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Observing Pioneers in Our Changing Societies

Sofi Kurki

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ABSTRACT

At times when change seems to be the only constant, long wave theories help in conceptualizing periods of systemic transition. The Kondratieff wave theory describes the functioning of the socio-economic system as fluctuations of growth and decline in a 40-60 year cycle. Socio-economic transformations typically affect broadly societal structures, practices, technologies, and organising models.

In this study, the societal change process was studied by focusing on emerging ways to use the future as basis of good decisions in the present. In this study, novel approaches to forward looking were examined in case studies on low hierarchy organisations and Silicon Valley entrepreneurs. Studies were made by interviews, and in one case also by non-participatory observation. From the cases, it was found that the studied network organisations orient themselves towards the future by using a unifying purpose as guide to information seeking. This is combined with a constant day-to-day monitoring of the state of the organisation and its environments. The approach may be proactive (fulfilling a mission) or reactive (focus on survival and finding new opportunities). A particular feature of the studied organizational models is the decentralization of authority over strategic decisions to the individual level. Thus, the organizing model enables making full use of the anticipatory capabilities of the individuals constituting the organisation.

The analysis of the novel form of foresight was connected with the analysis of the key drivers for the next Kondratieff wave. There, one effect of advancing ICT is that individuals have an enhanced capability to connect to novel kinds of information sources. As result, more traditional ways of applying futures research methodology may come across as an artificial narrowing down of the scope of relevant futures related information. The other key driver, limits of planetary bio-capacity, may explain the surprisingly strong ethical argumentation that guides the operations in some of the studied organisations. The Reflexive Foresight approach, presented as the summary of findings from the novel approaches to foresight, describes the structured way in which the guiding ethos or purpose, observations and anticipations, combined with autonomous motivation are comprising the forward looking attitude.

For understanding the studied cases in the context of broader systemic change, two cases from the established fields of foresight were included in the thesis. The first of these cases studies the views of an international loose network of foresight professionals. Another analyses the foresight approach in three processes conducted

for the preparation of the Finnish Government report on the future. The purpose of these case studies is to find out if the novel approaches to forward looking are making an impact on the more established processes. Findings there reveal efforts made towards the utilization of systemic models. However, the novel approaches are not easy to combine with the existing paradigm, resulting in conflicting aims and tensions between competing approaches. The results were interpreted as indicating an ongoing transition in the regime.

The thesis' theoretical contribution is a theoretical concept of Reflexive Foresight, built on the observations from the pioneering cases and related literature. Methodologically, the combination of long wave analysis and pioneer analysis is a new tool for anticipating effects of societal innovation in socio-economic systems.

KEYWORDS: anticipation, Kondratieff long wave theory, pioneer analysis, case study, social change, organisational culture, self-managed organisations

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TIIVISTELMÄ

Nopean muutoksen aikakausina pitkien aaltojen teoriat auttavat hahmottamaan systeemisten murroskausien ja tasaisen kehitysvaiheen suhdetta. Kondratieffin aaltoteoria kuvaa sosio-ekonomisen järjestelmän toimintaa 40–60 vuoden sykleinä. Sosio-ekonomisille murroksille on tyypillistä, että ne koskettavat laaja-alaisesti yhteiskunnallisia rakenteita, ja vaikuttavat vallitseviin käytäntöihin, teknologioihin ja organisoitumisen malleihin.

Tässä tutkimuksessa yhteiskunnallisen muutoksen tematiikkaa tutkittiin tulevaisuuden ennakoinnin tapojen muutoksen kautta. Uudenlaisia ennakointitapoja tutkittiin tapaustutkimuksilla, joiden kohteina oli kaksi matalan hierarkian organisaatiota, sekä Piilaakson alueellisen bisnesekosysteemin piirissä toimivia yrittäjiä. Tapaustutkimuksissa menetelminä käytettiin teema- ja ryhmähaastatteluja, ja yhdessä tutkimuksista myös etnografista havainnointia. Tutkimuksissa havaittiin, että tutkitut verkostomaiset organisaatiot orientoituvat tulevaisuuteen käyttämällä organisoitumisen jäsentäjänä toiminnan tarkoitusta, ja yhdistävät sen organisaation tilan ja ympäristön jatkuvaan seurantaan. Kaksi erillistä lähestymistapaa havaittiin tapaustutkimusaineistosta. Tulevaisuuteen orientoituminen voi olla proaktiivista ja missiolähtöistä, tai reaktiivista, jolloin fokus on organisaation ylläpitämisessä ja uusien mahdollisuuksien löytämisessä. Tutkittujen organisaatiomallien erityispiirre on strategisen päätöksenteon hajauttaminen yksilötasolle. Tämä mahdollistaa kaikkien organisaation jäsenten ennakointikyvykkyyden tehokkaan ja samanaikaisen hyödyntämisen.

Ennakoinnin uusien muotojen analyysi liitettiin tutkimuksessa seuraavan Kondratieff-aallon avaintekijöihin. Yksi kehittyvän tieto- ja viestintätekniikan vaikutuksista on, että yksilöillä on entistä paremmat mahdollisuudet hyödyntää uusia tietolähteitä. Kompleksisessa ympäristössä perinteisemmät tavat soveltaa tulevaisuudentutkimuksen menetelmiä saattavat vaikuttaa keinotekoisesti kaventavan relevantteja näkökulmia tulevaisuuteen. Toinen tärkeä muutostekijä, planeetan biokapasiteetin rajat, voi osaltaan selittää tutkimuksessa yllättävän voimakkaasti esiin nousseen eettisen argumentaation, joka ohjaa joidenkin tutkittujen organisaatioiden toimintaa. Refleksiivinen ennakointi on tutkimuksen tulosten pohjalta muotoiltu konsepti, joka kuvaa järjestelmällistä lähestymistapaa, jossa toiminnan tarkoitus, ympäristön havainnointi ja sen pohjalta tehdyt ennakoinnit orientoivat organisaation tulevaisuutta kohti. Keskeistä refleksiivisen ennakoinnin mallissa on

organisaatioiden jäsenten autonominen motivaatio suhteessa organisaatioon ja työn sisältöön.

