the long-term futures by analysing the current environment, which facilitates decision making and action in the present to achieve desired changes in the future (Martin 2010; Minkkinen, Auffermann, and Ahokas 2019). Foresight is more frequently viewed as a process or activity of futures knowledge creation (Miles et al. 2008; Piirainen and Gonzalez 2015; Dufva and Ahlqvist 2015b). In addition, various settings have generated different views of foresight as strategic (Slaughter 2002; Coates 2010; Godet 2010), industrial (Hamel and Prahalad 1994), corporate (Rohrbeck and Gemünden 2011; Rohrbeck,

Battistella, and Huizingh 2015) and organizational foresight (Paliokaitė and Pačesa 2015).

Foresight has also been applied to entrepreneurial activity, leading to the conceptualization of entrepreneurial foresight (Fuller, Argyle, and Moran 2004; Fuller and Warren 2006; Fontela et al. 2006; Hajizadeh and Valliere 2022). In the scarce research on foresight in entrepreneurial activity, foresight is viewed as a capacity or competence of a firm, as well as being inherently individual (Fuller, Argyle, and Moran 2004; Fuller and Warren 2006). Individuals' entrepreneurial foresight is viewed as a capacity to interpret the operating environment (Fuller, Argyle, and Moran 2004) and is related to individuals' cognitions and reflexivity (Fuller and Warren 2006) and entrepreneurs' capacity to imagine the futures (Fontela et al. 2006). More recently, entrepreneurial foresight has been viewed both as the ability to and a process to discover future business opportunities (Jafari-Sadeghi, Kimiagari, and Biancone 2019; Hajizadeh and Valliere 2022). Thusly defined, entrepreneurial foresight as entrepreneurs' individual capacity appears to be related to their cognitive ability to cope with the complexity of their operating environment and the unknowability of the future (Townsend et al. 2018). This understanding of entrepreneurial foresight is in line with the general view of foresight as the ability to embrace complexity and unpredictability (Minkkinen, Auffermann, and Ahokas 2019) and to reduce uncertainty (Paliokaitė and Pačesa 2015). Therefore, in their objective to frame entrepreneurial foresight in terms of opportunity formation, the four independent articles of this dissertation look at the complex and uncertain settings entrepreneurs operate in (Saravathy 2001; Dew et al. 2018), the future-oriented cognition they employ in opportunity formation (Frederiks et al. 2019; Wood and Mckelvie 2015; Gaglio 2004) and their complex cognition in opportunity formation about which we lack knowledge (Krueger and Day 2010). In doing so, these articles address the question: ***What are the structuring dimensions of entrepreneurial foresight?*** This is the third subquestion of this dissertation.

In its objective of discussing entrepreneurial foresight as entrepreneurs' transformative power to induce contextual change through opportunity formation, the synthesis part of this dissertation relies on Giddens' structuration theory and ontology of time (Giddens 1976, 1984, 1981). While the primary goal of structuration theory is to highlight the recursiveness of structure and its reproduction through agents' knowledge of social (institutionalized) practices, Giddens' work also deals with how social change emerges through agency. The criticism that Giddens has 'overintellectualised practices and actions' (Schatzki 1997, 285) and that he missed making a connection between structure and action in explaining structural change (Hernes and Bakken 2003) stems from a misunderstanding of his conceptualization of agency. For Giddens, agency occurs prior to practice and actions (Caldwell 2012), and yet it has the power to transform structural properties. Thus, Giddensian agency is not focused on action itself but rather on agents' purposiveness, that is, their determination to pursue a 'project' (Giddens 1976), which is related to their knowledgeability and reflexivity. Yet, if it is argued that agents' knowledgeability contributes to the reproduction of structural properties that

are reflected in social practices, it is their capacity to reflexively monitor 'the ongoing flow of social life' (Giddens 1984, 3) that yields change (Bradbury and Lichtenstein 2000). Thus, agents' reflexive capacity allows them to reinvent structural properties, which points at the agents' creative side and their transformative power (Sewell 1992). Furthermore, if agents are knowledgeable and reflexive, they are always so within the contexts in which they move and live. Context is relevant for Giddens, as it situates agents' knowledge about the structural properties in social practices in time and space. This understanding points at agents' knowledgeable as always being contextual. Further, as contextuality represents 'the situated character of interaction in time-space' (Giddens 1984, 373), it implies that agents' knowledgeable is bound to time and space. Therefore, to understand entrepreneurs' agentic transformative power, we need to observe it through their knowledgeable and reflexive monitoring in relation to the temporal and spatial aspects of the contexts in which they move and operate.

In the synthesis part of this dissertation, I rely on Giddens' structuration theory and ontology of time to examine individual entrepreneurs' transformative power to induce contextual change by situating them within the context(s) in which they move and operate. In the entrepreneurship literature, entrepreneurial context is spatially multidimensional (Welter 2011). Entrepreneurs move and operate through different but interwoven contextual dimensions, thus leading us to consider entrepreneurial contexts in their plurality. The temporal aspects of entrepreneurial contexts only accentuate their plural nature (Welter and Baker 2021). Therefore, in this dissertation I use the singular and plural forms interchangeably when referring to the context(s) in which entrepreneurs operate and which influence entrepreneurs' transformative power. Furthermore, by focusing on individual entrepreneurs outside any specific organization, this study does not isolate them from the social practices that guide their conduct. On the contrary, it provides a more detailed view of the constitution of entrepreneurial agency, the way it is shaped by structural properties and other agents' knowledge and behaviour through time and space and how in turn, entrepreneurial agency shapes these properties and other humans' agency and with it, time and space. Therefore, in line with Giddens' thought and the calls for contextualizing entrepreneurial activity (Welter 2011; Baker and Welter 2017; Welter and Baker 2021), I consider the concept of contexts and their temporal-spatial aspects crucial in understanding opportunity formation. Consequently, I consider entrepreneurial opportunities as contextual changes and, in line with this, opportunity formation as the process of inducing change within the given context(s) by bringing new value (Bruyat and Julien 2001). However, prior to becoming a contextual change in terms of the structure, I consider entrepreneurial opportunities to be entrepreneurs' anticipated construals of contextual change. As such, I view entrepreneurial opportunities not only as products, but also as sources of entrepreneurial agency; that is, entrepreneurs' transformative activity is guided by the purpose of their anticipated 'projects', which are expressed in entrepreneurial opportunities.

Therefore, I consider entrepreneurs as agents who have transformative power

to change contexts and the ability to make change (Dimov 2020), found in their purposiveness, which distinguishes them from other human agents with whom they interact. When referring to entrepreneurs, I therefore use ‘entrepreneurs-agents’ and ‘entrepreneurs’ interchangeably. When using the term ‘agents’, I refer to other agents or actors who are situated in various contexts, who exhibit social practices inherent to those contexts and who are knowledgeable but do not necessarily demonstrate an effort to transform those contexts by creating new value. Furthermore, in my conceptualisation of entrepreneurs’ transformative power to induce change in existing contexts I embrace Giddens’ understanding that such power lies in agents’ purposiveness imbued with knowledgeable and reflexive monitoring both of which drive their actions. By ‘knowledgeability’, I understand agents’ contextual knowledge to be bound by time and space. The term ‘reflexive monitoring’ refers to agents’ cognitive interpretative capacity to process temporal continuity and at the same time to connect newly acquired knowledge with old knowledge (Giddens 1984, 46–47). Both knowledgeability and reflexive monitoring resonate with foresight as a knowledge-building activity (Pirainen and Gonzalez 2015; Dufva and Ahlqvist 2015b) and temporal reflexivity or temporal processing (Cunha 2004; Karlsen, Øverland, and Karlsen 2010). Finally, in my conceptualization of entrepreneurial foresight that differs from that in the literature on foresight (Fuller, Argyle, and Moran 2004; Fontela et al. 2006; Hajizadeh and Valliere 2022), I define it as the entrepreneurs’ capacity to structure acquired contextual knowledge and subjectively process it based on their own temporal experience to create futures (anticipatory) knowledge (Dufva and Ahlqvist 2015; Van der Steen and Van Twist 2013). Thus, Giddens’ structuration theory and ontology of time provide us with an overall view of the dance between structure and agency in entrepreneurial opportunities, which we could see as a contextual change that emerges, and illuminate how entrepreneurial foresight as an entrepreneur’s power leads to contextual change.

1.3 Structure of the dissertation

This dissertation consists of two parts. The first part comprises a synthesis, and the second part comprises four independent research articles. The synthesis contains six main sections. The first section introduces the phenomenon, the key concepts, and positions the objective of the dissertation in relation to the research questions. The second and third sections develop the theoretical grounding. The second section situates entrepreneurial opportunities within the temporal and spatial aspects of entrepreneurial contexts. The third section introduces and examines foresight as entrepreneurs’ power to transform entrepreneurial contexts through the acquisition and structuration of temporal–spatial knowledge and its temporal processing by conceptualizing it as entrepreneurial foresight. This section ends with a description of the theoretical framework I propose in this dissertation. The fourth section describes

the epistemological and methodological approaches in the three independent empirical articles and reflects on the fourth article, which is conceptual. The fifth section covers the development of the independent articles and summarizes them. The last section discusses the key findings of this dissertation and the implications for theory, methodology and practice. This section ends with suggestions for further research.

2 Locating entrepreneurial opportunities within the time-space of entrepreneurial contexts

Ever since Gartner (1995) called for entrepreneurship scholars to consider the context in which entrepreneurship occurs, the need to contextualize entrepreneurial activity has not abated (Welter 2011; Welter and Baker 2021; Baker and Welter 2017; Johnsen and Holt 2021). Therefore, studying entrepreneurial opportunities as the central phenomena of entrepreneurial activity and opportunity formation also requires contextualization. Contextualizing entrepreneurial activity and entrepreneurial opportunities means setting them in time and space (place) (Welter 2011). To do this, it is necessary to overcome the dichotomy created in viewing opportunities either as ‘institutional’ entities stemming from the environmental structure or as ‘social’ entities emerging from entrepreneurs’ interactions with other agents (Alvarez, Barney, and Anderson 2013). Embracing the dual view of entrepreneurial activity and opportunities has led to a more unified approach, by incorporating both in conceptualizations of opportunities. However, the interchangeable use in these conceptualizations of opportunities as ideas or visions calls for a better understanding of these two concepts that appear to differ in terms of the knowledge that imbues them and their temporal aspects (Strange and Mumford 2005; Verganti 2010; Runco and Chand 1994). Therefore, in this section, after introducing the dual perspective in opportunity conceptualization, I examine the differences between the concepts of idea and vision by looking at the degree of knowledge one has of a specific context, knowledge that always contains both spatial and temporal aspects. In my further elaboration on entrepreneurial opportunities, I look at the spatial aspects of entrepreneurial contexts (Welter 2011) and introduce Giddens’ view of agency, contexts and time within his structuration theory to establish the temporal aspects of knowledge that entrepreneurs integrate when forming opportunities.

¹ *Institutional is used here in the sense of the fourth dimension of entrepreneurial contexts proposed by Welter (Welter 2011).*

2.1 From a dichotomous to a dual view of entrepreneurial opportunities

Structuration theory (Giddens 1976, 1984) was first introduced in the entrepreneurship literature as an attempt to reconcile the dichotomy underlying the assumptions about how opportunities are formed (Chiasson and Saunders 2005). The main tension in these different views lies, on one hand, in the view of opportunities as already existing changes in the environment, unknown until discovered (or recognized) by alert entrepreneurs (Shane 2000; Baron 2006) or as created through entrepreneurs'–agents' actions and their interactions with other agents (Sarasvathy 2001; Alvarez and Barney 2007; Alvarez, Barney, and Anderson 2013). More recently, Davidsson (2021) has observed that this dichotomy relating to opportunity conceptualizations rests on a deeper theoretical discussion about how social structure (system) shapes individuals and vice versa (e.g. Berger and Luckmann 1967; Bhaskar 1979; Bourdieu 1977; Giddens 1984).

By conceptualizing entrepreneurial opportunities as discoverable, pre-existing entities, discovery theory focuses on the structural dimension of the opportunities, thus stripping entrepreneurs–agents of their agency and neglecting the agency of other actors in opportunity formation (Davidsson 2021). According to discovery theory, entrepreneurial opportunities are emanations of the aggregate of different objective environmental forces, such as various political, social, technological or regulatory changes (Shane and Venkataraman 2000; Shane 2012). Recently, these objective environmental forces have been conceptualized as 'external enablers' (Davidsson 2015; Davidsson, Recker, and Von Briel 2020). Thus, external enablers represent structural properties in a Giddensian sense in that both have enabling or constraining characteristics vis-à-vis entrepreneurial activity, including the formation of entrepreneurial opportunities (Davidsson, Recker, and Von Briel 2020). Bound by such an environment, an entrepreneur can only discover or recognize them (Baron 2006; Baron and Ensley 2006) due to their alertness capacity (Kirzner 1973) and prior knowledge (Shane 2000; Baron 2006). Acknowledging a certain form of agents' knowledgeability expressed through prior knowledge (Shane 2000) is a mere recognition of a far bigger agentic power entrepreneurs possess in relation to structural properties.

Conversely, creation theory has brought to light a perspective on opportunities as the outcomes of human action and interaction (Alvarez and Barney 2007; Alvarez, Barney, and Anderson 2013), thus bringing into focus other human agents' knowledgeability in opportunity formation. Different from discovery theory, creation theory argues that opportunities do not emerge from structure but are new social realities that unfold in the interactions between an entrepreneur–agent and other agents. In this view, the entrepreneur–agent does not rely on the existing structure, and nor is their conduct guided by the enabling or constraining features of that structure. Rather, what guides their actions is other agents' diverse knowledge that may spark an idea about a potential opportunity (Alvarez, Barney, and Anderson 2013, 309). Entrepreneurs'

knowledgeability in the form of their prior experience is almost irrelevant in this approach. It is not excluded in the sense that it may allow entrepreneurs to detect the signals emanating from the external environment (*ibid.*). These signals may act as potential initial triggers that lead to the process of gaining new knowledge from other agents, which enriches the entrepreneur-agent's perceptions and beliefs. Thus, opportunities viewed as created hold intersubjective knowledge (Venkataraman et al. 2012).

The question of agents' knowledge and knowledgeability is relevant in Giddens' structuration theory in the sense that in having knowledge about the contexts in which they live and move, agents reproduce the structural properties that guide their conduct in an institutionalized manner. Chiasson and Saunders (2005) view entrepreneurs' knowledge as knowledge of business and social scripts that guide them to either reproduce them when the structure is strongly institutionalized and leave little room for change or to introduce change by creating new scripts. Their explanatory work sheds light on the constraining or enabling properties of different institutionalized settings, but it does not provide an understanding of what underlies entrepreneurs' agentic power to potentially transform the structural properties in the contexts in which they operate. Yet, Giddens is clear that while the structure has power over agents' conduct by setting different rules and allocating resources, agents also exert power to transform the structure not only through their knowledgeability but also through their reflexive capacity, which indicates their creative capacity (Sewell 1992). This idea is missing in the work of Chiasson and Saunders (2005).

In their approach to amend the discovery approach to opportunities using structuration theory, Sarason, Dean, and Dillard (2006) have pointed precisely at the question of agents' power to act upon structure, while at the same time their conduct is shaped by the enabling and constraining aspects of structure. Following Giddens' theory, the authors recognize that entrepreneurs' agentic power to influence structural properties lies in their knowledgeability, the 'memory traces' of these structural properties that orient 'the conduct of knowledgeable human agents' (Giddens 1984, 17), and in their capacity to reflexively monitor their actions and the consequences of those actions. Therefore, Sarason, Dean, and Dillard argue that a structuration perspective of opportunity views opportunities not as an interpretation of a singular social and economic gap, but as an individually idiosyncratic conceptualization of an instantiated social and economic system' (Sarason, Dean, and Dillard 2006, 293), thus equating opportunity to an entrepreneur's idea. In doing so, the authors have embraced the creative capacity lying in entrepreneurs' power to change existing structure. However, it is not clear how an idea arises from entrepreneurs' knowledgeability of structure and reflexive monitoring of their actions. Furthermore, although they acknowledge that structuration theory 'argues that social and economic systems become real or meaningful to the agent at the moment of interaction with other agents' (*ibid.*), they do not offer a deeper understanding of how other agents and their daily lives and activities contribute to forming an opportunity-idea. Finally, the authors recognize that the process of op-

portunity discovery takes across time and space, as also stated in Chiasson and Saunders (2005), which is in line with Giddens' ontology of time. Nevertheless, they have remained silent on how time and space are entwined in entrepreneurial opportunities.

While Sarason, Dean, and Dillard initially intended to amend discovery theory vis-à-vis opportunity formation, their conceptualization of entrepreneurial opportunities as entrepreneurs' ideas continued to resonate among researchers and led to another view of opportunities as being idiosyncratic to entrepreneurs but shaped by external circumstances and other agents. This idiosyncrasy approach (Davidsson 2015, 2021) differs from the discovery and creation theories in that it equally embraces structure and agency in entrepreneurial opportunities, thus acknowledging opportunities' dual nature. This approach conceptualizes opportunities as ideas and visions (Sarvasathy 1997; Sarason, Dean, and Dillard 2006; Dimov 2007, 2020; Berglund, Bousfiha, and Mansoori 2020), thus highlighting the relevance of entrepreneurs' creative cognition (Dimov 2007) and their orientation towards the future. However, while it may appear that the terms 'idea' and 'vision' are synonyms, the entrepreneurship literature indicates that these two terms do not express the same phenomenon (Berglund, Bousfiha, and Mansoori 2020). Furthermore, the literature that explores ideas and visions as concepts related to human creativity and future-oriented cognitive capacity seemingly distinguishes these two concepts. Therefore, to conceptualize opportunities while embracing their dual nature, it is necessary to understand what underlies an idea and a vision.

2.2 Opportunities as ideas or visions: A matter of contextual knowledgeability and reflexive monitoring

The contention that the process of opportunity formation reflects modification and articulation of raw ideas through unique circumstances and social interactions has linked this process to one's creative capacity (Dimov 2007). The generation of ideas as novel and useful products of one's creativity (Amabile 1996) has been related to the problem-solving process whereby an individual goes through the stages of problem construction, conceptual combination, idea generation and idea evaluation (Runco and Chand 1994). This indicates that generating an idea is only one stage in the problem-solving process and that before an idea comes to existence an individual first needs to frame a problem. To solve this, they would combine different elements to provide novel, creative ideas as solutions to the constructed problem. This view of ideas in entrepreneurship is part of the new venture idea construct, which refers to a novel combination of offerings–users–means (Davidsson 2015). Such combinations may represent entrepreneurs'–agents' interpretations of enabling or constraining structural properties (Davidsson 2015; Davidsson, Recker, and Von Briel 2020). Generating an idea from the 'objective' reality of structural properties echoes Wood and McKinley's 'opportunity objectification', which is the 'attribution of objective reality to an oppor-

tunity idea, so that the idea begins to be seen as an entity outside the observer's mind' (Wood and McKinley 2010, 70). With such an idea in mind, an entrepreneur engages in a process of testing and evaluating their idea through interactions with other agents. This idea, which can be expressed in an artefact, is mutable and subject to the process of transformation that 'thrives on heterogeneity of both knowledge and perspectives' (Berglund, Bousfiha, and Mansoori 2020, 833). Therefore, it could be said that an idea begins with a problem knowledge (Jungermann and Thüring 1987) and contains an initial solution to that problem. However, such knowledge appears to be insufficient and requires change and transformation through interactions with other agents.

A vision, however, appears more complex than an idea. Diverse definitions of vision converge towards a conceptualization of a vision as an imagined image of a future state (Strange and Mumford 2005, 2002). A vision expresses a mental representation of a potential future state of a system. These mental representations rest on prior experience and knowledge 'about how a system operates' (Strange and Mumford 2005, 123). However, knowledge acquired in this way is halfway toward the construction of a vision. Strange and Mumford (2002) highlight that while such knowledge underlies a vision, it is a combination of other agents' feedback and personal values that combined together would lead to a vision of how a system should be in the future. At this point, a vision and an idea both appear to be subjected to other agents' feedback. However, subsequent research on vision formation has demonstrated that it is imagination about potential change in a system through an individual's anticipatory capacity prior to social feedback that has a strong impact on vision creation (Shipman, Byrne, and Mumford 2010). In looking at the formation of opportunities as artefacts through the lens of discovery theory, Berglund et al. (2020, 831) state that such opportunities are vision-laden and are subjected to experimentation, that is, social feedback. Therefore, structuration logic in Sarason et al.'s view of discovered opportunities where 'entrepreneurs tend to start with an idea, but alter that idea through a process of experimentation in which they test the system' (Sarason et al. 2006, 301) converges towards the view of opportunity as a vision and not an idea. This distinction between an idea and a vision returns us to the long-standing discussion on opportunities as being discovered or created.

Instead of seeing the discovery and creation theories as dichotomous, we should rather perceive them as different ways of seeing Giddens' concept of contexts and the question of knowledgeability. One of the criticisms of the discovery and creation theories highlights their failure to embrace the phenomenon of uncertainty, which is central in entrepreneurial activity (Foss and Klein 2020). However, different perspectives of uncertainty indicate that what underlies the perception of uncertainty is limited knowledge or a lack of knowledge (see Packard et al. 2017). Giddens recognizes that agents' knowledgeability is related to the contexts in which they move and live their daily lives. By contexts, Giddens means the specific connections in time and space between broader structural properties of social systems and social interactions (Giddens 1984, 83, 119). Being in one context grants one agent specific knowledge of it that does not extend

to another (*ibid.*, 90). Through social interactions, agents may move to novel contexts about which they lack knowledge. Such novel contexts equate to novel or nascent industries and markets (Sarasvathy 2001; Alvarez, Barney, and Anderson 2013). In such novel contexts, other agents' disparate knowledge is relevant in constructing and shaping initial ideas (Alvarez, Barney, and Anderson 2013). Although Alvarez, Barney, and Anderson (2013) argue that even some form of knowledge of prior markets and industries can generate an idea, in novel contexts it does not suffice to form a vision due to the lack of knowledge of the novel contexts and how such contexts operate. Therefore, in unknown contexts other agents' knowledgeability is crucial in catalysing an idea into an opportunity.

In the discovery view, entrepreneurs operate in known contexts and therefore possess prior knowledge of them (Shane 2000). Such prior knowledge allows them to perceive different structural properties that are in force in their contexts (Shane 2012), as well as some emerging movements that may announce a potential change, which, blended with entrepreneurs' prior knowledge, may lead to building a vision of how the contexts could or should be in the future. The conceptualization of a vision as an imagined future state of a system (Strange and Mumford 2005) clearly indicates the relationship between strong prior knowledge about the operating system and the imaginative capacity that gives vision a future-oriented nature. Conversely, although the view of an idea as a solution to a constructed problem recognizes the relevance of domain-specific knowledge in this process (Runco and Chand 1994), it remains silent on the temporal nature of an idea.

At this point, I would like to reflect deeper on the distinctions between idea and vision. As it appears, the concepts of idea and vision meet at the point where both require some type of prior, even domain-specific, knowledge. Further, it appears that they both require some type of creative connections between already possessed and, potentially, new knowledge. However, the literature on creativity and ideation argues that, in building ideas, individuals rely on connecting (spatially!) remote elements of knowledge with a purpose to resolve a problem in real time (Weisberg 2018). Therefore, even if an idea resolves a problem and may be used in the future, in building the ideas, the present time affects the future. Although visions may also embrace elements of knowledge that are spatially remote, the purpose of vision is not to solve any given, present problem, but to propose a desired design of a future state that is not yet a reality. In that sense, vision contains knowledge about the future that affects the present time. Therefore, the main distinction between the concepts of idea and vision, as I see it, lies in the tenets of anticipation and the distinction between 'strong' and 'weak' anticipation (Dubois 2000; Poli 2010). I argue that an idea requires a strong form of anticipation, which, according to Dubois (2000), understands a projection of a present (and past) time into the future. Conversely, visions represent a weak form of anticipation that understands a projection of the future into the present time.

Thus, it stands to reason that the underlying difference between an opportunity-idea and an opportunity-vision rests in the temporal nature of anticipation, and, with it, in their purposes which returns to the question of entrepreneurs' agency and consequent-

ly to entrepreneurs' knowledgeable and reflexive monitoring within the operating contexts. According to Giddens an agent's knowledgeable of and within a context implies knowledge of the structural properties and other agents' activities, which have their own temporal and spatial aspects. In this dissertation, I call such knowledgeable 'temporal-spatial knowledgeable', by which I mean entrepreneurs' knowledge about the time (duration) and space of the elements (structural properties and other agents) of their operating contexts. All knowledge, according to Giddens is reflexively processed (experienced). Following Giddens' thought, I argue that, in forming opportunities, entrepreneurs as agents are driven by their purposes, which are imbued with anticipation in one form or another. In the contexts they already have prior (deep) and broad knowledge, entrepreneurs may experience that knowledge subjectively, according to their own temporality, which allows them to build visions. In the contexts in which they lack knowledge, entrepreneurs may begin with a stronger form of anticipation—an idea—but, as they move through different contextual dimensions (Welter 2011), they acquire deeper and broader temporal-spatial knowledge. As they process this, it allows them to gradually build an imagined state of a system—that is, opportunity-vision.

This examination could explain the evolving stance in Dimov's work with regard to entrepreneurial opportunities (Dimov 2007, 2020). The author's interchangeable view of opportunities as evolving ideas (Dimov 2007) and imagined future images of the potential changes in a system that echoes with opportunities as visions (Dimov 2020) points not at a dichotomous view of opportunities, but at their (anticipated) contextual nature. Therefore, at this point I argue that entrepreneurial opportunities represent visions of the potential changes within the entrepreneurial contexts that hold new values (Bruyat and Julien 2001). I further argue that an opportunity may be formed either as a vision or it can undergo a process of 'maturation' from an idea into a vision. Whether an opportunity will be constructed immediately as a vision or whether its formation will begin with an idea that will evolve towards a vision will depend on the entrepreneurs'-agents' temporal-spatial (contextual) knowledge and their reflexive monitoring (experience) of that knowledge.

Regarding this contention, I provide four arguments. First, to form opportunities-visions entrepreneurs need to possess deep knowledge of the contexts in which they move, which is in line with Giddens' thought. Second, given the multidimensionality of entrepreneurial contexts (Welter 2011), which will be examined later, entrepreneurs also need to acquire broad knowledge that provides them a systemic view of the contextual dimensions. Third, entrepreneurs need to have knowledge about the temporal aspects of contexts, that is, knowledge about the existence of the contextual dimensions in time. Fourth, to envision an opportunity, entrepreneurs subjectively experience contexts by processing their knowledge based on their own experience of time (their temporality). This personal experience of time is in line with Giddens' concept of reflexive monitoring (Giddens 1984, 46-47). These arguments provoke the question of entrepreneurs'-agents' transformative power, which will be developed in the third

section. However, to do so it is necessary to first elaborate the entrepreneurial context and its temporal and spatial aspects that permeate entrepreneurs' knowledgeability.

2.3 The temporal-spatial contextualization of entrepreneurial opportunities

The underlying tenets of structuration theory are that structure reproduces and changes through agency. When Giddens speaks about change, he speaks in terms of change in social systems, which are bounded by structural practices, institutionalized rules that guide agents' conduct. For Giddens, social systems and therefore the structural properties that bind them may differ across geographic regions; that is, they are regionalized (Giddens 1984, 365). In that sense, they are dispersed in space. At the same time, structural properties as institutionalized practices stretch over time; they have history, *longue durée*, that will develop further. Within one social system, structural properties have a tendency to regulate agents' activities in such a way that they reproduce the established rules. However, a change may occur within a social system but only when different social systems connect, thus creating an intersection of the systems that Giddens calls 'intersocietal systems'. Given that each system has temporal and spatial dimensions, when two different systems meet they connect in both space and time. That is, their times and spaces interconnect as well, thus creating time-space edges from where a change emerges (Giddens 1984, 243–245). For a change to be brought to existence, agents need to perceive it. Their perception of change is continuously guided by the interplay of their knowledgeability and reflexive monitoring, both of which relate to their contexts.

According to Giddens, for different social practices to be brought together and induce a potential change agents need to meet in social encounters that happen through means of communication. When agents encounter each other, they interact in time-space, thus creating the contexts of their interactions. The contexts represent the connections between different social practices that are expressed in time-space interactions. Having knowledge about a context and continuously reflecting upon one's own action and the actions of others are therefore crucial in bringing change into existence. To understand how an entrepreneurial opportunity as a change occurs, it is necessary to first delineate the entrepreneurial contexts. The literature on entrepreneurial contexts argues that both temporal and spatial aspects are relevant in theorizing about them (Welter 2011; Welter and Baker 2021). However, the existing typology of entrepreneurial contexts focuses on the spatial aspects. For this reason, I will introduce the spatial aspects in the following subsections before discussing the temporal aspects.

2.3.1 The spatial aspects in entrepreneurial contexts

In their conceptualizations of entrepreneurial opportunities, Sarason et al. (2006) view an entrepreneurial context as a socio-economic system. However, a more detailed analysis by Welter (2011) indicates that a socio-economic system is only one of the facets of the multidimensional nature of entrepreneurial contexts. Welter proposes a view of entrepreneurial contexts as intersections of different dimensions—aspects (Welter 2011, 168). The first dimension is the business dimension, including the industry and market(s) in which an entrepreneur operates and the nature and number of competitors. The second dimension refers to social networks, including the various weak and strong ties within those networks (Granovetter 1973, 1982). This dimension explicitly embraces agency in entrepreneurial contexts. The third dimension is the spatial one, which represents the geographic regionalization of an entrepreneur's business, including local communities, thus more explicitly situating agency in (geographic) space. The fourth dimension refers to the institutional practices of the culture and society and the political and economic systems. This multidimensional perspective of entrepreneurial context resonates with the Giddensian view of contextual positioning of agents in the contemporary world (Giddens 1984, 84) whereby agents are situated at a regional level in their daily lives and also at an intersocietal level and thus a global one.

However, while such contextual positioning is clearly spatial, it is also temporal. Welter indicates that both the spatial and temporal characteristics of entrepreneurial contexts affect entrepreneurial activity (Welter 2011, 174). This view is in line with the Giddensian understanding of the temporal aspect of enabling and constraining features of structural properties. This echoes the recent conceptualization of external enablers as structural properties that may enable or constrain the creation of new ventures and thus opportunity formation (Davidsson, Recker, and Von Briel 2020). However, the temporal and spatial scope of these external enablers indicates their existence and duration in time and space as structural properties, thus not taking into consideration how such time is integrated within agents' daily lives nor how agents, in this case entrepreneurs, individually experience such time. Yet, recent studies pointing at the relevance of time and temporality in entrepreneurial activity indicate the relevance of other temporal aspects besides that of structural properties.

² *To avoid overlapping terms, when I mention Welter's spatial dimension, I will refer to it as 'regional', given that this dimension relates to geographic locations.*

2.3.2 The temporal aspects in entrepreneurial contexts

The question of time and the temporal aspects of entrepreneurial activity has recently been closely scrutinized (Lévesque and Stephan 2020; Johnsen and Holt 2021; Wood, Bakker, and Fisher 2021; Van Lent, Hunt, and Lerner 2020). A growing consensus on entrepreneurial activity as a temporal journey (McMullen and Dimov 2013; Selden and Fletcher 2015; Davidsson and Gruenhagen 2021) has stimulated the need to study entrepreneurial activity as a process that unfolds through time. To date, a number of recent scholarly articles have proposed various insights on time in entrepreneurial action (Lévesque and Stephan 2020; Wood, Bakker, and Fisher 2021; Johnsen and Holt 2021). Concentrating on decision making and judgment under uncertainty, these studies notably focus on entrepreneurs' time perception. Wood, Bakker, and Fisher (2021) view time as timing, that is, the perception of the 'right time' to induce an action (initialization)—the time elapsed between the initial action and the desired outcome (pace) and time as a sequence of events that drive towards achieving the desired results (chronology).

However, the contention that entrepreneurs need to situate 'within a temporal landscape' (Wood, Bakker, and Fisher 2021, 147) resonates with the argument that entrepreneurial activity is contingent upon historical context and collective memories (Welter 2011; Welter and Baker 2021). This temporal context echoes with Ricoeur's world time and represents the time of the external enablers (Davidsson, Recker, and Von Briel 2020), that is the structural properties that condition entrepreneurial action (Johnsen and Holt 2021). Therefore, entrepreneurial activity from a temporal perspective arises from the interaction between the two temporal dimensions, world time and entrepreneurs' personally experienced time, which represents articulation between entrepreneurs' memories and anticipation. However, if the duality of entrepreneurial activity and thus of entrepreneurial opportunities also takes into account the agency of other humans, then we should also consider the temporal dimension of other agents in the entrepreneurial process. This dimension derives from Heidegger's view of time of agents' daily lives, which is implicitly incorporated in creation theory (Alvarez, Barney, and Anderson 2013). Therefore, I argue that entrepreneurial contexts include not only historical time but also other agents' time. For this reason, I argue that in 'formulating visions' (Wood, Bakker, and Fisher 2021, 148), entrepreneurs rely on both the spatial and triadic temporal aspects of the contexts in which they move and operate. Finally, I contend that it is through the intersections of the three temporal aspects and space that opportunities as visions of the novel contexts occur. To help understand these 'triadic' temporal aspects within an entrepreneurial context, I next briefly discuss Giddens' ontology of time.

2.3.3 Giddens' temporal triad in entrepreneurial opportunities

For Giddens, everything that moves in space moves in time. Therefore, while social encounters happen in space, they also have three different temporal dimensions. Thus, the structural properties as institutionalized social practices guiding agents' conduct have historical time, the *longue durée* (Giddens 1984, 35). It is the time of reproduction of structural properties that can be seen in the continuous reproduction of social practices in the social systems extended throughout time (and space). Such time thus embraces the tendency of structural properties to have past, present and future dominance over agents' conduct in a specific geographic location or globally. In entrepreneurial contexts, the *longue durée* may be seen as the temporality of the institutional dimension of entrepreneurial contexts (Welter 2011). However, given that structural properties may differ throughout different geographic locations, the *longue durée* also reflects the temporality of the regional dimension of entrepreneurial contexts (*ibid.*). Thus, *longue durée* may represent the historical time of the politico-economic structure in a country or a region, legislation that is in force and social and cultural norms.

Giddens argues that structural properties with their historical time dictate agents' social practices and therefore affect their time, known as *durée* of daily life. Such time reflects the repetitive nature of agents' daily practices within their contexts—at home, at work, in school, at the doctor's. Having knowledge about how human agents meet, work and conduct different sorts of activities in these contexts means knowing their deontic relationships (McBride and Wuebker 2022) and therefore how these relationships occur in agents' time and space. In entrepreneurial contexts, this agents' time would relate to (potential) customers and networks and as such would be notably expressed in the business and social aspects of the entrepreneurial contexts (Welter 2011). Further, because the social practices and therefore the deontic relationships between agents may differ across different geographic locations, agents' time may also be related to the regional dimension of the entrepreneurial contexts (*ibid.*). For instance, the relationship between a doctor and a patient or between a teacher and a student may differ among countries.