Tutkittujen tapausten ymmärtämiseksi laajemman systeemisen muutoksen osana tutkielmaan sisällytettiin kaksi tapausta vakiintuneemman ennakointitoiminnan piiristä. Ensimmäinen näistä tapauksista tutkii ennakoinnin ammattilaisten löyhän kansainvälisen verkoston näkemyksiä alan tulevaisuudesta. Toinen tapaustutkimus tarkastelee ennakointikäytäntöjä kolmessa viimeisimmässä Tulevaisuusselonteko-prosessissa. Tulevaisuusselontekojen laatiminen on suomalaisen kansallisen ennakointijärjestelmän keskeisin prosessi. Kummassakin regiimitason tapaustutkimuksessa havaittiin pyrkimyksiä systeemistä toimintamallia hyödyntävien ennakointikäytäntöjen rakentamiseen, mutta myös näiden mallien kanssa ristiriitaisia tavoitteita. Tämän tulkittiin olevan heijastuma sosio-ekonomisen järjestelmän käynnissä olevasta murrosvaiheesta.

Väitöskirjan teoreettinen kontribuutio on edelläkävijäorganisaatioiden toiminnasta tehtyjen havaintojen ja aihetta käsittelevän kirjallisuuden pohjalta rakennetun Refleksiivisen ennakointimallin esittely. Metodologisesti väitöskirjassa kehitetty pitkien aaltojen yhdistäminen pioneerianalyysiin on uusi tapa ennakoida sosiaalisten innovaatioiden vaikutuksia sosio-ekonomisen järjestelmän tasolla.

ASIASANAT: antisipaatio, Kondratieffin aaltoteoria, pioneerianalyysi, tapaustutkimus, yhteiskunnallinen muutos, organisaatiokulttuuri, itseohjautuvat organisaatiot

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29.7.2020
Sofi Kurki

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List of Original Publications

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

I Kurki, Sofi & Wilenius, Markku (2015). Organisations and the Sixth Wave: Are Ethics Transforming Our Economies in the Coming Decades? Futures vol. 71, 2015.

II Kurki, Sofi & Wilenius, Markku (2016). "Trust Makes this Organisation Unique". Looking at the Future of Work through Two Human-centric Organisations. European Journal of Futures Research (2016) 4:23.

III Kurki, Sofi (2019). The Long waves and the Evolution of Futures Practice and Theory. World Futures Review. 11(2), pp. 122-140. DOI: https://doi.org/10.1177/1946756718796487

IV Wilenius, Markku & Kurki, Sofi (2017). K-Waves, Reflexive Foresight, and the Future of Anticipation in the Next Socioeconomic Cycle. Roberto Poli (Ed.) Handbook of Anticipation. Theoretical and Applied Aspects of the Use of Future in Decision Making. Cham: Springer Nature.

V Kurki, Sofi (manuscript sent to the journal Futures for evaluation). Towards National Systems Level Foresight? Understanding the role and future directions of citizen participation in the production of Finnish national foresight reports.

1 Introduction: Societal Anticipation as Challenge for Futures Studies

Understanding what the future will bring is an aspiration deep within the human kind (see e.g. Malaska, 2017 for a discussion on the history of humanity's interest in the futures). This interest in the future has been connected to fundamental features of the human cognition enabling futures thinking (Poli, 2017; Terrace & Metcalfe, 2005; Buckner & Carroll, 2006; Atance & O'Neill, 2005), and has even been claimed to be an evolutionary driver for the development of memory and language (Suddendorf & Corballis, 1997; Corballis, 2009). Indeed, different forms of futures thinking seem to permeate our daily lives from weather forecasts to news about economic trends, to personal plans and goals. Adam and Groves (2007) analyse the approaches to and uses of futures throughout the Western cultural history, identifying four distinct functions for futures oriented inquiry, which they present in a chronological order of emergence as *Telling, Taming, Trading* and *Transforming* of futures:

Telling of future refers to the tradition of seeking knowledge about a future understood as pre-existing and pre-determined. Knowledge regarding the future is accessed through various forms of divination and ritual, and with a belief that knowledge about the future will be revealed to the initiated though supernatural forces (Adam & Groves, 2007; Heinonen, 2000; Cohen, 1964). Futures as told is in part overlapping with the second approach to using the future, which Adam and Groves (2007) label *Taming the future*. It means cultural practices aiming at reducing anxiety about unknown futures. Religion is a good example of narratives, rituals, and explanations that help to reduce anxiety related to uncertainty regarding existential questions. Also social life is to a large extent reliant on different ways that help to increase predictability and reduce uncertainty. Customs, laws and moral codes are examples of ways to enable making sense of the future. *Trading of Futures* concerns the commodification of futures. It has its roots in the cultural shift taking place in the Middle Ages, when the Christian church reverted its position on trading[1]. This enabled the development of other fundamentally futures oriented practices such as

[1] Before the Middle-Ages, the Christian church regarded matters regarding the future the domain of God and thus making profit on them a theft.

interest charging, credit, and risk calculations, among others. The dynamics created by these actions ultimately led to the capitalist system and the money economy, where (future) time is inseparably tied in with its monetary value. Commodification of futures can also be seen as the source of another, perhaps even more significant change in the societal ethos: the industrialised capitalist societies' appreciation of change as a sign of progress and innovation makes them different in comparison to other types of societies, where more often stability is seen as a core societal value. *Futures Transformed* describes the contemporary relationship towards the futures as a combination of market driven dynamics, and the development of ICT that has changed the perception of duration and spatial extension of the present. Due to the simultaneous, networked nature of the contemporary world it is difficult to form narratives of interlinking effects and causations. Adam & Groves (2007) view these factors as contributing to the way futures is presented as an abstraction: indeterminate, open space regarding which uncertainty, unknowability and possibility are emphasised. This is a critically different perspective from a view of the futures as embodied and embedded in distinct historical developments, and thus understood as emerging from the past and the present. (Adam & Groves, 2007). As illustrated by Adam's and Groves' (2007) overview, the way we conceive of the future has consequences on the actions considered as relevant in the present.