The third aspect of time in Giddens' ontology of time was borrowed from Alfred Schutz' work (e.g. Schutz 1962, 1976) and relates to an individual's temporal experience, the *durée* of activity or *durée* of lived-through experience (Giddens 1984, 3). This third temporal aspect is both subjective and intersubjective and encompasses the temporal layers of the past, present and future. It encompasses past through an agent's old knowledge, such as memory or remembrance, their present interaction with other agents and their anticipation of future action. The intersubjectivity of this individual temporal experience lies in the individual's situatedness within a context of communication with other agents of which the individual has knowledge (Wagner 1977, 190). Such knowledge about other agents is therefore related to time of their daily lives, which the individual experiences through encounters and lives as proper experience. However, such lived experience is subjectively processed based on the individual's existing knowledge (memory) to generate meaning that can be further

subject to imagination through anticipation (Muzzetto 2006, 13). Anticipation as the lived experience in the future motivates the individual's action towards the meaningful future (ibid.). In the entrepreneurship literature, this individually lived experience may be related to the first-person opportunity belief, which directs an entrepreneur's attention towards an opportunity and shapes their decision making about pursuing that opportunity (Shepherd, McMullen, and Jennings 2007). However, I argue that the individually lived experience not only directs an entrepreneur's attention towards an opportunity but also contributes to the formation of the entrepreneur's vision in which knowledge about other agents' lives is connected with the entrepreneur's existing knowledge and then imagined in a novel way in the entrepreneur's future. These newly imagined agents' lives represent a change from the point of view of existing contexts, as they differ from the relationships and behaviour in the present contexts.

In their activity, entrepreneurs engage in social encounters with different agents, thus moving through different contexts, that is, time-spaces. While 'moving', entrepreneurs not only acquire knowledge about agents' deontic relationships and structural properties, which are always temporally and spatially bounded, but they articulate these time-spaces based on their own experience of time. For entrepreneurs to envision a contextual change, they need to acquire knowledge that has the temporal (and spatial) aspects of both structural properties and agents' lives within the relevant contexts, which they then process based on their own temporally lived experience through which they synthesize past, present and future. Therefore, I propose, as illustrated in Figure 1, entrepreneurial opportunities as visions of contextual change arises at the intersections of these temporal aspects.

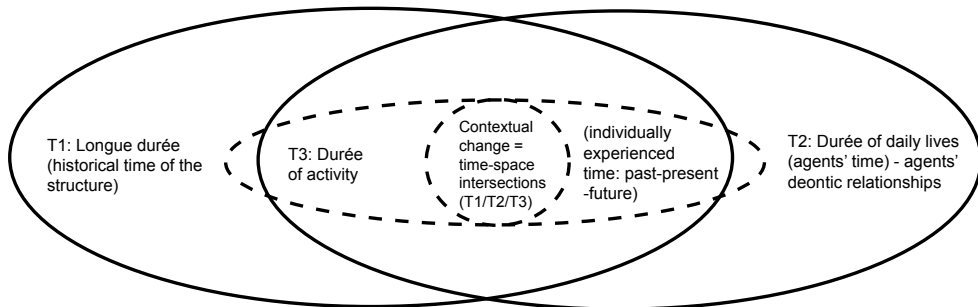


Figure 1. Giddens' temporal triad in entrepreneurial opportunities

Therefore, Giddens' temporal triad is relevant in understanding opportunity formation and with it entrepreneurs' transformative power. This power rests on entrepreneurs' capacity to build temporal-spatial knowledge and process it based on their temporal reflexivity. I argue that building temporal-spatial knowledge and articulating it based on one's own experience of past, present and future represents entrepreneurs'-agents' foresight capacity, which I call entrepreneurial foresight (Fuller, Argyle, and Moran 2004; Fontela et al. 2006; Hajizadeh and Valliere 2022).

3 Entrepreneurial foresight : Entrepreneurs'- agents' power to envision change within entrepreneurial contexts

Before being considered a necessary capacity for organizational survival and competitiveness, foresight was initially viewed as the capacity of individuals, notably entrepreneurs, to profoundly understand societal evolution and perceive social change in order to impact the future direction of society (Tsoukas and Shepherd 2004a). Such capacity is considered to be deeply rooted in individuals' temporal reflexivity (Cunha 2004). More precisely, viewing temporal reflexivity as articulation between past experiences, today's realities and possible trajectories (Cunha 2004; Karlsen, Øverland, and Karlsen 2010) indicates that temporal articulation allows an individual to connect old and new knowledge, which results in creating some sort of future-looking knowledge. Creating knowledge about the unknown and unknowable future is at the core of foresight; that is, it is the final outcome of foresight (Miles et al. 2008; Piirainen and Gonzalez 2015; Dufva and Ahlqvist 2015b).

In the literature on foresight, knowledge about the future, also known as futures knowledge, refers to 'all future-oriented information that is acquired, assimilated and used by an organisation' (Pouru, Dufva, and Niinisalo 2019, 85), a group of participants in foresight workshops (Dufva and Ahlqvist 2015b) and by individuals (Tapinos and Pyper 2018). Such knowledge may also be held in visions (Dufva and Ahlqvist 2015b; Pouru, Dufva, and Niinisalo 2019) in which, as imagined, potential future states of systems (Strange and Mumford 2002, 2005) are not disconnected from the past or the present. Therefore, futures knowledge is not and cannot be disconnected from the past and present temporal layers despite its future orientation. The literature on futures knowledge creation indicates that such knowledge is created through an interplay between different types of knowledge (Dufva and Ahlqvist 2015b; Pouru, Dufva, and Niinisalo 2019). However, it remains silent on the temporal aspects of these knowledge types and on the role of individuals' temporal reflexivity in futures knowledge creation, which is relevant in understanding entrepreneurial foresight. Yet, I argue that each of these types of knowledge used in foresight holds the previously discussed temporal aspects of the structural properties and agents within the given contexts and that such knowledge is processed based on individuals' lived temporal experience, that is, through their temporal reflection in action (Cunha 2004).

If creating futures knowledge is the final outcome of foresight regardless of the setting in which it is employed, then it cannot be excluded as the outcome of entrepreneurial foresight, an observation that is missing in the literature discussing this concept (e.g. Fontela et al. 2006; Fuller et al. 2004). Doing foresight, and therefore, building futures knowledge always requires prior space setting to frame a context (Dufva and Ahlqvist 2015b; Ruff 2015; Tapinos and Pyper 2018). Thus, the context is always linked to a given unit of analysis, a system of actors (Miles et al. 2008) and drivers of change (Dufva and Ahlqvist 2015a). In that sense, knowledge that is used in foresight is highly context-dependent (Belis-Bergouignan, Lung, and Héraud 2001; Piirainen and Gonzalez 2015). Therefore, the knowledge entrepreneurs rely upon and process is related to the contexts in which they operate, including their temporal and spatial aspects. Entrepreneurship scholars acknowledge the relevance of the different types of knowledge entrepreneurs rely on in opportunity formation, such as entrepreneurs' prior knowledge (Scott Shane 2000; Ardichvili, Cardozo, and Ray 2003), the heterogeneous or intersubjective knowledge of other agents (Venkataraman et al. 2012; Erikson and Korsgaard 2016; Berglund, Bousfiha, and Mansoori 2020) and objective knowledge related to the operating environment (Alvarez, Barney, and Anderson 2013; Erikson and Korsgaard 2016). In addition, in forming opportunities, entrepreneurs also employ subjective, future-looking knowledge (Erikson and Korsgaard 2016). However, what such a 'typology' of knowledge in entrepreneurial opportunities lacks is a deeper understanding of its contextual (time-space) characteristics. In the following section, I attempt to provide such understanding.

3.1 Temporal-spatial aspects of knowledge in foresight and entrepreneurial opportunities

In this section, I argue that these different types of knowledge in opportunity formation share a common nature with different types of knowledge observed in foresight, labelled as (1) codified, (2) embodied, (3) articulated and (4) future-oriented (new) knowledge (Dufva and Ahlqvist 2015b). In my examination, I compare and contrast types of knowledge used in foresight with knowledge that is used in opportunity formation. In doing so, I discuss the temporal and spatial aspects of knowledge that entrepreneurs use in forming opportunities to create futures knowledge expressed in opportunities-visions. Table 2 illustrates this discussion and lists each knowledge type's temporal and spatial aspects.

Table 2. Characteristics and temporal and spatial aspects of knowledge in foresight and entrepreneurial opportunities

Characteristics of knowledge in foresight (Dufva and Ahlqvist 2015b)	Characteristics of knowledge in entrepreneurial opportunities	Temporal aspects (Giddens 1981, 1984)	Spatial aspects (Welter 2011)
Codified (objective)	Objective (Erikson and Korsgaard 2016) Objective, factual, historical (Alvarez, Barney, and Anderson 2013)	Historical time	Institutional/ Regional
Embodied (expert) Tacit, experiential, systemic	Prior knowledge (industry, markets, customers) (Shane, 2000; Ardichvili, Cardozo, and Ray 2003) Special interest and experience (Ardichvili, Cardozo, and Ray 203; Klepper and Sleeper 2005; Politis 2005) Specialized (Grégoire, Barr, and Shepherd 2010)	Agents' time Historical time	Business/Social/ Regional/ Institutional
Articulated (shared) Codified and embodied	Objective and intersubjective (Erikson and Korsgaard 2016)	Historical and agents' time	Institutional/ Regional/ Business/Social
Future-oriented (new) Highly contextualized (dependent on prior, expert's knowledge) (Ahlqvist and Uotila 2020)	Intersubjective or subjective (Erikson and Korsgaard 2016)	Individually experienced time	Business/Social/ Regional/ Institutional

3.1.1 Codified (objective) knowledge

To begin with the analysis of key drivers, a foresight process employs codified knowledge, as is the case in foresight workshops (Dufva and Ahlqvist 2015b). Such knowledge can be acquired in the form of information and is therefore objective by nature. Codified knowledge is stored in various reports and documents or artefacts, such as patents (Uotila and Melkas 2008; Kaivo-oja 2012). By nature, it resembles objective knowledge, which reflects the existence of external conditions and is used in discovering opportunities (Shane 2012; Alvarez, Barney, and Anderson 2013).

What is viewed as objective knowledge in the entrepreneurship literature is equated with factual and/or historical knowledge of the environment and the circumstances in which entrepreneurs operate (Alvarez, Barney, and Anderson 2013; Erikson and Korsgaard 2016). Objective knowledge is expressed in knowledge of 'external enablers' (Davidsson, Recker, and Von Briel 2020), such as technological advancements or legislation. As such, objective knowledge would correspond to the contextual knowledge of interrelated systems, such as political, economic, societal and cultural systems, which corresponds to Welter's institutionalized practices or Giddensian structural properties. These properties, as previously mentioned, are regionalized, which would explain why entrepreneurs who have prior experience in a specific geographic location (Toft-Kehler, Wennberg, and Kim 2014) might have access to such objective knowledge. Although objective knowledge indicates to entrepreneurs the spatial impact of structural properties, it also provides entrepreneurs information on time, that is, the temporal scope of structural properties (Davidsson, Recker, and Von Briel 2020). However, previous entrepreneurship literature indicates the historical and present force of these 'objective' structures but neglects their existence throughout time, that is, their future-oriented dimension. In this sense, the foresight literature complements our understanding of the structural properties of entrepreneurial contexts.

I have previously pointed out that in foresight as a knowledge-building activity the initial focus is on understanding the observed system. Such understanding involves analysis of the forces that shape the system over time (Coates 1985) and that may be both the determiners of stability or change (Coates 2010). The main key drivers in a system are trends and megatrends, which are the forces that are extended throughout different regions and longer time spans (Saritas and Smith 2011), which indicate their *longue durée* or historical time and their orientation towards the future. Dominant by nature and role, megatrends, such as rising demographics or the climate crisis (Saritas and Smith 2011), are considered to shape agency over long spans of time and frequently on an almost global level (Naisbitt 1982). Trends, on the contrary, may have shorter time spans and can be less global (Hiltunen 2013, 54–55), but they also indicate and guide human conduct. In that sense, trends and megatrends may be said to represent the structural properties that regulate institutional and social practices, that is, agency in time and space.

3.1.2 Embodied (expert) knowledge

Besides codified (objective) knowledge, a foresight process also calls for specialized knowledge held by experts who participate in the process. Experts' knowledge resides in their brains as embodied knowledge (Dufva and Ahlqvist 2015b). Knowledge held by experts is characterized by its depth in a specific domain (Chi, Feltovich, and Glaser 1981; Ericsson 2004) and may afford more profound insights regarding the observed system. Experts' knowledge is characterized by a strong understanding of the causal interrelationships within a system, which allows them to comprehend the dynamics of the system, how it is structured and how it behaves, including the evolution of its behaviour over time (Hmelo-Silver and Pfeffer 2004). The literature on the individuals' foresight process indicates that the prior knowledge and experience of highly experienced futurists supports this view of experts' knowledge as tightly interconnected in a system of relationships (Tapinos and Pyper 2018). This structured knowledge of experts allows them to understand the system they have knowledge about in a holistic manner (Gitomer 1988; Sonnentag, Niessen, and Volmer 2006). Experts' knowledge is perhaps the most relevant in a foresight process, given that experts may provide novel insights that are not available to a larger audience and that are specific and contextualized (Dufva and Ahlqvist 2015b). Furthermore, deep and specialized knowledge within an operating context allows the detection of future-oriented low-frequency signals about a potential change that the context emits (Ahlqvist and Uotila 2020).

Embodied knowledge in a foresight process resonates with both entrepreneurs' prior knowledge and specialized knowledge, specific technological or scientific knowledge that is relevant in recognizing opportunities (Grégoire, Barr, and Shepherd 2010). Such knowledge can be imbued in human capital, held by individuals in a firm who have experience in specific industries and markets (Klepper and Sleeper 2005) or held by entrepreneurs themselves as prior specific knowledge of an industry or specific domain of interest (Ardichvili, Cardozo, and Ray 2003). The relevance of entrepreneurs' prior knowledge has been widely discussed in the entrepreneurship literature. In Hayek's view (1945), prior knowledge is unique to every individual and creates a specific 'knowledge corridor' through which they perceive opportunities (Venkataraman 1997). Prior knowledge is argued to take various forms, such as prior knowledge of markets, prior knowledge of ways to serve markets and prior knowledge of customer problems (Shane 2000). Additionally, prior knowledge related to a specific industry is also relevant in forming opportunities (Ardichvili, Cardozo, and Ray 2003; Politis 2005). Thusly characterized, prior knowledge corresponds to entrepreneurs' contextual knowledge related to their business, in accordance with Welter's typology of entrepreneurial contexts. Nevertheless, it appears that entrepreneurs' prior knowledge is not only business context-bounded. In their study on the relationship between entrepreneurial experience and success in new venture formation, Toft-Kehler, Wennberg, and Kim (2014) demonstrate that entrepreneurs' experience and knowledge are

also 'regionalized'; that is, they are related to a specific geographic region to which their business pertains. Entrepreneurs' experience and knowledge related to a specific location grants them close connections to local communities, relevant stakeholders and the knowledge of specific external enablers related to that geographic sector, such as regulations. In that sense, prior knowledge related to a regional contextual dimension also allows entrepreneurs to have knowledge of the social and institutional practices (Welter 2011). Finally, knowledge of customers indicates entrepreneurs' knowledge that has a social contextual dimension and can be equated to knowledge about other agents' activities that are related to a specific entrepreneurial context.

Thusly examined knowledge indicates not only its contextual nature, notably related to space, but can lead us to examine its temporal dimension. Therefore, entrepreneurs' knowledge of the institutional dimension of contexts grants them knowledge of the historical temporal aspect of institutionalized practices. These practices may regulate their businesses, but they also regulate the activities of other agents who constitute the entrepreneurs' networks. Thus, entrepreneurs have knowledge of the practices of these agents with whom they constantly interact. Through these interactions, entrepreneurs gain knowledge about these agents' time of their daily lives, their routines and their practices, and given that these agents also move in other contexts they bring into the encounters with entrepreneurs their knowledge about these other contexts in which they are also present. Furthermore, as Giddens explains, when agents move through different contexts they acquire new knowledge about different social practices that they tend to abide by. Therefore, although an entrepreneur may not move in the same contexts as the members of their social network, they still may gain knowledge about these contexts and novel social practices through encounters with their network. This is how different times of daily activity may intersect, thus sending signals about potential changes. However, these signals are processed through entrepreneurs' reflexive monitoring, meaning an entrepreneur's personal experience of time. This indicates that the perception of time-space edges may lead to a perception of change but that the change is acted upon once it is individually temporarily processed.

3.1.3 Articulated knowledge

Knowledge labelled as articulated in a foresight process refers to knowledge that is expressed and shared in interactions between participants (Dufva and Ahlqvist 2015). By nature, it can be objective but more contextualized, referring to the system being observed. When objective (codified) knowledge is articulated, it is subject to the participants' interpretations, which means that meanings are given to such knowledge. Furthermore, as objective knowledge holds historical time, this temporal aspect can also be found in the articulated knowledge. In addition, articulated knowledge also refers to the expressed and shared embodied, expert knowledge. By articulating their

embodied knowledge, experts are explicit about their activities, skills and competences and by doing so may express their perceptions of time with regard to the potential evolution of the system. Therefore, it may be argued that articulated knowledge that is strictly contextualized allows other participants, as agents, to acquire knowledge, both objective and experts' knowledge, and reflect upon the temporal–spatial aspects of that shared knowledge. Regarding entrepreneurial opportunities and the knowledge that contributes to their formation, articulated knowledge as knowledge that is shared in agents' interactions resonates with intersubjective knowledge (Erikson and Korsgaard 2016). Depending on what is shared through interactions, such knowledge may contain relevant information about different dimensions of entrepreneurial contexts (business, regional, social or institutional) and thus allows different temporal aspects to intersect.