Contemplations of what constitutes an ideal future, and how to reach it, abound in the Western canon, from Plato's Republic to St. Augustine's City of God, Francis Bacon's New Atlantis, Thomas More's Utopia and the societal ideals of Auguste Comte and Karl Marx (e.g. Masini, 2006). Yet, futures studies as a specific field of knowledge is usually considered to have been founded as late as in the 1940s by Ossip K. Flechtheim (1971). The aims for his envisioned "futurology" could in contemporary terms be called sustainability goals: fostering peace, conserving nature, stabilizing population growth, promoting democratization, and eliminating hunger, poverty and exploitation (Bell, 1996, Poli, 2017, Malaska & Virtanen, 2009)[2]. Following from the normative outlook of this definition, futures studies has been described as being generally inclined to focus on aspects of futures that depend on choices made by human beings (or more generally by actors) (Kuusi, 1999, 2019): intentional human actions and their consequences (e.g. Malaska & Virtanen, 2009,

[2] However, a major leap forward for the field, from the perspective of methodological development, occurred under slightly different framings, when in the beginning of the cold war, in the United States, Project RAND was tasked with looking into long-range planning of future weapons. After various failed methodological approaches the Delphi method, a structured expert insight gathering technique, was developed and established as a forecasting tool to be used for the purpose. In the 1950s, the RAND corporation continued to develop futures methods, and in addition to the Delphi, also the development of the scenario technique has its origins there. (Kahn and Wiener, 1967, Poli, 2017).

Kuusi, 1999, 2009). In this realm, Roy Amara (1981), an American futurist, formulated three principles for futures studies. They are: 1) *The future cannot be predicted*: we can only formulate images and conceptions of possible futures. 2) *The future is not pre-determined*: we can assess probabilities of potential futures, and 3) *Actions and choices have an effect on the future outcomes*: therefore, it is important to assess the possibility and probability of different kinds of futures, but also to discuss the preferability of different options. (Amara, 1981).[3]

Over the 20th century the field developed through the work of a number of scholars from different backgrounds, focused on developing theoretical and methodological foundations for the field of futures research. In the following, two early French futures thinkers are presented for their insights that are particularly important from the perspective of the questions explored in this thesis.

In the 1960s, Gaston Berger initiated the still ongoing discussion on the ontological and epistemological limits of futures studies by making the argument that fast technological and social change are the reasons for why *forecasting* the future is more or less impossible. Thus, rather than aiming to predict, contemporary conditions call for the development of thinking tools that allow for preparing for different futures (Berger, 1964; Poli, 2017). Berger (who was a former professor of philosophy) espoused a view that an individual faces inescapable choices regarding the future, but such decisions can be successfully managed by using various tools developed for futures thinking. For this reason, his futures approach has been fittingly called a "marriage between existentialism and planning" (Cornish, 1977). The ability to affect and choose between different futures was for Berger not only a matter concerning individuals, but also nations and countries, and Berger's ideas were influential in the development of futures oriented policies in France (Cornish, 1977).

Another early French futures researcher, Bertrand de Jouvenel, emphasised the difference between past issues as *facta*: the domain of knowable facts that can be approached with the scientific method, and *futuribles:* ideas, hopes, and fears about possible futures. De Jouvenel argued that for individuals navigating their lives, *facta* is mainly of interest as basis of inferences about *futuribles*. As there can be no knowledge of the futures, anticipations of what will or will not happen produce a *fan of possible futures.* Out of them, it is impossible to say which will materialize as the forthcoming future, or if the future that will come to pass is actually even within the possible futures imagined. Thus, any forecast needs to be understood as an *opinion*

[3] One can argue that Amara's theses are considered with human abilities to forecast the future, given the complexity of the world, and the various interactions between individual processes that as such may be more or less predictable. The theses themselves are thus leaving aside ontological questions of the "true" nature of the world or free will.

regarding the future (albeit often a very carefully considered one), not a scientific finding about reality outside of the observer (de Jouvenel, 1967). The last point is at the heart of the subjective or intersubjective epistemology that has been argued to underlay many if not most of the (implicit) contemporary futures research paradigms (see e.g. de Jouvenel, 1967; Tapio & Hietanen, 2002).[4] De Jouvenel also emphasised the "naturalness" of futures thinking as a dimension of human thought (de Jouvenel 1967; Paalumäki, 2003), there anteceding contemporary discussions on anticipatory capabilities (discussed in further detail in chapter 2).

In the decades following the work of the pioneering futures thinkers the field has continued to diversify. Today futures studies is a multi-disciplinary field that is practiced for many different purposes, with different aims, governed by different anticipatory assumptions (e.g. Minkkinen, 2019). Among key questions in futures studies are: what is knowable about the future/s (ontology), what are the ways such knowledge is produced (epistemology), and what kind of influence can be exerted upon potential futures. Important issues in practicing futures research also relate to values about how, and by whom, should futures oriented decisions be made. These questions have been given different answers within several contesting approaches, frameworks, and philosophies (see e.g. de Jouvenel, 1967; Inayatullah, 1990; Amara 1981; Mannermaa, 1991; Tapio & Hietanen, 2002; Masini, 2006; Ahlqvist & Rhisiart, 2015, Minkkinen, Auffermann & Ahokas, 2019). There are, however, certain basic assumptions and approaches shared by the majority of the theoreticians and practitioners in the field. These have been summarized as characteristics of Futures Studies (Heinonen, 2013):

- Long timeframe
- Complexity, systems thinking, and holistic thinking – connectivity;
- Multi-disciplinarity and multi-sectorality (breaking boundaries between different fields of study, industries, and actors)
- Critical thinking and constant questioning of the futures
- Proactivity (affecting and creating the future)
- Participatory approaches

[4] On the other hand, like in the case of other social sciences, not all agree that constructionism is the optimal epistemology for futures research: it has been argued that were the field to emerge at the present moment, with all the currently available sociological, psychological, statistical and / or game theoretical understanding, futures research would have proceeded from a more realist position, and approached the predictive aim more straightforwardly (de Mezquita, 2009, Pang, 2010, Silver, 2012, Tetlock, 2006, 2015).