3.1.4 Future-oriented (new) knowledge

Finally, a foresight process also embraces new knowledge in the form of weak signals and/or wild cards (Dufva and Ahlqvist 2015b). Adopting a general definition, weak signals constitute an 'emerging phenomena that are the first potential signs of a major change in the future' (Ahlqvist and Uotila 2020, 2). On the contrary, wild cards are sudden, high-impact events characterized by a low probability of occurrence (Mendonça et al. 2004). Both weak signals and wild cards are argued to be purveyors of new, future-oriented knowledge. Earlier, it was mentioned that megatrends and trends have a future-oriented nature, but knowledge of these external enablers is rather objective and available to a larger audience in the form of information (Dufva and Ahlqvist 2015b). Furthermore, these external enablers stretch over past, present and future, thus holding time that has *longue durée*.

Weak signals and wild cards do not have *longue durée*; that is, they do not represent the structural properties within a social system but can become a part of them with time. They can be viewed as the indicators of a potential change or a disruption in a system that can happen either gradually, as in the case with weak signals, or suddenly, as is the case with wild cards. In that sense, they differ in their temporal and spatial scope. Wild cards occur suddenly and may have high local or global impact. They are considered to be unpredictable but can potentially be anticipated (Mendonça et al. 2004, 2009). For instance, natural disasters as usually regionalized sudden events have significant consequences for the regions in which they occur. However, these kinds of sudden events have previously been experienced and therefore may be more easily anticipated, which makes them potential external enablers (Davidsson, Recker, and Von Briel 2020) that are relevant for opportunity formation. However, the outbreak of Covid-19 as a more recent example of a wild card was more difficult to anticipate, although some indicators of the occurrence of a dangerous virus were given earlier (Popper et al. 2011, 17). The reason why such events are difficult to anticipate is because their anticipation requires high expertise in a specific domain (Markley 2011).

Weak signals differ from wild cards in that they are not sudden but emergent. They emit low-frequency signals of a potential change within a specific system that may become a trend, thus becoming a part of structural properties, or they can eventually die out (Hiltunen 2013). As Ahlqvist and Uotila (2020) argue, knowledge of weak signals as future-oriented knowledge is highly contextualized, which means that such knowledge is highly dependent on the strong prior knowledge of individuals within a specific context, which refers again to experts' knowledge. In the entrepreneurship literature, weak signals may echo with emergent political, economic, social or technological changes that may enable entrepreneurial activity and therefore opportunity formation (Davidsson, Recker, and Von Briel 2020). Viewed this way, it appears that weak signals as future-oriented knowledge may refer to all four spatial aspects of entrepreneurial contexts (Welter 2011). Given that weak signals and wild cards are strongly dependent on an agent's prior contextual knowledge, that is, that it may be hidden for other agents lacking prior contextual knowledge, this new, future-oriented knowledge is imbued with the knowledgeable agent's individual temporal experience.

How, then, do entrepreneurs employ contextual knowledge and its temporal-spatial aspects in forming opportunities-visions? Taking the concept of visions as future images of the evolution of previously known systems (Strange and Mumford 2002, 2005), entrepreneurial opportunities hold both prior knowledge of contexts as systems and as future-oriented knowledge of a potential change in the given contexts. Based on the above examination of knowledge, if entrepreneurs already possess prior knowledge of business, social, regional and institutional contextual dimensions, their strong contextualized knowledge allows them to acquire future-oriented knowledge and process both historical and other agents' temporal aspects based on their own lived temporal experience. This allows them to construct opportunities-visions. However, if entrepreneurs enter novel, previously unknown contexts they will turn to other agents who have knowledge of these contexts. That is, they will rely upon the articulated knowledge. In this case, as I argued in the section discussing entrepreneurial opportunities as ideas or visions, entrepreneurs will more likely begin with an idea that will gradually mature into a vision. The reason for this lies in the fact that in lacking knowledge of the contexts, they also lack knowledge of the temporal aspects of structural properties and other agents' behaviour, which they need for their own temporal experience. Entrepreneurial opportunities as visions are imbued with entrepreneurs' individual temporal experience that is based on their past contextual knowledge and present interactions with other agents, all of which may signal a potential change. However, it is entrepreneurs' imagined future experience of that change that transforms the existing contexts, a change that also represents novel contexts in which the relationships between the agents have changed. Such envisioned novel contexts hold entrepreneurs' futures knowledge.

3.2 Building theoretical framework

Studying entrepreneurial activity and with it entrepreneurial agency is a complex task because it means embracing the complexity in which entrepreneurs operate and the indeterminacy of the future they face. Unfolding in the complexity of external circumstances and human agency, entrepreneurship is a future-making activity that may lead to great societal transformations. Yet, in understanding how such change occurs without analysing world time we should study change within entrepreneurial contexts that may shed a more focused light on entrepreneurial agency. In addressing entrepreneurial agency, I initially started by scrutinizing the existing entrepreneurship literature addressing entrepreneurs' relationship with the future indeterminacy and complexity of their operating environment. This led me to the concept of foresight, which is underdeveloped in the entrepreneurship literature yet appears to be a promising lens through which to understand how entrepreneurs tame complexity and act upon their imagined futures. In parallel, I examined such entrepreneurs' capacity regarding the formation of entrepreneurial opportunities, which has been a central concept in the entrepreneurship literature for more than two decades and has been considered a focal phenomenon in understanding entrepreneurial activity and entrepreneurial agency. Nevertheless, the opposing views and disagreements around the conceptualisation of entrepreneurial opportunities and the scarce literature on entrepreneurial foresight required me to rely on the growing consensus in the entrepreneurship literature regarding the dual nature of entrepreneurial opportunities. However, even in embracing the duality of entrepreneurial opportunities, some points needed further development and clarification before shedding light on entrepreneurial foresight and, subsequently, on entrepreneurial agency, which fed back to entrepreneurial opportunities.

By remobilizing Giddens' structuration theory with regard to entrepreneurial opportunities, my intention was not to apply this theory but to use some elementary concepts that would allow me to better understand entrepreneurial agency. Given a number of the underdeveloped concepts, such as knowledge, time and temporality in entrepreneurial activity and opportunities, interchangeable views of entrepreneurial opportunities as ideas or visions and the unclarified concept of entrepreneurial foresight, a more synthetic approach to these concepts was called for. I found this to be supported by Giddens' view of agency, contexts, and time-space. Therefore, in my endeavour to synthesize these elements and provide a coherent picture of entrepreneurial agency in opportunity formation, I constructed a theoretical framework, which is illustrated in Figure 2.

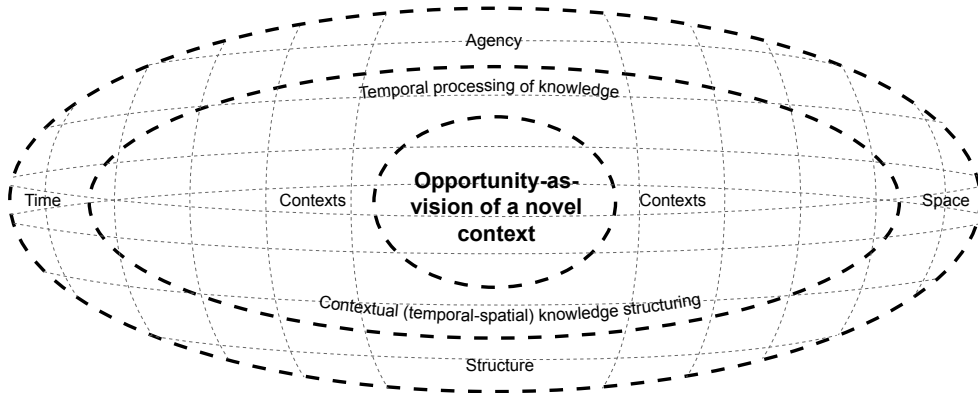


Figure 2. Theoretical framework

My view of entrepreneurial agency and its transformative power gradually develops by initially positioning entrepreneurs in the interplay of structure and other humans' agency, both of which exist in time and space. However, the structural properties are expressed through human encounters that happen in contexts, which are time-spaces per se. In space, contexts are regionalized, but from a temporal aspect they hold both time of structural properties and agents' time in their daily lives. However, as agents may move, contexts move with them. Therefore, they may intersect, just as, according to Giddens, social systems may intersect. However, intersection only happens due to agents' encounters. In such settings, entrepreneurs as purposeful, knowledgeable and reflexive agents move as well, thus acquiring knowledge of the contextual dimensions and time-spaces through which they move and reflecting on newly gained knowledge of these contexts. In their activity, they acquire and structure the acquired temporal-spatial knowledge, upon which they also reflect by processing it based on their own temporal experience. Thus, Giddens' understanding of contexts, time-spaces and agency also allowed me to shed light on entrepreneurial foresight as the capacity of entrepreneurs to structure and temporally process contextual knowledge. Due to entrepreneurial foresight, entrepreneurs are able to form opportunities as visions of novel contexts that represent a change to the contexts in which they already operate.

4 Methodology

4.1 Reflections on epistemological and methodological approaches

The epistemological stance of my dissertation falls within social constructionism such as it is defined and discussed by Michael Crotty (1998). In constructionism, meaning is socially generated in the sense that it is ‘contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context’ (Crotty 1998, 42). Accordingly, I construct (meaningful) reality in interactions with the entrepreneurship and foresight literature and a number of foresight and entrepreneurship practitioners, some of whom I have studied and worked with or met before I started my doctoral journey. The gradual construction of meaning (and knowledge) in my work about how entrepreneurs reason and act in the midst of complexity and in the face of an unknown and unknowable future has been guided by naturalistic decision making (NDM). NDM, also known as the macrocognitive framework or macrocognition, is a theoretical and methodological perspective developed in cognitive psychology as a way to investigate individuals’ knowledge and cognition in complex and uncertain real-world settings, contrary to ‘classical’ laboratory settings (Cannon-Bowers, Salas, and Pruitt 1996; Shattuck and Miller 2006). Claiming its roots to be at the intersection of phenomenology and naturalism (Schraagen, Klein, and Hoffman 2008; Storkerson 2010), NDM opposes the positivistic stance in experimental cognitive psychology that seeks to generate and test hypotheses (Schraagen, Klein, and Hoffman 2008). Rather, NDM studies the cognition and knowledge of individuals in their natural settings, with a focus on discerning and understanding the complex cognitive work of individuals by observing them through their experience (Storkerson 2010). Therefore, although its final objective may be to inform experimental psychology and bring nomothetic information, by nature NDM embraces an idiothetic approach. Furthermore, in its specificity to discern and understand individuals’ complex cognitive phenomena triggered in complex indeterminate settings, usually performed in shifting and ill-defined activities (Hoffman, Klein, and Miller 2011), NDM is a good fit to approach entrepreneurial cognition given the complexity and indeterminacy of entrepreneurial contexts (Dew et al. 2018). Finally, the NDM approach to individuals’ cognitions does not reject their socially situated character. On the contrary, the NDM approach clearly embraces it (Schraagen, Klein, and Hoffman 2008, 7–10).

The gradual construction of my knowledge in this dissertation has its roots in my previous experience working with entrepreneurs in my home country of Serbia. This experience led me to resume my studies in 2013/2014, this time in entrepreneurship, at the ESCP Business School in Paris, France. At that time, one professor from the ESCP

School shared with the students two concepts, effectuation and ‘la prospective’, which is the name of the French foresight school. These two concepts strongly resonated with my previous experience of witnessing the extraordinary capacity of one entrepreneur in particular who created several business ventures during our collaboration by following his mental constructions of these businesses in the future. The basic tenets of the two concepts and the question of how they relate and blend with entrepreneurial activity followed me all the way to Strasbourg, where I decided to pursue a Master’s degree in research, the first step in my doctoral journey. Article 1 is the product of my research that began at that time. The initial exploratory work that aimed at examining the implicit links between entrepreneurial activity under high uncertainty and complexity, which are claimed in the effectual approach (Sarasvathy 2001), and foresight activity corresponds to the initial step that NDM requires from a researcher, which is to document their knowledge about the phenomenon in question (Crandall, Klein, and Hoffman 2006).

As the objective in the NDM perspective is not to seek objectivity and generalizability but to focus on observing, understanding and capturing the idiosyncrasy of the phenomenon, NDM calls for an interpretative, qualitative, methodological approach. A wide range of methods and tools that NDM proposes (Crandall, Klein, and Hoffman 2006) fit well in observing the complex phenomenon of entrepreneurial cognition in the complex and indeterminate settings in which entrepreneurial activity unfolds. Some of these methods were employed in the three empirical articles of this dissertation. Table 3 summarizes the motives behind the material collection, a list of participants and the research design and methods employed in these articles. The fourth article is a conceptual one that I reflect on at the end of the methodological section.

³ *Disclaimer: At this point, I would like to state that Professor Jari Kaivo-oja, who, according to the co-tutelle agreement signed between the University of Strasbourg in France and the University of Turku in Finland (October, 2017), has acted as my supervisor at the Turku School of Economics since January 2018, was one of the participants interviewed for Article 1 of this thesis. However, the data for this research work were collected in April–May 2016 prior to my enrolment in doctoral studies at the University of Strasbourg (November 2016). At the time Professor Kaivo-oja agreed to act as my supervisor (Summer 2017), the article in question was already under review by Technological Forecasting and Social Change. Therefore, I received no additional guidance from Professor Kaivo-oja in developing the article.*

Table 3. Material collection, participants, research design and methods

Empirical article	Effectuation and foresight – An exploratory study of the implicit links between the two concepts	Knowledge dynamics in opportunity–vision (trans) formation	Thinking Over the Horizon: Entrepreneurial Cognition in Complex, Far-off Tasks
Motives behind empirical material collection	To identify the building blocks and role of foresight in entrepreneurial activity	To study the role of knowledge in opportunity formation	To investigate entrepreneurial future-oriented cognition under uncertainty
Participants	7 futurists (Finland, France, Hawaii, Spain) 4 entrepreneurs (France)	24 entrepreneurs (Brazil, Bulgaria, Canada, France, Germany, Holland, Ireland, Mexico, Serbia, UK and USA)	20 entrepreneurs (Belgium, Canada, France, Germany, Greece, Mexico, Serbia, Spain, UK and USA)
Used methodologies and techniques	Semi-structured interviews	CDM (task analysis through retrospective semi-structured interviews)	CTA (experiment-like (constrained) task through semi-structured interviews guided by the foresight scenario method)

4.2 Research design and methods

As mentioned, Article 1 was designed to uncover the links between entrepreneurial activity under uncertainty, discussed using the effectuation framework and foresight as the activity and process of exploring alternative futures. One of the basic tenets of the effectual approach is recognition of the unknowability of the future and with it entrepreneurs’ refusal to predict it but rather to create it through action (Sarvasvathy 2001). More recently, proponents of effectuation have linked this approach to contexts characterized by complex indeterminate causation (Dew et al. 2018). A comparative analysis of the two literature streams highlights the links between entrepreneurial and foresight activity in terms of the nature of their contexts. The subsequent semi-structured interviews were designed to deepen the understanding of the building blocks of foresight and its role in the way entrepreneurs approach the complexity of their environment and deal with the uncertainty of the future through their activity. The use of interviews as a way to refine and analyse existing knowledge of the concepts and definitions prior to engaging in an in-depth study of the phenomenon is strongly suggested in the NDM approach (Hoffman 1987; Crandall, Klein, and Hoffman 2006). Therefore, the thusly

designed study set forth the interplay between entrepreneurs and their environment in the knowledge creation process and entrepreneurs' need and capacity to build a systemic perception of the environment and to anticipate the future, all of which blend in their capacity to envision future business ventures.

Article 2 explores the role of knowledge in opportunity formation using the critical decision method (CDM). CDM is one of the methods in cognitive task analysis (CTA), a methodology that aims to elicit individuals' knowledge and cognitive mechanisms in complex and dynamic real-world settings (Crandall, Klein, and Hoffman 2006). In approaching knowledge elicitation, CDM orients around a representative task of an individuals' activity that needs to be familiar to them (Hoffman, Crandall, and Shadbolt 1998). In discerning such tasks in entrepreneurial activity, this study relies on the entrepreneurship literature in which opportunity formation is defined as the central task of entrepreneurial activity (Gustavsson, Smith, and Mitchell 2006; Baron and Henry 2010). Furthermore, to ensure a degree of the participants' familiarity with the task, CDM selects the most recent task in which the participants' were involved, thus approaching knowledge and cognition elicitation in a retrospective manner. Selecting the most recent task helps reduce recall bias. The initial questions were designed to elicit the participants' recollections of the recent events preceding or happening at the same time as their engagement in the task, thus setting the participants in time and space with the aim of minimizing retrospective bias (Klein, Calderwood, and Macgregor 1989).