- Alternative thinking and scenario thinking;
- Taking radical, unorthodox and unconventional views seriously
- Identifying discontinuities, disruptions, and tipping points

To sum up, one may conclude the obvious: all forward looking is societal in its nature[5]. Futures are explored in the light of making decisions in the present that help in steering towards a desirable future. The field of futures studies is concerned with understanding the process of how futures emerge from the present: through what mechanisms do the individual decisions, social dynamics, technological drivers, physical and ecological factors convene to compose novel forms of social (and physical) realities. Skills and methodology for forward looking are developed for providing thinking skills and well-grounded arguments for assessing different futures possibilities, and for articulating not only the expected outcomes of societal processes, but also possible and preferred directions for the future, and understanding the difference between the three. (e.g. Bell, 1996). One of the field's shared key rationales is resisting the tendency to view the future as a singular, deterministic path. Thus, instead of prediction, its aim can be seen to be exactly the opposite: to point out the contingencies in the prevailing trajectories, and to remind of the existence of bifurcation points where ongoing trends break and may continue on to completely different directions.

[5] To say that the forward looking is always approached to serve societal needs does not remove that fact that the world consists of different kinds of processes, with a varying number of invariances. On one hand there are phenomena that can be reliably forecasted, for instance in cases where the phenomenon is governed by well understood physical theories (e.g. an orbit of a meteorite). On the other hand, there are processes that result from dynamics that are yet to be discovered to an extent that would allow for their reliable use in forecasting (e.g. earthquakes). In some cases it is not clear if predicting the outcomes of the phenomenon is even in theory possible (e.g. issues where learning has an effect on the process. (Kuusi, 1999). Demarkating the line between issues where prediction is possible, and where it is not is a constant source of debate in scientific futures studies. However, all these different phenomena contribute to the overall complexity of the world. Such a system of systems is currently generally perceived as impossible to analyse with a prediction oriented approach. There exist also convincing arguments that this impossibility is not only due to e.g. lacking computing power or the inability to document all ongoing processes as basis of analysis, but rather is an ontological question related to novelty being actively produced into the world. According to this argument, no model can take into account features that do not yet exist. (e.g. Tuomi, 2012). Generally, futures research community has thus given up on measuring their success on the accuracy of prediction, but rather see the focus of the work in opening relevant possibilities for consideration in decision-making. See, however, the footnote 4 on page 17, along with the Article III for different perspectives on this question.

However, societal foresight as the *topic* of forward looking is evasive. Slaughter (2016), in his analysis of articles published in the journal Foresight, found that topics that are predominantly addressed in foresight projects tend to have a narrowly pragmatic focus on the developments in science, technology, and economic questions. In the same analysis he also observes that work on "*civilizational foresight (that) seeks to understand aspects of the next level of civilization – the one that lies beyond the current impasse, the prevailing hegemony of techno/industrial/capitalist interests*" (Slaughter, 2016) is greatly under-represented in relation to its importance in the futures thinking framework[6].

This thesis provides one perspective to the broad question regarding the nature of societal change. In more detail, it addresses the issue of what kinds of societal effects can we imagine individual and organisational practices to have in the overall societal change.

The thesis is structured in the following way: The summary article (part one of the thesis) begins by contextualising the study first within futures studies (chapter 1.1), and then moves on to present two topics that are critical for understanding the case based research conducted for the articles: theories on societal transformation (chapter 1.1.1) and landscape level drivers for the next decades (chapter 1.1.2). The objectives and scope of the study are presented in chapter 1.2. The theoretical framework based on the concept of anticipatory systems is presented in chapter 2. Chapter 3 presents the methodological framework employed in the studies, and the research approach. Data gathering and findings of the individual studies are presented as an introduction to the original research articles in chapter 4. Chapter 5 draws together the conclusions from the research and discusses their potential implications. Original research articles form the part two of the thesis.

1.1 Contextualizing the study

In the history of futures thinking the challenge to make sense of the outcomes of societal dynamics has been met with different methodological approaches, stemming from different ontological and epistemological interpretations about the nature of future as a topic of investigation (Tuomi, 2019). The frameworks, paradigms, or schools of thought in futures studies have been described as three temporally successive waves (e.g. Mannermaa, 1991; Son, 2015; Masini, 2006).

[6] The question of change in societies is central in futures studies, but it can hardly claim to be the only field of knowledge exploring the issue. See e.g. Lombardo (2006) for a presentation of approaches relevant for futures studies, and Chirot (2012) for a well argumented overview on societal development over time, building on Parsonian theory of social change.

Historically, the first way to conceive futures oriented study was to examine and try to evaluate probabilities of different outcomes, based on available data on past events. This prediction oriented approach in futures studies is commonly referred to as *forecasting*. Adopting the Newtonian physics as the ideal model, the approach aims to identify the most probable future based on linear methods, such as time-series extrapolations, modelling, and search for invariances. Ontologically, such work assumes a direct causal relationship from the present trends to a future (in singular form). Methods rooted in historical development are still relevant for many questions, and assessing various forms of trends is standard background work in most forward looking approaches. Forecasting can be estimated to still be the dominant form of futures thinking, at least outside of the field of futures studies. For instance, economics are mostly based on elaborating sophisticated models utilizing data generated by economic activities. However, a basic problem inherent in such extrapolation based study are the bifurcation points and transformations that are difficult to estimate by focusing on past developments as notions of novelty and emergence are difficult, if not impossible, to incorporate into models. (e.g. Mannermaa, 1991; Masini, 2006).