Without losing sight of the objective to observe the central phenomenon of entrepreneurial cognition from different angles, Article 3 takes a different approach by following a prospective research design but still under the guidelines of CTA. In line with considering entrepreneurship as activity that unfolds in the complexity of entrepreneurial contexts with an indeterminate future (Dew et al. 2018), this study aims at eliciting entrepreneurs' future-oriented cognition in such contexts. Therefore, it was necessary to re-create the nature of such contexts, which was done by designing an experiment-like task (Crandall, Klein, and Hoffman 2006). Similar to the design in Article 2, Article 3 also orients around opportunity formation as a representative task of entrepreneurial activity, thus making it familiar to the participants. However, the objective of this study was to subject the participants to a certain degree of uncertainty, thus placing them in an unknown context. This was simulated by presenting to the participants a video featuring a folding kayak as an actual designed product. The aim was to select a product with which the participants' were not familiar and which was not related to their operating sectors. By selecting such a product as the initial step in the opportunity formation task, the participants were deliberately exposed to particular constraints that simulated the situation of so-called 'creative uncertainty', thus allowing them to have an open set of possible courses of action (Packard, Clark, and Klein 2017). Additionally, exposing the individuals to unfamiliar information related to a task is argued to help in eliciting their knowledge and reasoning (Hoffman 1987; Hoffman et al. 1995; Schraagen 2006). Another specificity in the design of this study is the way the underlying themes

of the interviews were conceived. One major theme was to elicit how entrepreneurs would proceed in using the product to create an opportunity. Another theme was to elicit entrepreneurs' future-oriented cognition. In this part, one set of questions was designed by following the major steps in the scenario method, one of the most common foresight methods (Schwartz 1991; Schoemaker 1993; Godet 2008). In foresight, scenarios allow exploration of the operating environment and taking a longer view (Bezold 2010). Therefore, a set of questions was designed that would allow capturing the participants' understanding of the environment as a system. The questions were based on the steps of identification of the key forces that may influence the environment, such as current trends, potential sudden events and the analysis of relevant stakeholders, their potential actions and interests (Schoemaker 1993; Durance and Godet 2010). In general, the scenario-building process begins by defining the scope of the observed system and setting a time horizon. Designing the questions around the time expectation allowed the participants' time perspectives to be identified. The participants were also asked how they would see the opportunity they envisioned in five and ten years' time. These timeframes, which were set at the end of the interviews, brought interesting insights on the impact of participants' future thinking in opportunity formation.

4.3 Collection of empirical material and selection of participants

In all three empirical articles, the data were collected through semi-structured (in-depth) interviews (Given 2008). This technique allowed me to structure the major themes to be discussed with the participants, while still being able to probe their experience and knowledge in a flexible, yet thorough manner.

The objective of Article 1 is two-fold. First, the article intends to examine the theoretical links between foresight and effectuation as the approach in entrepreneurial activity under complexity and uncertainty. Second, it intends to investigate the experience of both foresight and entrepreneurship practitioners in their respective activities to uncover potential foresight elements in entrepreneurial activity, while at the same time allowing further analysis of the concepts and theoretical perspectives in both fields. For this reason, I interviewed seven futurists and four entrepreneurs in the period of April to mid-May 2016. The participants were selected from the professional and personal networks of both authors. The interviews lasted approximately 45 to 60 minutes. Additionally, data were collected through continued e-mail correspondence with two futurists due to differences in our time zones and schedules. Although I initially thought this format would be a constraint, in reality it allowed the informants to take time and reflect on my questions and to express and develop their experience. This format proved to be a good option in additional probing of the informants' answers when clarification was needed (Murray and Sixsmith

1998). The prior relationship I was able to establish in person with Professor Dator and through Skype with Professor Bas likely facilitated this method of communication.

Research Article 2 investigates how entrepreneurs use different types of knowledge in opportunity formation and how such knowledge contributes to the future-oriented nature of entrepreneurial opportunities. The data used in this study were collected through retrospective semi-structured interviews. The probe questions were used both to reduce the recall bias and to explore the in-depth knowledge they use in the familiar task of opportunity formation. In total, 24 interviews with 24 entrepreneurs were conducted, eight of which were conducted by a group of students in business administration. Prior to collecting the data, the students were trained in the CDM method. The interviews were conducted from October 2018 to March 2019. Each interview lasted approximately 90 minutes. The interviews were carried out in person or via Skype or Zoom, which allowed them to be conducted face to face.

In its objective to investigate entrepreneurs' reasoning throughout the steps in opportunity formation in a setting characterized by a specific degree of uncertainty, Article 3 uses a different approach that is prospective in nature. The semi-structured interviews were designed to capture the individual entrepreneurs' future-oriented cognition they employ in opportunity formation in an unfamiliar setting. The interviews were conducted from October 2019 to March 2020 with 20 entrepreneurs from different countries operating in various sectors. Each interview lasted 1–2 hours, depending on the time the interviewees had available. The interviews were conducted in person or via Skype or WhatsApp, which allowed them to be face to face. Each interview was recorded and transcribed. The interviewers were me as the lead researcher and a group of seven international students in business administration with the necessary training. To elicit knowledge from the participants in an effective manner, the interviewers were familiarized with the CTA methodology. Prior to interviewing the entrepreneurs, the students were first subject to the protocol that they subsequently used as interviewers. Thus, they acquired personal experience in collecting the data required by the CTA methodology. Notes about the participants' reactions and the time they took to give their responses were taken during the interviews. However, given that the notes did not add any value to the data, they were omitted from the analysis. This observation technique is suggested in the CTA methodology, but it is mainly used in studying individuals such as army commanders or firefighters whose reasoning and decision making can be observed based on their actions, which are subject to time constraints (Klein 1989). Therefore, it did not particularly apply in this study.

4.4 Methods of data analysis

The main focus in Article 1 was not only to bring to the fore the underlying relationship between entrepreneurial and foresight activity at the existing theoretical level but also

to uncover how in practice both entrepreneurs and futurists approach complexity and indeterminacy of the future in their respective activities. Therefore, in Article 1 we used the Gioia method (Gioia, Corley, and Hamilton 2013) to structure, code and interpret the interview transcripts. First, we generated the first-order concepts using the informants' wording. Next, we developed the second-order themes by approaching the initially generated concepts from our perspective as researchers. Finally, in the stage of grouping these themes into the aggregate dimensions, we were able to reveal traces of the foresight approach in the entrepreneurial activity and the emerging foresight approaches that may enhance knowledge creation, systems thinking and the envisioning of future business opportunities.

The other two empirical articles examine the in-depth knowledge and cognition entrepreneurs employ in opportunity formation. Article 2 investigates the different types of knowledge entrepreneurs rely on in opportunity formation and how such knowledge underlies their capacity to imagine opportunities. Article 3 focuses on the cognitive mechanisms that underlie future-oriented cognition in the complex and indeterminate setting of opportunity formation. In both articles, the semi-structured interviews were analysed using the analytical grounded theory approach (Strauss and Corbin 1990). However, Article 2 was approached from the perspective of thematic analysis, which, although it may be used in other disciplines, is particularly common in psychology (Braun and Clarke 2006). Given the focus of the article, my initial assumption led me to approach the data from this perspective. Nevertheless, although the focus of the article is the phenomenon of knowledge in opportunity formation, this phenomenon was observed in relation to the setting, which is the process of opportunity formation. Thus, although the initial thematic analysis allowed me to detect different themes related to the main theme of knowledge, I found it to be an inconvenient approach for the more fine-grained analysis that the data needed and in analysing the evolution of the phenomenon through a process. Therefore, I opted instead for the approach of Strauss and Corbin (1990). Even before coding the data, I employed the procedure of memoing and diagramming. This step allowed me not only to become familiar with the data but to capture some recurring patterns in the data. Therefore, I used this technique throughout the entire process of data collection and data analysis.

In the first analytical step, I approached the data using multiple coding methods with the aim of exploring the data and allowing different processes and phenomena to emerge (Saldaña 2016). This allowed me to analyse the processes and make sense of the longer chunks of data, such as is the case of descriptive coding, while also taking into consideration informants' wording (Miles, Huberman, and Saldaña 2014; Saldaña 2016). In this stage of coding, numerous concepts emerged. To make sense of and group them, I noted to what kind of phenomenon they refer. The data revealed the concepts related to either the phenomenon of knowledge or to the process of opportunity formation. These two phenomena guided my further analysis in grouping the concepts into categories. Prior to axial coding as the second-order coding (Strauss

and Corbin 1990; Saldaña 2016), these categories were analysed by assigning them properties and dimensions, which allowed identification of the locations of categories in the data and of their nature and the form in which they occurred. Thus, for instance, the properties of the category “knowledge dynamics” related to the characteristics of different types of knowledge detected from the data as well as whether the type of knowledge was held by the participants personally or taken from external stakeholders. The dimensions indicated the spatial and temporal dimensions of knowledge, that is, not only when such knowledge was employed and at which stage of the opportunity formation but also whether the knowledge brings a deeper or broader understanding or whether it was anticipatory (future-oriented). Such categorization enabled the axial coding in which I sought to establish the relationships between these different categories. Ultimately, in the stage of selecting the main category the data revealed that the category of ‘knowledge dynamics’ reflects the main phenomenon and that this phenomenon influences the process of opportunity formation.

Finally, as Article 3 aims at examining entrepreneurs’ future-oriented cognition through a process of opportunity formation, my intention was to analyse in which stages of this process different dimensions of the participants’ future-oriented cognition were triggered and how they affected the development of the subsequent stages. Therefore, my decision to proceed in the same vein to analyse the data was informed at the same time by the nature of the article’s focus of investigation and my experience in using the grounded theory analytical approach in Article 2. Table 4 illustrates the articles’ main focuses, units and methods of analysis.

Table 4. Overview of the focus, units and methods of analysis of the articles

Empirical article	Effectuation and foresight – An exploratory study of the implicit links between the two concepts	Knowledge dynamics in opportunity–vision (trans) formation	Thinking Over the Horizon: Entrepreneurial Cognition in Complex, Far-off Tasks
Main focus of analysis	To uncover how in practice both entrepreneurs and futurists approach the complexity and indeterminacy of the future in their respective activities	To study the different types of knowledge entrepreneurs rely on in opportunity formation and how such knowledge underlies their capacity to imagine opportunities	To investigate at which stage of opportunity formation entrepreneurs employ future-oriented cognitive mechanisms and how these mechanisms affect opportunity formation under uncertainty
Main unit of analysis	Interviews	Interviews	Interviews
Method of analysis	Gioia method (Gioia, Corley, and Hamilton 2013)	Grounded theory (Strauss and Corbin 1990)	Grounded theory (Strauss and Corbin 1990)

4.5 Reflections on the conceptual article (Article 4)

In this subsection, I briefly shed light on the rationale and objective of Article 4, which differs from the other articles by its conceptual nature. The NDM theoretical perspective that permeates this dissertation and guides the methodological choices in the empirical articles allowed me to empirically investigate and deeply examine the phenomenon of entrepreneurial cognition in the complex and indeterminate task of opportunity formation. Thus, the objective of NDM to study knowledge and cognitive work in complex indeterminate contexts suited my initial intention. However, NDM also helped me tackle a more specific phenomenon, one on which it particularly focuses—human expertise. Although the empirical articles in this dissertation do not centre on the question of expertise in entrepreneurship, the analysis of their data and findings pointed to this phenomenon, which I conceptually discuss and develop in Article 4. The data in the three empirical articles were collected by interviewing a number of entrepreneurs who differed in their entrepreneurial experience. The data analysis revealed some recurring cognitive mechanisms in entrepreneurs' activities that appear to be fundamental in cognitively grasping complexity and indeterminacy and that entrepreneurial activity shares with foresight. Article 4 highlights the nature of entrepreneurial activity and calls for studying entrepreneurial expertise through the lens of entrepreneurial foresight. Using a propositional style, Article 4 brings into the research stream of entrepreneurial cognition three cognitive mechanisms underlying entrepreneurial foresight that can be operationalized, thus allowing the measurement of entrepreneurial expertise. The call for the operationalization of variables may appear counterintuitive to the NDM approach. However, although the focus of NDM is to reveal cognitive work that may be neglected in laboratory settings, it still claims its role to 'inform' the experimental approach by highlighting the recurring patterns in cognitive work, thus contributing to the potential operationalization of these patterns (Schraagen, Klein, and Hoffman 2008, 10–14). Therefore, the purpose and the nature of Article 4 remains loyal to the NDM objectives.

5 Overview of the research articles

In writing the independent articles that comprise the second part of this dissertation, I was honoured to collaborate with other researchers. In this section, I reflect on these collaborations and the contributions my collaborators and I made in these articles. I also reflect on the development of each of these articles that were presented at international conferences. Finally, I provide summaries of each article in which I relate their results, which are detailed later in the discussion section. Their implications are also discussed.

5.1 The writing and development process of the research articles

I collaborated with other researchers in writing three of the articles and wrote one by myself. Table 5 lists the contributions of the authors with whom I collaborated.

Table 5. The authors' contributions in the research articles

Research article	Effectuation and foresight – An exploratory study of the implicit links between the two concepts	Knowledge dynamics in opportunity–vision (trans) formation	Thinking Over the Horizon: Entrepreneurial Cognition in Complex, Far-off Tasks	Entrepreneurial Foresight in Opportunity Formation: Toward Operationalization of Entrepreneurial Expertise
Authors	Ksenija Djuricic Dr Jean-Philippe Bootz	Ksenija Djuricic	Ksenija Djuricic Dr Pekka Stenholm Dr Norris F. Krueger	Ksenija Djuricic Dr Pekka Stenholm Dr Norris F. Krueger
Authors' contributions	Ksenija Djuricic contributed to the study's conception and design, data collection, analysis and interpretation, and was responsible for writing the manuscript. Dr Bootz contributed to the study's conception and design, data analysis and interpretation, and contributed to the revision of the manuscript.	Ksenija Djuricic was the sole author on this manuscript.	Ksenija Djuricic contributed to the study's conception and design, data collection, analysis and interpretation, and was responsible for writing the manuscript. Dr Stenholm contributed to the study's conception and design and to the revision of the manuscript. Dr Krueger contributed to the revision of the manuscript.	Ksenija Djuricic contributed to the article's conception and was responsible for writing the manuscript. Dr Stenholm contributed to the article's conception and to the revision of the manuscript. Dr Krueger contributed to the revision of the manuscript.

Table 5 shows that for Articles 1, 3 and 4, which were co-authored, I was the lead author. Regarding these three articles, I contributed to their conception and design and was entirely responsible for writing the manuscripts. Regarding Article 1, my co-author and I worked together in conceiving the design of the article and conducting the analysis and interpretation of the collected empirical material. Regarding Articles 3 and 4, one of my co-authors contributed to their conception and design, while I was entirely responsible for the analysis of the empirical data in Article 3. The data collection for Article 1 did not include any other researcher. The empirical material for Article 2 and Article 3 was collected by me and two groups of international students in business administration. Regarding Articles 1, 3 and 4, I was entirely responsible for writing the manuscripts, while all my co-authors contributed by revising them. Regarding Article 2, I was the sole author.

Throughout the writing process, the manuscripts were regularly presented at research seminars and different international academic conferences and symposiums, all of which immensely contributed to the development of the manuscripts. As Table 6 shows, Article 2 was finished and presented at two international conferences after Article 3. In the initial conception of the project and its main objective, Article 2 was designed and the data for it were collected before Article 3. However, the opportunity to collaborate with Dr Pekka Stenholm and Dr Norris F. Krueger was the reason I chose to write and develop Article 3 first and present it at the RENT Conference in 2020.

Table 6. Development of the articles

Research article	Effectuation and foresight – An exploratory study of the implicit links between the two concepts	Knowledge dynamics in opportunity–vision (trans) formation	Thinking Over the Horizon: Entrepreneurial Cognition in Complex, Far-off Tasks	Entrepreneurial Foresight in Opportunity Formation: Toward Operationalization of Entrepreneurial Expertise
Earlier version(s)	The first version of the manuscript was presented at the AGECSO Conference in 2016.	The first version of the manuscript was presented at the Futures Conference in 2021. The second version of the manuscript was presented at the RENT Conference in 2021.	The first version of the manuscript was presented at the RENT Conference in 2020.	The first version of the manuscript was presented at the EURAM conference in 2021. The revised version was presented at the AOM Symposium on Neuroentrepreneurship in 2021.
Final version	Published in Technological Forecasting and Social Change			

5.2 Summary of research article 1

Effectuation and foresight – An exploratory study of the implicit links between the two concepts

Although effectuation was not initially conceptualized as an approach to opportunity formation (Sarasvathy 2001), the concept has since been used interchangeably with creation theory (Alvarez, Barney, and Anderson 2013) and the idiosyncrasy approach (Davidsson 2015) to entrepreneurial opportunities. In terms of its perspective on the complexity of the operating environment and its consideration of the future as open and malleable through human action, effectuation approaches entrepreneurial activity and foresight on a deep theoretical level. The necessity to explore in depth the implicit links between the two concepts stemmed from the need to fill in the theoretical gap and shed light on how entrepreneurs potentially use foresight, as well as how foresight as a process and a set of methods can inform and guide individual entrepreneurs in their activity in complex contexts about which they lack knowledge and which they frequently face in forming novel opportunities.

Therefore, in this study we strengthened the implicit links between effectuation and foresight through a literature review. The subsequent empirical study that included 11 semi-structured interviews with seven globally renowned international futurists and four experienced entrepreneurs operating in France revealed a number of relevant findings about how foresight can structure individual entrepreneurs' reflection and enhance opportunity formation in an ill-structured context.

This study reveals that entrepreneurs engage in forward-thinking activities to anticipate possible future occurrences related to their operating environment. Prior to building new ventures, they express a need to tap into their networks to gain specialized and new knowledge that would allow them to imagine the future, which indicates the necessity to first have a vision of the future before sharing it through their products and services. In that context, foresight can be used as a tool to help entrepreneurs develop systems thinking to gain a systemic perception of their ecosystems and select relevant stakeholders. Building a network of stakeholders who hold specialized knowledge and from whom entrepreneurs may extract new knowledge in the form of weak signals would inform them about emergent changes and possible future changes in the environment. As a platform where diverse perspectives converge, foresight is not just a platform for knowledge acquisition but may also help in building visions expressed either in scenarios (one of the most representative foresight methods) or through the construction of artefacts that can be shared with others. Moreover, some novel approaches to foresight that aim at conceiving tangible artefacts in a participatory manner can enhance the experimental dimension of the effectual approach. Therefore, aiding entrepreneurs to map out their ecosystems with relevant stakeholders foresight helps reduce the complexity of the operating environment by focusing

entrepreneurs' attention on relevant and coherently connected elements. In addition, by aiding them in knowledge acquisition and in building visions, foresight reduces uncertainty and serves as a tool for identifying and evaluating novel opportunities.

5.3 Summary of research article 2

Knowledge dynamics in opportunity–vision (trans)formation

Different conceptualizations of entrepreneurial opportunities recognize knowledge as their constitutive element. Therefore, the discovery theory that views opportunities as emerging from external circumstances highlights the importance of objective knowledge of external forces and prior knowledge of industry, markets and customers in identifying or recognizing opportunities. The approach to opportunities as created social realities focuses on new knowledge that emerges from social interactions as being intersubjective. Finally, the idiosyncrasy approach that acknowledges entrepreneurs' imaginative capacity in opportunity formation reveals the relevance of subjective knowledge, which is argued to have a future-oriented nature. Nevertheless, these approaches do not address how different types of knowledge lead to opportunity formation and how knowledge shapes the future orientation of entrepreneurial opportunities.

To help fill this gap, this study approaches the phenomenon of entrepreneurial opportunities by acknowledging the relevance of external circumstances, human agency and entrepreneurs' capacity to imagine the future. Thus, by embracing the external complexity of the environment and the imaginative capacity of individual entrepreneurs, opportunity formation approaches foresight as a process that allows exploration of the future through the analysis of a current system and the imagination of individuals. By tapping into both the entrepreneurship and foresight literature, this article casts light on the similarities between entrepreneurial opportunities and foresight in terms of knowledge. Through an analysis of the different types of knowledge in both processes, this study introduces the concepts of future-oriented and futures knowledge. Furthermore, it provides a view of systemically structured prior knowledge in foresight that is relevant for capturing future-oriented knowledge.

Through an empirical design based on the principles of CDM, this study explores the knowledge and cognitive mechanisms entrepreneurs employ in opportunity formation. The analysis of the retrospective semi-structured interviews with 24 entrepreneurs reveals that different types of knowledge have different qualities in terms of whether they bring a deeper or broader understanding or even future-oriented knowledge to the participants. The results indicate that opportunities are formed through two different knowledge dynamics that depend on entrepreneurs' prior knowledge of a specific industry. The first dynamic demonstrates that prior experience and knowledge of a specific industry leads to a combination of different types of knowledge that are intertwined in such a way that they build systemic knowledge. Such knowledge allows

entrepreneurs to grasp more fine-grained future-oriented knowledge. This combined knowledge leads entrepreneurs to generate opportunities in the form of visions. When lacking industry-specific knowledge, entrepreneurs engage in a process of knowledge acquisition, which demonstrates that different types of knowledge are at play in different stages of opportunity formation. In this context, an opportunity unfolds from a problem knowledge into an idea that is finally transformed into an opportunity–vision. In both dynamics, opportunities as visions represent futures knowledge that emerges from a combination of deep, broad and future-oriented knowledge. Thus, opportunity–vision is either a product of an entrepreneur’s individual foresight capacity developed through prior experience or a product of a knowledge acquisition process that echoes with the conceptualization of foresight as a futures knowledge creation process.

5.4 Summary of research article 3

Thinking Over the Horizon: Entrepreneurial Cognition in Complex, Far-off Tasks

The extant entrepreneurship literature acknowledges the complex and future-oriented nature of entrepreneurial activity and therefore of entrepreneurial opportunities as the central phenomenon inherent in entrepreneurial activity. Prior research has addressed the importance and the potential effects of future-focused cognitive processes on opportunity formation. However, although entrepreneurship scholars recognize that entrepreneurs operate in uncertain and complex environments, empirical studies addressing the cognitive processes required when facing complexity and uncertainty are scarce. This study focuses on revealing how entrepreneurs tame complexity and uncertainty in building an opportunity and how they experience the future while forming opportunities.

For its theoretical grounding, this study relies on a recent conceptual framework of entrepreneurial opportunity representing the interplay of the attributes of opportunity, such as the external environment, individual cognitions and perceptions. These attributes are conceptualized under the labels external enablers, new venture ideas and opportunity confidence (Davidsson 2015). In addition, in bringing forward the elements of long-term thinking in a complex setting the study employs the concept of futures consciousness (Ahvenharju, Minkkinen, and Lalot 2018; Lalot et al. 2020). This empirical study offers a prospective design proposed in CTA in which a set of questions follows the steps of the scenario method that is widely employed in foresight studies. By subjecting 20 individual entrepreneurs to an unknown context related to a specific product, we created an experiment-like task in which we succeeded in eliciting the participants’ futures consciousness mechanisms. This allowed us to capture how entrepreneurs experience the future throughout opportunity building and how their thinking brings an opportunity to existence.

The findings reveal that an entrepreneurial opportunity is subject to a process of transformation in which new ideas emerge and mature into an opportunity. From an initial stage in which entrepreneurs imagine a potential relationship between a product

and a prospective targeted user, a new venture idea evolves into an opportunity as an envisioned system. Throughout this process, entrepreneurs rely on their knowledge of the structure in which an opportunity may be conceived, that is, external enablers. Such knowledge includes knowledge of different global trends, fashions, technological advancements and legislation that could be related to the product. Additionally, more experienced entrepreneurs rely less on external enablers and rather tap into their prior knowledge to form an initial idea that they will further develop. In this process from the ideation stage to the envisioning stage in opportunity formation, entrepreneurs also tend to seek the knowledge of relevant experts in understanding and finding the best match between the product and the user. This entire process has a two-fold aim. The first objective is to get a holistic picture of the operating system, its elements and their relationships. The second is to limit the system to a number of relevant elements between which entrepreneurs will imagine new possible relationships. Knowledge of the external structure and experts' and entrepreneurs' individual knowledge from previous entrepreneurial endeavours allow them to build systems perception and to imagine the future evolution of the initial new venture idea in the form of an envisioned business opportunity. Furthermore, the results reveal that entrepreneurs have several decision-making points that are expressed in opportunity confidence, their perception of the potential of each stage in the opportunity formation process. This perception is both knowledge- and time-bounded. In experiencing the time ahead, entrepreneurs preferably opt for short-time perspectives, which allow them to make financial projections. Nonetheless, long timeframes are considered when imagining the potential future development of the opportunity as a preferable future towards which they wish to aim. The results reveal that long-time perspectives are common among experienced entrepreneurs and are entwined with their own temporality.

5.5 Summary of research article 4

Entrepreneurial Foresight in Opportunity Formation: Toward Operationalization of Entrepreneurial Expertise

Understanding the phenomenon of entrepreneurial expertise is relevant for entrepreneurship researchers and professionals alike, as it aims at revealing the skills that lead to high proficiency and success in building new ventures. The extant research on this topic has provided important insights on this complex phenomenon. Nonetheless, it has failed to elucidate the elements that can potentially be operationalized. Doing so would significantly help in educating prospective entrepreneurs and enhancing the competence of established entrepreneurs and in informing relevant stakeholders, such as venture capitalists, when making investment decisions. In this conceptual article, we followed the traditional path in first defining entrepreneurship as an activity domain and delimiting its representative task that requires potential skills that distinguish experts. We first

examined the prior research on entrepreneurial expertise and entrepreneurial activity and acknowledged it as an ill-defined activity characterized by high complexity and a future-oriented nature expressed by opportunity formation as its representative task.

Seeing opportunity formation as a task in which entrepreneurs deal with the complexity of the external environment and human agency and face an indeterminate future, we posit that complex and futures thinking is not a prerequisite to entrepreneurship (Krueger and Day 2010) but a condition sine qua non of entrepreneurial expertise. By tapping into the foresight literature discussing foresight in entrepreneurial activity, we bring forward the concept of entrepreneurial foresight as entrepreneurs' cognitive capacity that allows interpretation of the complex environment, anticipation and proactive creation of the future (Fuller, Argyle, and Moran 2004; Fontela et al. 2006). Through examining the concept of entrepreneurial foresight, this article delimits its three underlying measurable cognitive mechanisms—systems thinking, openness to alternatives and forecasting—that structure both entrepreneurial reflection and action in opportunity formation. Thus, systems thinking allows structuring knowledge in a set of relationships. Openness to alternatives is a mechanism underpinned by systems thinking and allows the combining of structured knowledge into imagined future ideas that may become opportunities. Finally, forecasting is the mechanism that allows evaluating the future potential of an opportunity and informing a present decision to determine whether to pursue it or disregard it. In elucidating each mechanism in detail and their role and effects, this article puts forth a series of propositions regarding their application in opportunity formation. This article ends with a final model presenting the role of entrepreneurial foresight as a distinguishing skill of expert entrepreneurs in opportunity formation and opens up suggestions for developing measures for the mechanisms and applying them in further research and practice.

6 Discussion and conclusions

6.1 Main findings and propositions

In its aim to uncover how entrepreneurs employ entrepreneurial foresight to transform structure, this dissertation embraced the growing view of entrepreneurs' situatedness within a dual interplay between structural properties and other humans' agency that reflects in the contexts in which entrepreneurs operate. To achieve that aim, this dissertation focused on entrepreneurial opportunities as the central phenomenon of entrepreneurial activity from a dual perspective present in the alternative idiosyncratic view of opportunities and their formation. Given that this view resonates with the tenets of duality discussed in Giddens' structuration theory, this dissertation theoretically returns to structuration theory by making use of Giddens' understanding of contexts, agency and temporality to clarify some underdeveloped elements regarding the concept of entrepreneurial opportunities and entrepreneurial agency. Therefore, the theoretical framework this dissertation proposes synthesizes the concepts of entrepreneurial foresight and opportunities by relying on Giddens' understanding of temporal-spatial contextuality in which agents employ their knowledgeable and reflexive monitoring. Based on the theoretical knowledge and empirical research, I disclose my main findings by summarizing them into propositions that will improve the understanding of entrepreneurs' transformative power to form opportunities and thus yield contextual change. Therefore, I contend that:

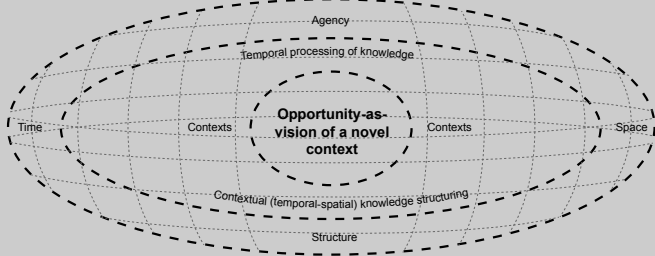
- 1) *Entrepreneurial opportunities represent entrepreneurs' subjective visions of novel contexts in which structural properties and agents' activities from previously known existing contexts are processed and combined to produce a change in the agents' behaviour.*
- 2) *In opportunity formation, knowledge is always spatial first, but once it leads entrepreneurs to frame their contexts it reveals temporal aspects that when processed feed entrepreneurs' subjective perceptions of the opportunities' existence in the future.*
- 3) *Entrepreneurial foresight represents the cognitive capacity of entrepreneurs that allows the structuring of operating contexts as systems, the envisioning of future contexts and the subjective and objective evaluations of the potential of newly envisioned contexts' existence in the future.*

These propositions jointly provide a coherent picture of how entrepreneurs capture the temporal and spatial aspects of both structural properties and other humans' agency by acquiring knowledge about them within the contexts in which they operate. The contextual knowledge entrepreneurs acquire and structure is then processed based on their own experience of time, leading them to envision opportunities as novel contexts that hold futures knowledge. Thus, while having their roots in the already existing structural properties and agents' activities that are contextually situated, entrepreneurial opportunities are formed through entrepreneurs' subjective capacity to create visions of novel contexts that hold futures knowledge. Therefore, my main proposition, which addresses the overall question of this dissertation, contends that:

When forming opportunities, entrepreneurs employ foresight to cognitively process and systemically structure their acquired knowledge of the contexts and then subjectively experience temporal and spatial aspects to create futures knowledge.

Table 7 summarizes the main aim, the research questions and the theoretical and empirical findings relate to what I have contended.

Table 7. Overview of the dissertation

Main aim of the dissertation	Entrepreneurial foresight as entrepreneurs' transformative power in inducing contextual change		
Main question	<i>How do entrepreneurs employ foresight in forming opportunities?</i>		
Subquestions	<i>How can entrepreneurial opportunities be (re)conceptualized from the dual perspective?</i>	<i>How are the knowledge and temporal-spatial aspects of entrepreneurial contexts entwined in the opportunity formation process?</i>	<i>What are the structuring dimensions of entrepreneurial foresight?</i>
Theoretical framework	 <p>The diagram illustrates a theoretical framework for opportunity formation. At the center is a dashed oval labeled "Opportunity-as-vision of a novel context". This central concept is surrounded by a grid of dashed lines representing "Contexts" in both "Time" and "Space". Several key elements are labeled around the grid: "Agency" at the top, "Temporal processing of knowledge" above the grid, "Contextual (temporal-spatial) knowledge structuring" below the grid, and "Structure" at the bottom. The grid lines are solid in the center and become dashed as they approach the outer boundary.</p>		

<p>Key findings of research Article 1</p>			<p>Empirical insights about how entrepreneurs use foresight in the different stages of opportunity formation: exploration, imagination and exploitation</p> <p>The study demonstrates that entrepreneurs use foresight to explore various perspectives and to acquire knowledge that strengthens their systemic view of the operating environment. Moreover, in the exploration stage, entrepreneurs move through different contexts and interact with other agents' in seeking various courses of action. Thus, foresight in the exploration stage also contributes to imagination.</p> <p>Empirical insights that imagination includes anticipation and vision formation, which guides entrepreneurs' actions (exploitation)</p>
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<p>Key findings of research Article 2</p>	<p>Empirical support that ideas are focused on resolving a potential customers' problem, while opportunities hold entrepreneurs' visions of a future system in which different actors are interconnected in a novel way</p> <p>Depending of entrepreneurs' prior knowledge of the operating contexts, the study demonstrates that opportunities may be formed through two different dynamics: vision formation and transformation of the idea into a vision.</p>	<p>Empirical examples that the future orientation of entrepreneurial opportunities is deeply anchored in deep and broad knowledge of the operating contexts</p> <p>The study demonstrates that futures knowledge expressed in opportunities—visions can be built both through entrepreneurs' prior contextual knowledge and through the acquisition and structuring of other agents' articulated knowledge.</p>	<p>Empirical support that prior to envisioning entrepreneurial opportunities entrepreneurs structure their knowledge in a systemic way</p> <p>Empirical insights that entrepreneurial opportunities are evaluated both through forecasting and entrepreneurs' subjective perception of opportunities' potential to exist and last in the future</p>
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<p>Key findings of research Article 3</p>	<p>Empirical support that in an unknown context opportunity formation begins with an embryonic idea that includes the offering and the potential user(s).</p> <p>Empirical insights that an opportunity differs from an idea in a sense that it contains more interrelated elements that entrepreneurs express as a system in the future.</p>	<p>The study demonstrates that in an unknown context to frame a potential need or a problem, entrepreneurs tap into either their prior knowledge of the known social contexts if more experienced or into more objective, codified knowledge if less experienced.</p> <p>Empirical insights that entrepreneurs use their temporal perceptions to evaluate the development of the initial idea over time.</p> <p>The study indicates that to advance an idea into an opportunity, entrepreneurs tap into knowledge of external enablers whose temporal scope allows possible development and duration in the future.</p> <p>Moreover, the study reveals that entrepreneurs' perception of themselves in the future plays an important role in opportunity formation.</p>	<p>The study demonstrates that building systems perception permeates the entire process of opportunity formation, contributing to entrepreneurs' time perception and their envisioning of an opportunity.</p> <p>Empirical insights that entrepreneurs' imaginative capacity expressed in openness to alternatives when combined with entrepreneurs' systems perception of the framed context allows them to construe an opportunity as a system.</p>
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<p>Key propositions of research Article 4</p>			<p>Through three constitutive cognitive mechanisms—systems thinking, openness to alternatives and forecasting—entrepreneurial foresight allows entrepreneurs to interpret external conditions and incorporate relevant stakeholders’ views, which leads them to imagine future opportunities and evaluate their potential duration and success in the future.</p>
<p>Subpropositions</p>	<p>Entrepreneurial opportunities represent entrepreneurs’ subjective visions of novel contexts in which structural properties and agents’ activities from previously known existing contexts are processed and combined to produce a change in the agents’ behaviour.</p>	<p>In opportunity formation, knowledge is always spatial first, but once it leads entrepreneurs to frame their contexts, it reveals its temporal aspects, which when processed, feed entrepreneurs’ subjective perceptions of the opportunities’ existence in the future.</p>	<p>Entrepreneurial foresight represents the cognitive capacity of entrepreneurs that allows the structuring of operating contexts as systems, the envisioning of future contexts and the subjective and objective evaluations of the potential of newly envisioned contexts’ existence in the future.</p>
<p>Main proposition</p>	<p>When forming opportunities, entrepreneurs employ foresight to cognitively process and systemically structure their acquired knowledge of the contexts and then subjectively experience temporal and spatial aspects to create futures knowledge.</p>		

The entrepreneurship literature has gradually adopted a view of entrepreneurship and therefore of opportunity formation as the activity that is situated within the aggregate dimensions of external circumstances, viewed as structural properties, and other human agency, both of which influence how the activity unfolds (Sarason, Dean, and Dillard 2006; Dimov 2007; Wood and McKinely 2010). The previous approaches to opportunity formation from structuration theory have attracted entrepreneurship scholars' attention to the dual nature of entrepreneurial opportunities (Chiasson and Saunders 2005; Sarason, Dean, and Dillard 2006). In their attempts to reconcile dichotomous assumptions about how opportunities are formed, Chiasson and Saunders (2005) notably point at the institutionalized aspect of structure that either guides entrepreneurs' conduct to reproduce the existing structural properties or that potentially introduces change where the institutionalized dimension is not strongly developed. However, such a view appears to be rather focused on the business and institutional dimensions of entrepreneurial contexts (Welter 2011) and thus neglects their social dimension, which is related to other agents with whom entrepreneurs interact. Although institutionalization of entrepreneurial contexts is relevant should we wish to embrace the structuration theory approach *stricto sensu*, we should not lose sight of the fact that entrepreneurial contexts have the specificity of being plural due to their multifacetedness. Therefore, understanding the dual nature of entrepreneurial opportunities and how entrepreneurs form opportunities within duality and exert power to transform the structure requires observing all these elements from the point of view of entrepreneurial contexts. Additionally, Sarason, Dean and Dillard's work (2006) shed light on entrepreneurial agency in opportunity formation whereby entrepreneurs affect the structure by acting upon it with their ideas. However, although ideas are relevant in opportunity formation, opportunities cannot be equated with ideas (Vogel 2017). In addition, if opportunity is an entrepreneur's vision of change of an existing system, 'a vision of how things will work' in the future (Dimov 2020, 341), we lack understanding of what such vision is, given that it is a product of entrepreneurs' agency, and also of how it comes into being within the multifacetedness of entrepreneurial contexts. This missing point in the current conceptualization of opportunity has motivated my first subquestion, which aims at addressing the issue of how entrepreneurial opportunities can be (re)conceptualized from the dual perspective by shedding light on entrepreneurial contexts and the entrepreneurial agency within them.