The second wave of futures approaches can be clustered together under a label *scenario thinking* or possibilistic futures thinking (e.g. Tuomi, 2019). Here, the key insight is the realization that the present contains latent potentials able to give rise to several qualitatively different emergent futures (a notion already pointed out by de Jouvenel, as discussed earlier). This line of thinking moves the focus of futures work from predictive logic towards normative problem solving (e.g. Masini, 2006). In the scenario approach, narratives about the future are an important methodological innovation (e.g. Burnam-Fink, 2015). The possibilistic futures orientation operates mostly on the logic of sense-making (Weick, 1995), which is an essentially constructivistic, not a rationalistic process. (e.g. Fuller, 2017).

Where many futures studies focus on understanding what could be the outcomes of present processes in different potential futures, in the study at hand the main interest is on understanding the process of futures making through futures oriented practices. Such interest places the focus on questions of emergence and complexity. This approach is in line with propositions for a third paradigm for futures studies. Various approaches to draft a description of the next phase of futures thinking have been made, and called, alternatively and with slightly different emphasis, the evolutionary paradigm (Mannermaa 1991), dynamic paradigm (Kuosa, 2009), networked foresight (e.g. van der Duin, Heger & Schlesinger, 2013) or systemic foresight (Dufva, 2015). All the mentioned stress the effects of complexity and emergence, and share similar ideas that contrast traditional foresight work, typically in the form of singular foresight processes and scenario work, with a forward leaning use of futures that is described in the literature as anticipation (e.g. Poli, 2014, Miller et al., 2018). The concepts mentioned here are discussed in detail in the context of

the theoretical framework, chapter 2. Key features of the approach include participatory methods, creativity, design thinking, knowledge building, and more generally an attitude prioritizing the ability to use the future in the process of innovating the present (Miller, 2018).

The study at hand in its theoretical and methodological design mainly falls under this third paradigm, where the interest is in understanding how futures are used and approached in the studied instances. This focus has resulted in a case based approach. However, in this thesis the aim to understand uses of future in the selected cases combines with the desire to understand the effects of a particular type of use of futures within the larger context of societal change. Therefore, it is important to examine in more detail the approaches to analysing societal change, as well as to understand the key factors in the context in which the studied cases exist.

1.1.1 Theories on societal change in futures studies

As an anwer to the question of how societal change happens, futures studies offers at least three basic analytical approaches[7]:

1.1.1.1 Images of the future as drivers of change

An image of the future is a concept originally proposed by a pioneering futures scholar Fred Polak in his book "The Image of the Future" (1973). Key elements of the approach are condensed in the following excerpt from the book:

> "As between two opposing schools of thought, historical materialism and historical idealism, we favor the latter. The primary in history are not propelled by a system of production, nor by industrial or military might, but rather by the underlying ideas, ideals, values, and norms that manage to achieve mass appeal. (…) We are primarily concerned with the larger social and cultural processes. The kind of images that we discuss are shared public images of the cosmos, God, man, social institutions, the meaning of history, and others of similar scope. Again, in all these images it is the time-dimension of the future that gives them their special force. For example, the dimension of the future exercises a dominating influence on the image of the world, the Weltanschauung (…)". (Polak, 1973, p. 14)

[7] Two main *interests* for this pursuit of understanding societal change may be distinguished, here represented by two central theoretical authors in the field: Wendell Bell (2004) emphasises *maintaining or improving* the state of human kind, whereas for James (Jim) Dator (2009), the main aim is to *enable* social change.

Later Wendell Bell took on Polak's image of the future as the basis for his theory about social change that emphasizes the importance of ideas in guiding the development of societies. He refers to the term "image of the future" as a bundle of concepts, values, and aspirations that address the future in the mind of an individual. Bell holds a process view to examining the functioning of the society, and argues that images of the future people have are the main driver of change. (Bell, 1996). Therefore, if one is to understand the directions for the future, one needs to study the images of the future affecting the actions and goals of individuals (Bell, 1996, see also Aligica, 2011). This theoretical view has been developed into a futures research method by Anita Rubin (2000).

1.1.1.2 Techno-economic long waves driving societal change

The approaches that explain societal change as a succession of rising and descending phases of prosperity base on the macro-economic theory formulated by Nikolai Kondratieff[8] at the turn of the 20th century. The Kondratieff theory is based on a descriptive finding depicting long-term fluctuations in economic indicators such as commodity prices (Kondratieff ,1928/1984; Louçã & Reijnders, 1999). The theory states that in addition to short business cycles, there exists a longer economic cycle with the duration of around 40 to 60 years[9]. Building on Kondratieff's initial finding, Joseph Schumpeter (e.g. 1934) provided the key insight that has shaped much of the later research on the long waves. He proposed that the adoption of a novel technological solution, or a group of generic technologies, shapes the socio-economic make-up of each wave. In this view, enterprises and entrepreneurs hold an important role as they are in the position to transform ideas and information into new businesses. (Schumpeter, 1934). The followers of this line of thought form the so called neo-Schumpeterian approach to the long waves that dominates in the current long wave literature. It emphasizes clusters of (technological) innovation as the main driver of societal renewal. The focus of interest is on the societal and economical systems reorganizing around a technology driver that produces the sources for new growth after a period of decline and depression (e.g. Perez, 1983; Freeman, 1993; Perez 2016). Later Mensch (1979) complemented the approach by suggesting that important innovations tend to occur during the period of recession due to less low-risk investment opportunity being available. This Schumpeter-Mensch hypothesis,

[8] Kondratieff had significant predecessors in exploring long-term fluctuations in economies, most notably Jevons and Van Gelderen (cited in Ayres 1990).