Together with the theoretical discussion in the synthesis part of this dissertation, the findings of Articles 2 and 3 clearly confirm that an idea is not an opportunity. Both articles indicate that an idea develops from a perception of a problem, that is, problem knowledge. Whether the entrepreneurs first perceive a problem and generate an initial solution to it, or an innovative product is presented to them without a previously given problem or need for it, the entrepreneurs engage in the process of acquiring knowledge about the perceived or potential problem to understand what that problem is and how the agents encountering that problem resolve it. These findings also reveal that bringing

an idea into being is a process in itself and that it requires not only the perception of a problem but an initial understanding of the context in which the problem arises. The empirical findings further reveal that the opportunity formation process begins with detecting a problem in contexts that are either completely unknown or incompletely known to entrepreneurs. Finding a potential solution to a detected problem, that is, generating an initial idea, is a way for entrepreneurs to enter into the context in which the problem is perceived and to explore that context in depth. While this process of idea formation is observed in unknown or little known contexts, entrepreneurs operating in the contexts in which they already have a high level of experience appear not to begin with an idea. The findings of Article 2 demonstrate that high experience and strong knowledge of specific contexts allows entrepreneurs to envision a future business as a novel context. These visions of novel contexts arise from entrepreneurs' prior knowledge of the elements constituting their operating contexts, such as knowledge about how these elements' (users, competitors, institutions) behave throughout time and to what degree their past behaviour continues in the present. In addition, such knowledge makes them sensitive to perceiving the evolution of these elements' behaviour and therefore to the signals of change in their behaviour. Entrepreneurs' visions of a potential future business incorporate these known elements, but their behaviour in these visions differs from the existing one. In the entrepreneurs' visions, the already known elements behave in different ways, and the 'rules' regarding their activities and encounters are set in a novel way, thus indicating novel contexts. Although visions are nourished by prior knowledge of the contexts that may already signal that relationships between the elements may be subject to transformation, that is, that there is potential for change, this potential is subjectively experienced by entrepreneurs. Entrepreneurs' subjective experience of such potential allows them to combine the elements in a novel way that when put together represents a change in behaviour among agents compared to the existing contexts. The way the elements are combined in entrepreneurs' visions clearly indicates that opportunities hold visions of novel contexts. The findings indicate that opportunities as visions of novel contexts are always subjectively formed, regardless of the similarity of the contexts in which entrepreneurs operate. Therefore, based on these findings, I contend that *entrepreneurial opportunities represent entrepreneurs' subjective visions of novel contexts in which structural properties and agents' activities from previously known existing contexts are processed and combined to produce a change in the agents' behaviour.*

According to Giddens, agents' transformative power lies in their knowledgeable and reflexivity. These elements of agentic power are related to the contexts in which agents move and live. Therefore, understanding entrepreneurs' power to transform the structure needs to come from our deeper understanding of their contextual knowledge. In opportunity formation, knowledge plays an important role. However, the dichotomous views on entrepreneurial opportunities and the differences in the degrees of uncertainty entrepreneurs face (Packard, Clark, and Klein 2017) have focused entrepreneurship scholars' attention on either entrepreneurs' prior

contextual knowledge or on other agents' heterogeneous knowledge of novel contexts. Yet, knowing contexts means having knowledge about their spatial and temporal dimensions (Welter 2011; Welter and Baker 2021). Nevertheless, the existing entrepreneurship literature does not provide understanding of how knowledge and temporal-spatial aspects of entrepreneurial contexts are entwined in the opportunity formation process. This is what motivated my second subquestion.

Combined with the synthesis part of this dissertation, the findings of Articles 2 and 3 clarify this missing point. The findings of Article 2 highlight that knowledge in opportunity formation can be observed through its three main characteristics of being deep, broad and future-oriented. Observing knowledge through the lens of these three characteristics allows the temporal and spatial aspect to be revealed. Therefore, deep knowledge appears to be related to a thorough understanding of the social, business and regional dimensions of entrepreneurial contexts and as such is focused on the behaviour of industries, customers and/or communities in a specific region or industry cluster. Gained through one's extensive experience in an industry or through interactions with experts in the relevant industry, deep knowledge represents embodied knowledge. Having deep knowledge signifies having knowledge of the existence and evolution of these contextual dimensions in their past and present time. Regarded through Giddens' temporal triad, deep knowledge holds temporal aspects of agents' behaviour in these dimensions. Conversely, broad knowledge extends to the broader spatial and institutionalized contextual dimensions. Thus, broad knowledge relates to knowledge about an industry in a specific region and within the political-economic and social system in which the industry is embedded. Entwined with deep knowledge, broad knowledge has a Giddensian historical temporal aspect, which is expressed, for instance, in knowledge about an industry's relevance throughout the past and in the present.

However, broad knowledge also may reveal a future-oriented temporal dimension, which is expressed in the industry's potential for growth. Although stemming from entrepreneurs' broad knowledge of their contexts, this future temporal dimension goes beyond historical and other agents' time and reveals entrepreneurs' temporal experience. This individual temporal experience is notably expressed in future-oriented knowledge, which, although by nature represents knowledge of contexts' potential change in the future, is subjectively understood and entwined with the previously acquired and structured deep and broad knowledge. Thus, deep and broad knowledge and their temporal and spatial aspects constitute entrepreneurs' knowledgeability of their operating contexts as systems with constitutive elements and interrelationships. Future-oriented knowledge appears to be notably related to reflexive monitoring of knowledge, the capacity to subjectively process newly gained knowledge with existing knowledge.

The way knowledge interweaves in opportunity formation appears to be the same regardless of whether entrepreneurs are already acquainted with the contexts or whether they enter contexts previously unknown to them. The findings of Article 3 confirm that when facing an unknown context, both highly and less experienced entrepreneurs tend to

acquire first knowledge from the relevant stakeholders, such as potential users, partners and knowledgeable agents who can advance entrepreneurs' knowledge of the unknown context. In entering an unknown context, entrepreneurs appear to tap into a social and regional dimension of the context, for they seek to gain a deeper understanding about a potential need or a problem agents may meet in their daily lives. Thus, in the unknown context, entrepreneurs rely on knowledge other agents express, which corresponds to intersubjective, articulated knowledge. More experienced entrepreneurs tend to tap into their prior knowledge of the social dimension of other contexts in which they move to seek potential needs or problems among the agents with whose lives and behaviour they are already acquainted. When lacking such knowledge, entrepreneurs tap into a more objective, codified knowledge that would allow them to grasp potential contexts in which they may perceive a problem to resolve or a need to fulfil with a novel offering.

Acquiring knowledge of unknown contexts requires time that entrepreneurs calibrate in the form of temporal boundaries. These temporal boundaries correspond to time-calibration in terms of pace and chronology (Wood, Bakker, and Fisher 2021), which entrepreneurs use to build their perception of the contexts in the form of a system through knowledge acquisition and by mapping out the regional, social, institutional and eventually business dimensions of the prospective context. Tapping into agents' articulated knowledge or codified knowledge also brings entrepreneurs knowledge about the existence of a potential problem or a need in time. Thus, entrepreneurs use the acquired knowledge to assess whether a potential problem not only exists in the present time but also whether it will continue to exist in the future. Temporal processing of an initially framed idea that resolves a problem appears to be a relevant moment in evaluating the favourability of that idea in terms of its potential duration in the future. This temporal processing appears to be a continuous process in opportunity formation. However, even if the temporal aspects of the acquired knowledge are relevant in evaluating the potential of the idea throughout time towards its development into an opportunity, entrepreneurs also rely on their own experience of time. Viewing themselves in and throughout time influences how they form an opportunity. Thus, both the temporal aspects of the contextual dimensions and entrepreneurs' own temporal experience are relevant in making a decision to pursue the envisioned opportunity. Therefore, based on these findings, I contend that *in opportunity formation, knowledge is always spatial first, but once it leads entrepreneurs to frame their contexts it reveals its temporal aspects that when processed feed entrepreneurs' subjective perceptions of the opportunities' existence in the future.*

In the literature, foresight has been theorized from various perspectives as a way to tame complexity and reduce uncertainty with the aim of realizing desirable changes in the future. As such, foresight has also been discussed in relation to various settings and activities, including entrepreneurship. Nevertheless, the scarce literature on entrepreneurial foresight has not provided a clear and coherent picture of entrepreneurial foresight, which in the past was considered an organizational capacity and inherently individual.

Therefore, the need to frame entrepreneurial foresight as a capacity to induce a desirable future change in opportunity formation has motivated my third and last subquestion, which aims to examine the structuring dimensions of entrepreneurial foresight. I approach this question by bringing together both entrepreneurship and foresight literature.

Taken together, the articles provide a coherent picture of the building blocks of entrepreneurial foresight as the capacity entrepreneurs rely on in opportunity formation within the operating contexts' complexity and indeterminacy yielded by the interconnectedness of the environmental structure and human behaviour. The findings reveal that throughout the entire process of developing their businesses under uncertainty, entrepreneurs approach complexity and indeterminacy similarly to how futurists approach the exploration of alternative futures. Although entrepreneurial foresight was initially equated to entrepreneurs' anticipation of the future (Fuller, Argyle, and Moran 2004) and their imaginative capacity (Fontela et al. 2006), the findings of this dissertation highlight that prior to imagining the future, entrepreneurs first tend to gain a holistic view of the operating contexts. This holistic view is obtained not only through mere knowledge acquisition but also through structuration of the acquired knowledge—relevant agents, their behaviour and their knowledge and representations of the contexts in which they move. Thus, to structure knowledge and gain a holistic, systemic view of their operating contexts, entrepreneurs employ systems thinking, the first structuring dimension of entrepreneurial foresight without which imagination of the future appears impossible. If systems thinking allows imagination of future alternatives for a business, it also allows capturing the contexts' existence and behaviour in the past and the present. This is why entrepreneurs with more experience within specific contexts are more sensitive to potential changes in the contexts, known as weak signals. Underlain by relational reasoning, systems thinking not only allows structuring of prior knowledge in a set of relationships but also connecting newly acquired knowledge with the previously built knowledge database. Thus, systems thinking allows creating new relationships and imagining potential evolutions of these relationships. In that sense, systems thinking allows structuring knowledge, framing contexts as systems and preparing solid ground for imagining the alternative futures and is thus strongly linked to entrepreneurs' imaginative capacity.

Further, the findings highlight that prior to creating a business venture or even if a business venture is created around an initial idea, entrepreneurs strive to build visions of the future in which their business will thrive. Thus, building a vision of a business venture is independent of an already tested and pursued idea. Linked to entrepreneurs' imaginative capacity, building a vision appears to be related to openness to alternatives (Lalot et al. 2020) and the capacity to imagine alternative futures. In these futures, which are expressed in entrepreneurs' visions, entrepreneurs imagine how their offerings may provide more sustainable value to the already existing relationships among the agents in the given context(s). In building their visions, entrepreneurs do not focus on their offering, but on imagining the potential future behaviour of other agents, which

leads them to take other agents' perspectives. These perspectives feed entrepreneurs' systems thinking, which in turn opens up different possibilities to be imagined in the future. For this reason, entrepreneurs' visions may differ from the initial ideas focused on an offering. However, what is inherent to openness to alternatives as the second structuring dimension of entrepreneurial foresight is entrepreneurs' subjective experience of agents' behaviour in the future. It is this subjective experience that allows entrepreneurs to qualitatively and subjectively evaluate the potential of their visions to exist in the future. However, to make a decision to pursue their visions of the future, entrepreneurs engage in quantitative evaluation of the potential of their vision, which is now specifically related to their business and its sustainability. Such evaluation is done through the cognitive mechanism of forecasting. This third structuring dimension of entrepreneurial foresight is directly linked to entrepreneurs' decision making in the present and their probabilistic estimation of a future event (Wills 1972, cited in Martin 2010), in this case a vision. As the findings indicate, forecasting is triggered only after prior elements are anticipated and there is a need to make a decision in the present (Durance 2010) on the basis of this anticipation. Without directly addressing forecasting, Article 3 indicates that entrepreneurs' perception of the favourability of an opportunity is strongly linked to specific, short timeframes, which is related to chronological time. In that sense, forecasting differs from openness to alternatives that hold individual temporal experience. Based on these findings, I contend that *entrepreneurial foresight represents the cognitive capacity of entrepreneurs that allows the structuring of operating contexts as systems, the envisioning of future contexts and the subjective and objective evaluations of the potential of newly envisioned contexts' existence in the future.*

Consequently, the subquestions and propositions not only provide a holistic picture of the building blocks of foresight and entrepreneurial opportunities, but they allow me to provide a constructive understanding regarding the main research question, which is how entrepreneurs employ foresight in forming opportunities. Throughout this process, entrepreneurs move and operate in known or unknown contexts. In their desire and effort to yield change and by proposing new value of the existing relationships within these contexts, entrepreneurs engage in a process not only of knowledge acquisition but also of structuration of such knowledge, which allows them to perceive the contexts as systems. This means that contexts as systems have their own behaviour, which is perceived in the agents' interactions and is dictated by the structural properties that bound their behaviour. Having a systemic perception of a context means having knowledge about its spatial and temporal aspects. Thus, entrepreneurial foresight allows entrepreneurs to cognitively process and acquire a holistic picture of the given contexts and to process the relationships that occur in them. In structuring and processing temporal-spatial knowledge, entrepreneurs may perceive some potential for transforming the existing contexts. However, it is through their individual temporal experience that entrepreneurs imagine potential evolution of these contexts, which is expressed in their visions of novel contexts, that is, opportunities. These opportunities–

visions thus contain new knowledge about the future. Therefore, I conclude that *when forming opportunities, entrepreneurs employ foresight to cognitively process and systemically structure their acquired knowledge of the contexts and then subjectively experience temporal and spatial aspects to create futures knowledge.*

6.2 Theoretical implications

Grounding this dissertation on the concepts of contexts and temporal-spatial aspects expressed in structuration theory allowed me to provide a wider theoretical lens through which to examine entrepreneurial foresight as entrepreneurs' capacity to induce contextual transformation in opportunity formation. In granting a special place for agents' purposeful character, their knowledge and their cognition in yielding change, structuration theory appeared to me a solid basis from which to examine entrepreneurs' transformative power inherent to entrepreneurial agency (McMullen, Brownell, and Adams 2021) in opportunity formation. Furthermore, by shedding light on the contextual dependence of agents' transformative power, structuration theory notably highlights the temporal aspects of entrepreneurial contexts that entrepreneurs-agents cognitively experience and process. These constitutive elements of structuration theory echo in the concepts of foresight, knowledge-building activity and cognitive and temporal processing. In this dissertation, I rely on and examine in depth these conceptualizations of foresight to provide a strong understanding of entrepreneurs' transformative power to bring change and of how they make use of it in taming the complex and future-oriented nature of opportunities. To conceptualize entrepreneurs' power, I borrowed the term 'entrepreneurial foresight'. However, in my work I shed new light on this concept by consolidating its structuring dimensions. Thus, by mobilizing Giddens' structuration theory as an alternative conceptual framework, I was able to clarify some constitutive elements of the concepts in this dissertation, namely entrepreneurial foresight and entrepreneurial opportunities, thus contributing to both the foresight and entrepreneurship fields.

First, by examining the intersection between entrepreneurial opportunities and foresight research, I was able to provide novel insights into the nature and role of knowledge in opportunity formation (Erikson and Korsgaard 2016). Knowledge in opportunity formation has generally been viewed as pre-existing and intersubjective but more recently is being viewed as new and subjective. I advance understanding of knowledge in opportunity formation by revealing the deeper qualities of knowledge—being deep, broad and future-oriented—that allow opportunity formation regardless of the aforementioned types. In addition, I point at the relevance of systemically structuring knowledge as both prior and intersubjective knowledge that allows capturing future-oriented knowledge. Furthermore, I bring to the fore two different dynamics in opportunity formation that depend on knowledge of the contexts

entrepreneurs possess at first. By no means do these differing dynamics support the discovery and creation views on opportunities. On the contrary, they should be seen as reflections of different levels of uncertainty entrepreneurs face due to their possession of or lack of contextual knowledge. In that sense, these results corroborate Foss and Klein (2020)'s criticism of the dichotomous theories of entrepreneurial opportunities.

Second, the findings of this dissertation contribute to the growing interest in the role of time and temporality in entrepreneurial activity (e.g. McMullen and Dimov 2013; Lévesque and Stephan 2020; Wood, Bakker, and Fisher 2021; Johnsen and Holt 2021). Current discussions in the entrepreneurship field have brought some important insights regarding how time is entwined in entrepreneurial activity. The acknowledged relevance of contexts in entrepreneurship has brought into focus the spatial aspects of contexts (Welter 2011) but has also highlighted its temporal aspects (Welter and Baker 2021). More precisely, the temporal view of entrepreneurial contexts views time as both world time, time of the structural properties and human time, that is, human capacity to process time (Johnsen and Holt 2021). This dissertation pushes these discussions forward by revealing a difference in our understanding of time and temporality in opportunity formation. In viewing knowledge in opportunity formation as contextual and therefore acknowledging its spatial character, I also highlight its temporal aspects, which include both time and temporality. Thus, time in knowledge refers not only to world time, time of the structural properties, but also to other agents' time. In having knowledge about the world and agents' time, entrepreneurs understand their existence in the past and the present. However, it is entrepreneurs' temporality, their past knowledge and experience, present attention and anticipation that allow them to process the temporal aspects of knowledge in a subjective manner, thus imagining future contexts. Therefore, entrepreneurs' temporality is dependent on the temporal aspects of knowledge. At the same time, if not temporally processed and experienced, mere knowledge does not yield an opportunity.

Furthermore, regarding the question of time in entrepreneurial activity, a time-calibrated theory argues that in their activity, entrepreneurs consider three temporal dimensions—initialization timing (when to start), pace (length of action) and chronology (sequence of actions) (Wood, Bakker, and Fisher 2021). The findings of this dissertation reveal that the dimensions of pace and chronology in opportunity formation are interwoven in the general timeframes that serve entrepreneurs as temporal boundaries to reduce uncertainty. Regarding the initialization dimension, the results indicate that entrepreneurs' consideration of timing is fed by the temporal aspect of knowledge that is entwined both in the initial stage of opportunity formation, which begins with an idea, and in the formation of opportunities as visions.

Third, by examining entrepreneurial cognition in complex and future-oriented tasks such as opportunity formation, the contribution of this dissertation is twofold. On one hand, this dissertation helps clarify the opportunity concept and the process of how opportunities are formed. Studies 2 and 3 empirically demonstrate that

an entrepreneurial opportunity cannot be equated with an idea and that the latter represents a starting point in the opportunity formation process (Vogel 2017). By arguing that entrepreneurial opportunities represent entrepreneurs' visions of future businesses in which previously known contexts and the relationships within them are processed and combined in a subjective way, I provide a novel insight regarding opportunity formation as a process not only of 'doing contexts' (Baker and Welter 2017) but also of 'making novel contexts'. On the other hand, this dissertation provides novel insights regarding the field of entrepreneurial cognition by suggesting complex and future-thinking as the constitutive elements of entrepreneurs' cognitive capacity in opportunity formation. In addition, this dissertation highlights that entrepreneurs' future-oriented cognition is highly dependent on their complex cognitive capacities.

Fourth, by positioning my theoretical grounding at the intersection of the fields of entrepreneurial opportunities and foresight, I was able to provide novel insights regarding the foresight research stream that examines foresight in entrepreneurial activity, conceptualized as entrepreneurial foresight (Fuller, Argyle, and Moran 2004; Fontela et al. 2006; Hajizadeh and Valliere 2022). Initially, entrepreneurial foresight was studied on a firm level, but the relevance of individual capabilities and cognitions in the process of interpreting the past and the present while at the same time seeking the sustainability of a firm have been recognized (Fuller, Argyle, and Moran 2004; Fuller and Warren 2006). However, the literature on entrepreneurial foresight at both the firm and individual levels remains scarce and requires further consolidation of the concept. This dissertation contributes to this research stream by clarifying the structuring dimensions of entrepreneurial foresight at the individual level. Thus, entrepreneurial foresight that allows entrepreneurs to explore the future is not only an activity that underlies opportunity discovery (Hajizadeh and Valliere 2022). This dissertation highlights that the way opportunities are formed depends on the degree of contextual knowledge entrepreneurs have, which renders the context more or less uncertain. Thus, in opportunity formation, regardless of the level of contextual uncertainty, entrepreneurial foresight underlies knowledge creation through the individual capacity to process the temporal aspects of knowledge and structures it through a set of specific cognitive mechanisms—systems thinking, openness to alternatives and forecasting. Article 4 also suggests operationalizing the cognitive mechanisms of entrepreneurial foresight as a distinguishing skill of entrepreneurial expertise.

Fifth, the findings of Studies 2 and 3 contribute to the understanding of how futures knowledge is created at the individual level. The foresight literature focusing on futures knowledge creation has notably studied this phenomenon at the organization level (Puru, Dufva, and Niinisalo 2019) or in foresight workshops (Dufva and Ahlqvist 2015b). In these settings, futures knowledge is created through the participation of individuals and does not allow observing an individual's process in futures knowledge creation. Although Tapinos and Pyper (2018) provide some relevant insights into how individuals use foresight in creating futures knowledge, their focus is on already trained

futurists. This dissertation deepens the understanding of how individual entrepreneurs who as futurists face complex and indeterminate futures create futures knowledge and act upon it to bring change in existing contexts. Furthermore, the studies provide a clear view of the dynamics of futures knowledge creation in opportunity formation and of the types of knowledge needed at specific stages in opportunity formation.

Finally, by applying Giddens' concepts of contexts, agency and temporality to entrepreneurship research I was able to discuss and argue about how change emerges through entrepreneurs'-agents' movement through different dimensions of entrepreneurial contexts, how they become knowledgeable and reflect on both their prior and newly acquired knowledge and how contextual temporal aspects and their temporal experience lead to envisioning change that may transform existing contexts. Thus, this dissertation clarifies the embryonic stage of opportunity formation (Dimov 2011) and how entrepreneurs' power to change their contexts arises and takes place. Further, by observing entrepreneurial agency to induce change within contexts, this dissertation proposes that prior to considering a structural change (Giddens 1984, 212–213), we should view it and study it as contextual. Finally, the discussion and analysis of Giddens' concepts of agents' knowledgeability and reflexive monitoring through entrepreneurs'-agents' temporal-spatial knowledge and their temporal processing of such knowledge could serve to deepen our understanding of Giddens' original concepts, thus providing the awaited answer about how knowledgeability can be incorporated into operational models of human behaviour (Lundberg 1988).

6.3 Methodological implications

This dissertation also makes one major methodological contribution that further enriches entrepreneurship research and foresight methods, where it can be used to elicit individuals' cognition and knowledge in the initial steps of framing a studied system. In their objectives to study entrepreneurs' complex and future-oriented reasoning and knowledge in opportunity formation, Studies 2 and 3 use CTA. While Study 2 uses CDM that allows eliciting knowledge in participants in a retrospective manner, Study 3 uses a prospective, experiment-like method to simulate an ill-structured task characterized by a certain degree of uncertainty. Indeed, this approach has already been used in entrepreneurship research. Gustafsson (2006) investigated the differences in decision making between novice and expert entrepreneurs in opportunity formation by subjecting them to experiment-like tasks, each of which brings one of the three types of uncertainty (Knight 1921). Although Study 3 uses a similar approach, it was designed to elicit entrepreneurs' futures consciousness that underpins future-oriented behaviour and future-oriented cognition (Ahvenharju, Minkinen, and Lalot 2018). Futures consciousness also expresses one's capacity to grasp complexity and perception of time (Lalot et al. 2020). To elicit the different dimensions of entrepreneurs' futures consciousness, in our research design we make

use of the scenario method, one of the most representative and widely used methods in foresight studies (Heger and Rohrbeck 2012; Major, Asch, and Cordey-Hayes 2001).

By using the initial steps in scenario building to design the interview guide, we were able to elicit entrepreneurs' futures consciousness dimensions and determine in which stages in the opportunity formation process they are present. In addition, exposing the participants to the longer timeframes brought insights about not only entrepreneurs' time perception but also about how different temporal aspects influence opportunity formation. Given the increasing need to study entrepreneurial cognition, consciousness and decision making under uncertainty using neuroscience methods (Krueger et al. 2021), the research design in Study 3 could be done in combination with neuroscience techniques to study entrepreneurial foresight in opportunity formation under uncertainty.

In terms of foresight, such a technique could be used in the initial steps of framing a studied system (Wright, Bradfield, and Cairns 2013). Eliciting participants' knowledge in the very first session of a foresight workshop would bring a more participative approach to foresight by allowing incorporation of their perceptions of the interrelationships between the actors and the relevance of the drivers of change. Thus, the participants would contribute to delimiting the system as a group. Additionally, depending on the participants' level of expertise in their respective domains, this technique would allow future knowledge elicitation, which is highly contextual and therefore not necessarily shared by all participants. By doing so, it could accelerate the process of challenging one's knowledge and assumptions, which appears to be difficult (Dufva and Ahlqvist 2015b).

6.4 Practical implications

This dissertation also provides a number of practical implications for both entrepreneurship practitioners and other stakeholders, such as entrepreneurship educators and advisers who work in different institutions providing guidance for entrepreneurs.

First, novice or less experienced entrepreneurs should seek to develop a deeper understanding of a problem they perceive by identifying the agents who could be directly concerned with that problem and those with whom they interact and who could help them resolve the problem. They need to acquire knowledge about the main agents' daily lives and activities and understand their relationships with other agents in both the past and the present. In proceeding in such a way, I suggest that entrepreneurs may benefit in two ways. First, understanding the temporality of a problem and the relationships between the agents who are directly and indirectly concerned with it enables the entrepreneurs to individually temporally process these things and realize whether and how a novel solution may potentially minimize the problem or even resolve it in the future. Second, in acquiring a deeper understanding of a context they enter for the first time, the possibilities to expand their contextual knowledge will open up, which is necessary in envisioning opportunities.

Second, in teaching entrepreneurial competences (Bacigalupo et al. 2016; Reis, Fleury, and Carvalho 2020; Stenholm et al. 2021) to entrepreneurship students, entrepreneurship educators should include in their approaches the main principles of entrepreneurial foresight particularly with the aim to build their systems perception and thinking. This dissertation provides a clear understanding that this cognitive dimension is related to openness to future alternatives and time perception that help in building vision and inciting action (Bacigalupo et al. 2016). Furthermore, by aiding young entrepreneurs to structure their knowledge in a systemic way educators contribute to developing a cognitive competence that underlies meta-competences, such as gaining contextual knowledge, building strong ethics and values (Reis, Fleury, and Carvalho 2020) and ensuring sensitivity to peers and other actors.

Finally, given the relevance of the spatial aspects of contexts, policy makers may wish to rethink the way entrepreneurial activity is supported in cities, regions and countries. The countries whose regions host specific industries and sectors should rethink their regional policies in supporting entrepreneurial activity related to these industries. In collaboration with major local companies, regional governments could allocate a budget and create policies facilitating research and development within these industries, accelerators for seed entrepreneurship, collaboration through co-working spaces and financial support of independent entrepreneurial projects relating to these industries. By creating institutional support, policy makers would allow the development of these industries and a growing social network and would contribute to regional development and the creation of strong regional communities that would continue to provide support.

6.5 Limitations and future directions

There are some limitations that should be noted and that could drive further research. First, the data in this dissertation were collected using a retrospective and prospective research design and lack some real-time information. Therefore, observing knowledge creation and temporal processing in opportunity formation should be complemented with a longitudinal approach.

Second, Study 3 was designed in a way that simulated a kind of uncertainty that is more problem–solution-oriented, thus limiting the participants to creative uncertainty (Packard, Clark, and Klein 2017). The results of Study 2 also indicate that the process of opportunity formation in an unknown context begins with the problem knowledge. Although such findings are arguably related to the selection of participants, it would be relevant in the future to observe cases in which the entrepreneurs have a novel technology and seek to implement it, thus finding themselves in a situation of absolute uncertainty (Packard, Clark, and Klein 2017; Knight 1921). Would the knowledge acquisition and creation dynamic differ from the one proposed in Study 2? How can these entrepreneurs employ foresight in a setting of absolute uncertainty? How do they process the temporal aspects of the knowledge

they gather and make their own experience of time? These questions remain open.

Third, although Article 4 discusses the question of entrepreneurial expertise and the three empirical studies count among the interviewed participants experienced entrepreneurs, they do not provide a strong empirical basis for a deeper understanding of the phenomenon of entrepreneurial expertise, thus leaving some questions open for further research. The existing research tackling entrepreneurial experience and entrepreneurial expertise points to the relevance of strong prior contextual knowledge as the prerequisite for opportunity identification (Baron and Ensley 2006) and for high performance in building new ventures (Toft-Kehler, Wennberg, and Kim 2014). However, it has been revealed that experienced entrepreneurs may not perform better than novices (Westhead and Wright 1998) and that experienced entrepreneurs identify few opportunities in relation to their experience (Ucbasaran, Westhead, and Wright 2009). These findings strongly question the view of entrepreneurial expertise through the lens of entrepreneurial experience and performance. In addition, the phenomenon of entrepreneurial expertise needs to be reviewed, particularly as more recently it has been acknowledged that entrepreneurial activity is ill-structured (Dew et al. 2018), which makes it difficult to define the skills that makes one an expert (Hoffman, Klein, and Miller 2011).

Viewing entrepreneurial foresight as a capacity that incorporates both complex and future thinking, Article 4 proposes that entrepreneurial foresight is the skill that distinguishes expert from novice entrepreneurs. The other empirical studies in this dissertation also suggest an additional angle from which to reconsider entrepreneurial expertise. While previous studies have observed entrepreneurial experience (and expertise) through entrepreneurs' prior experience in a specific domain, even among serial and portfolio entrepreneurs (Westhead et al. 2005; Westhead, Ucbasaran, and Wright 2005), they did not consider entrepreneurs' 'movements' through other sectors and contexts that differ from those in which they operate. This dissertation provides some indications that moving to other, less known contexts will provide entrepreneurs with new and diverse knowledge that they connect with old knowledge, thus broadening their existing knowledge base. Further, frequently reflecting on new knowledge allows entrepreneurs to subjectively experience it, which as this dissertation argues contributes to opportunity formation. Such a view of expert entrepreneurs as agents moving through different contexts and gaining new, diverse knowledge and facilitating opportunity formation echoes the findings of Gruber, MacMillan, and Thompson (2013) about how diverse knowledge in entrepreneurial teams helps in identifying a larger number of and more varied opportunities. Therefore, further research based on qualitative approaches may bring a deeper understanding of how individual entrepreneurs' 'contextual mobility' facilitates opportunity formation and whether 'contextual mobility' may be an activity for deliberate practice in entrepreneurship (Baron and Henry 2010) that enhances entrepreneurial foresight as a distinguishing skill of expert entrepreneurs.

Fourth, the pool of interviewed entrepreneurs in the empirical studies did not include social entrepreneurs. Social entrepreneurs are known to work with

wicked problems (Dacin, Dacin, and Matear 2017), which are significant societal problems characterized by high complexity and uncertainty (Ferraro, Etzion, and Gehman 2015; Reinecke and Ansari 2016). Therefore, it would be relevant to investigate the dynamics of knowledge creation in social entrepreneurship and how social entrepreneurs experience time and process the temporal aspects of acquired knowledge in opportunity formation. Addressing these voids may have implications for further research on foresight. To date, the foresight literature has generated several articles in which different foresight methods can help address these problems (Navarro, Hayward, and Voros 2008; Wright et al. 2019; Lyons 2022). However, there is lack of studies on how individuals employ foresight when facing wicked problems.

Fifth, the empirical studies in this dissertation focused solely on individual entrepreneurs, thus neglecting the role of the entrepreneurial team in opportunity formation. Entrepreneurial foresight has been observed and discussed as an individual capacity, and it would be relevant to observe how it is employed and even supported by an entrepreneurial team or by entrepreneurs within established organizations, especially in terms of temporal processing of knowledge. Therefore, a case study approach could be effective in addressing this omission.

Sixth, in this dissertation opportunities are conceptualized as the novel contexts that represent changes in existing contexts through new value creation. Nevertheless, the relationship between new value creation and entrepreneurial foresight has not been deepened. This represents a potential topic for further research. Recently, Lackéus provided a framework of different types of values that may permeate an entrepreneurial endeavour (Lackéus 2018). It could be of interest to study if the values that individuals perceive and pursue in their entrepreneurial activity alter their foresight capacity and to what degree.

Finally, further research could also explore entrepreneurial foresight in opportunity formation from the stance of neuroscience. The field of neuroentrepreneurship is still emerging (de Holan 2014; Korpysa 2020) and aims to study deeper neurological processes in entrepreneurial activity, particularly in opportunity formation (Krueger and Welppe 2014). In parallel, there are some emerging discussions about how futures studies and neuroscience could complement each other in a joint objective to investigate how humans think about the future (Rhemann 2019). Studying entrepreneurial foresight as an entrepreneur's capacity to structure knowledge and temporally process it to envision opportunities as novel contexts from the standpoint of neuroscience would thus be beneficial for the fields of entrepreneurship and foresight.

Abbreviations

CDM	Critical Decision Making
CTA	Cognitive Task Analysis
NDM	Naturalistic Decision Making

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