[9] The existence of the long waves has been under debate ever since the idea was proposed, and even today it is considered a part of so called heterodox economics (e.g. Foldvary, 1996) referring to a group of theories outside of the mainstream economic thought.

despite being the main theoretical framework in use among contemporary long wave theorists, has also been criticized for not fully accounting for the downswing after the period of prosperity (Ayres, 1990).

Continuing along the same intellectual history from Kondratieff through Schumpeter to Freeman and Perez, Sustainability transitions is a label for an academic field dedicated to the study and development of tools for understanding, and also promoting, transitions towards sustainability (for a comprehensive presentation of the approach, see Grin, Rotmans & Schot, 2010). In this context, a transition has been described as "*A process of structural, non-linear systemic change in dominant cultures, structures and practices (regime) that takes place over a period of decades*" (Rotmans, Kemp & van Asselt, 2001; Grin et al., 2010). In the definition, culture implies shared values, paradigms, worldviews and discourses, by structures are meant institutions, economic structures, and physical infrastructures, and practices denote routines, behaviours, action and lifestyles (ibid.). The Multi-Level Perspective (MLP) is an analytical framework under Sustainability transitions, for understanding different forces affecting the socio-technical system, on different levels of the system. The three levels of the MLP are Niche, Regime and Landscape (see also Braudel, 1953). There, the *niche* level depicts isolated areas of novelty production that are sheltered from the market forces. The regime represents the ruling mindset of the socio-technical system, and it is the main mechanism for generating stability and development trajectories within that system[10]. The landscape

[10] Such models certainly raise the question of what is the role of human agency compared with the structural factors such as the newest technology or nature as an agent of change? The MLP model, the neo-institutional theory (for connections between the MLP and neo-institutional theory, see e.g. Geels, 2004 and Geels, 2020) and other systemic models (which arguably also the long-wave theories are), adopt a perspective where change arises from a complex interplay between individuals (niche level, here the studied pioneers), and macro-level developments, themselves of course often a result of individual and collective action. There are however also factors outside of direct human influence that affect societal change. The role of technology one such much debated question, with the roots of the discussion tracing back to antiquity (see e.g. Heinonen, 2000). For example Arthur (2009) has proposed that technology development follows evolutionary patterns, thus suggesting it being a somewhat independent realm existing alongside human cultural evolution. On the other hand, transition management assumes that technology can be managed and its development directed towards desired goals. Of this there also are ample examples in the history of technology development. The COVID-19 pandemic is also a borderline case in what is the human component and in what ways should it be regarded as an exogenous factor affecting societies. Although the virus itself originates from the animal world, current human practices have enabled the spread of the virus first to the human realm, and then its escalation into a global pandemic.

level refers to slowly changing external factors that develop over decades, centuries, or in the case of certain environmental features, even millennia.

The main authors developing the transitions framework (in Grin et al., 2010) maintain distance between the MLP framework and the long wave framework. However, considering that both frameworks aim to model the socio-technical system as an interplay of different actors and societal dynamics, and derive from common theoretical roots, it feels appropriate to make a direct connection between the two approaches. The tripartite depiction of the socio-technical system offers insights for a more thorough understanding of the long waves, as it articulates the process of how an innovation can eventually result in a comprehensive regime shift. By placing the Kondratieff waves on the Landscape level, and assuming them as an emergent macro-level outcome of the dynamics of the embedded structures (regime, niche), the model allows for exploring connections between landscape level issues (megatrends), niche level actions (pioneering acts and innovation), and regime level shifts. Understood this way, the multilevel perspective is illustrated in figure 1.

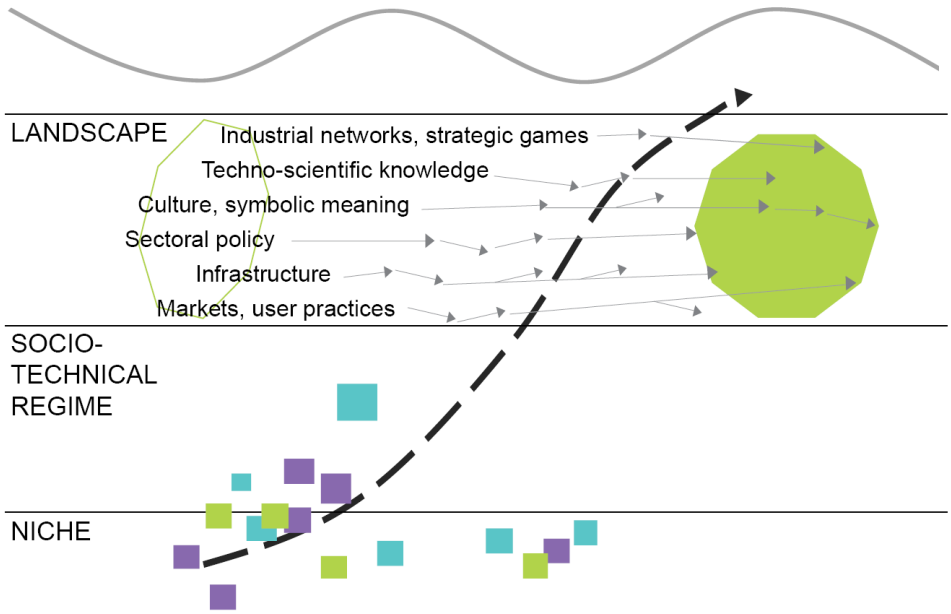

Figure 1. Dynamic multi-level perspective (from Geels, 2004).

1.1.1.3 Society as a dynamic learning system

Pentti Malaska was a key figure in establishing futures studies in Finland, and his contributions to futures research include a diverse set of theoretical, methodological and applied work (Pouru et al., 2018). In Malaska's thinking, societies are

predominantly perceived as dynamic learning systems, where progress is made over time (Malaska, 1999, on learning systems see e.g. Wenger, 1998; Blackmore, 2010). Malaska proposed a model for societal change that views societies as developing in recurring phases of stable development, and transformational periods that rearrange the system. In the model a new, extensive growth phase starts within the ongoing one by a developing "germ" (referring to novelty in the system) that starts to intensify. A transformation from one societal phase to another matures in the phase of intensive growth, in which changes in the division of work and the resulting wealth occur. For Malaska, the division of labour is an ongoing process. As it proceeds, new kinds of social classes emerge. Especially, Malaska points out a novel class of individuals: those whose aim is to renew the system (Malaska, 1999; Wilenius, 2014). In this thesis the latter notion is interpreted as referring to the kinds of pioneers studied in the cases. In Malaska's model intentionality is the decisive feature of societal development, and is what makes the human system different from natural systems. Learning taking place on the societal level is seen as a central element of the system.

1.1.1.4 Contextualizing the study in selected theories of societal change

Despite their differences, in this thesis the above mentioned approaches are not seen as mutually exclusive, but rather as complementary. Malaska's theory offers a bridge between the macro-economic wave theories and the image of the future -approach. It enables the weaving in of human intentionality as affecting the direction of the future in a dynamic system.

This thesis comprises the summary article at hand and five research articles. Together, they examine societal change as emerging from the level of niche actors as a response to landscape level changes, and the reception of these novel emergent practices on the regime level (Figure 2). The research articles depict cases analysing practical responses to drivers of change. The societal change process is examined on the level of niche actors by investigating a) two low hierarchy organisations (part two, article II) and b) entrepreneurs belonging to a common business ecosystem (part two, article I)[11]. Additional cases investigating the penetration of such novel practices on the regime level study how c) the change drivers are interpreted as affecting professional practices in a study on futures researchers and practitioners

[11] The metaphor of a business ecosystem (Moore 1993) has been frequently used to describe the unique culture of Northern California's Silicon Valley, and the way entrepreneurs, large companies, research institutes, and venture capitalists seem to live in a mutually reinforcing relationship with one another, and the culture where the local actors are at the same time collaborating, forming alliances of interests, and competing with one another (DeLong 2000).

(part two, article III) and d) the way national level, government led foresight processes are conducted in Finland (part two, article V). By adopting a perspective of investigating pioneers and their practices (Heinonen & Karjalainen, 2019; Karjalainen & Heinonen, 2018a) as futures signs (Hiltunen, 2008, 2010), the aim is to understand change on one hand from within, by analysing practices in individual case studies, and on the other hand by analysing the external drivers of change. The regime level cases illustrate the difficulties of incorporating novel approaches to a fundamentally different system.

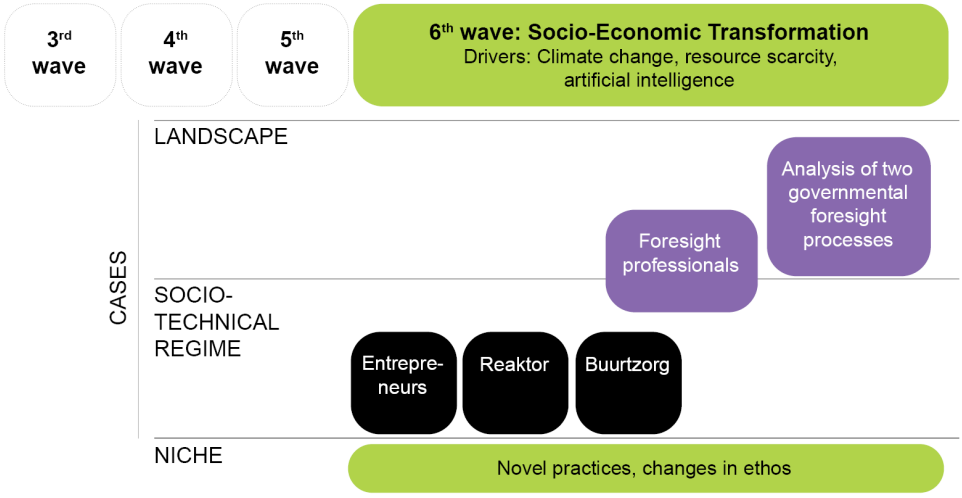

Figure 2. Studied cases in the structural transition framework (author's own conceptualization based on Geels' (2004) multi-level perspective framework.

The examined niche phenomena in the thesis are understood as "germs" in Malaska's terms: embodied, already existing examples of alternative futures that are potentially prefigurative of wider change. (Ramos et al., 2012; Juris, 2004, p.453-454).

Krawczyk and Slaughter analyse the evolution of futures methodology, and note that the methodology can be divided into different generations of approaches (Krawczyk & Slaughter, 2010, see also Linstone, 2011; Kurki 2018). This suggests an intimate connection between the surrounding socio-economic landscape, and the ways that are seen as appropriate for understanding its development. Thus, for understanding the genealogy of the novel forward looking practices that are examined in the thesis, in the next chapter changes in the global environment are examined for understanding the context of the potential socio-economic transformation.

1.1.2 Landscape level drivers for the Sixth Kondratieff wave and their implications

As discussed earlier, the Kondratieff theory of long waves of economic development as a framework for futures studies postulates a 40-60 year cycle of societal development, defined by a key technology, and co-developing with new kinds of societal structures and ways of organizing (Kondratieff, 1928/1984; Louçã & Reijnders, 1999; Schumpeter, 1934). From the perspective of the MLP model, there are two landscape level issues that are taken as starting point for the analysis of the next wave: the societal need to address the pressures related to environmental sustainability, and the effects of applied ICT on the socio-economic system. In the following two chapters, these themes are explored in more detail in the context of the thesis' focus.

1.1.2.1 Limits of the planetary bio-capacity

The most urgent landscape level environmental factors imposing pressure on human systems and their continuation include climate change and declining bio-diversity, conceptualised as crossing of planetary boundaries of safe limits to human action (see e.g. Wijkman & Rockström, 2012). Common to these challenges is that they are arising from, and aggravated by, unsustainable production and consumption patterns, population growth and a large number of new consumers from the emerging markets (e.g. Kurki & Wilenius, 2015). These challenges are interlinked with others similar in scope. They are summarised in the 17 Sustainable Development Goals (SDGs) that are at the core of the United Nation's 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015 (United Nations, 2015)[12]. Together, these challenges and goals form pressure to innovate resource efficient technologies and novel practices (Kurki & Wilenius, 2015; Moody & Nogrady, 2010; von Weizsäcker et al., 2010), conceptualized as planetary living skills (Pouru & Wilenius, 2018) that enable humanity's continued existence among the environmental pressures.

Understanding the scale and the systemic, interconnected nature of the global problematique has slowly started to have an effect on businesses. In August 2019 an association of CEOs of the largest United States based companies called the Business Roundtable announced as their view that corporations should prioritize social responsibility over profit. This goes against their long standing view that businesses

[12] A similar kind of compilation of interrelated global problems is for instance the list of 15 global challenges as a framework for evaluating prospects for humanity's future (Millennium Project), by the Millennius Project, a global participatory think tank for futures studies. Progress on each challenge is evaluated and reported on annually.

should primarily serve shareholders interest. Among the aims that the Business Roundtable CEOs now commit themselves to advancing are: investing in employees salaries and education, environmental protection, ethical behaviour, and supporting local communities. (Dilts, 2019). A month later, in September 2019, the Financial Times, an international daily newspaper focusing on business and economics, echoed the Business Roundtable message at the launch of their campaign "Capitalism: time for a reset". There, the paper declared its intention to for instance "[…] promote stronger corporate purpose", arguing that "[…] in the decade since the global financial crisis, the [liberal capitalist] model has come under strain, particularly the focus on maximising profits and shareholder value. These principles of good business are necessary but not sufficient. It's time for a reset." (Financial Times, 16.9.2019). In January 2020 the OP Group, one of Finland's biggest banks, reported the results of their annual survey on the attitudes of leaders of large Finnish companies. They found that 72 percent of the respondents consider that their company should take part in solving burning societal problems such as environmental and economic questions. This is a significant leap from the results of the previous year's survey, in which 56 percent of the respondents considered these to be among the goals of private companies. (Niskakangas, 2020).

In practice, ethical dilemmas are inherent in negotiating business goals with non-business goals, such as fighting climate change. These are reviewed in Toft's and Rüdiger's (2020) mapping of corporations' approaches to climate change (Toft & Rüdiger, 2020). In their conclusions, they call into question the notion of traditional firms as moral agents, and rather seek solutions from novel types of organisations which they quote to 'operate in the blurry space between for-profit and 'nonprofit worlds'' (Boyd et al., 2017, quoted in Toft & Rüdiger, 2020).

Schuler et al. (2017) also review key ethical orientations in corporate responses to sustainability. They conclude that the traditional extractive logic, where few limits are posed for resource use, still dominates corporate sustainability approaches (for a critical review of aspects of corporate responsibility see also Banerjee, 2008). However, they estimate that changes towards more intrinsic motivations have potential to thoroughly disrupt the entire business management paradigm. (Schuler et al., 2017). Such a disruption would be for instance linking climate change goals with the degrowth agenda, as proposed by Johanisova et al. (2013) as one way to approach the issue. Nesterova and Kelleher (2019) trace hints from such disruptive thinking in their discussion of cases of small radical firms. There, radical denotes a shift from profit driven business to pro-environmental, pro-social, and values driven approach in small businesses. From a practitioner's perspective, Yves Chouinard (2006) presents an autobiographical account of the development of Patagonia, an outdoors equipment company, to serve as a mechanism and platform for radical environmentalism (for a critical analysis of the paradox of promotic ecological

thinking through selling of consumer goods, see Hepburn, 2015). From the perspective of this thesis, these trends form another of the key themes surfacing in the findings. They link with the other key landscape level driver of applied ICT and its implications on the futures of work, which is the topic of the next chapter.

1.1.2.2 Applied ICT and its effects on the futures of work

Charles Handy, in his 1984 book "The Future of Work" traces the previous Schumpeterian process of creative destruction in working life to 1970s, beginnings of the fifth wave, when the arrival of ICT and related novel practices first started to affect the working places. Traditional notions of career, employment and skills were rapidly transformed to suit the novel demands and patterns that soon became the norm in the working life. The transformation was shocking to many, and the new phase left unemployment and hard competition for jobs as its seemingly permanent consequence (Handy, 1984: ix). More recently, at the advent and early stages of the sixth wave, discussions on the futures of work (and beyond) have been fuelled by a hypothesis that a similar kind of destructive process, potentially even more disruptive than the previous one, can be anticipated to emerge from the adoption of new intelligent technologies (e.g. Brynjolfsson and McAfee, 2011). Indeed, the rapid development of the information technologies and their applications, especially data analysis techniques and artificial intelligence, are generally viewed as potentially transformational. A number of analyses are pointing to their anticipated societal effects. The conclusions drawn from such analyses range from noting the potential of the technology to effectively replace human work (Brynjolfsson and McAfee, 2011; Frey & Osborne, 2013) to existential threats from independent AI (Boström, 2014; Harari, 2016), to utopian visions, evoked by the potential of intelligent technologies to be harnessed as mediators between humans and leading to a more peaceful existence (Honkela, 2017), or even to visions of a computer assisted immortality (Kurtzweil, 2005).

Dufva et al. (2018), in their analysis of discourses on the futures of work in light of this technological transformation[13] identified two distinct ways to make sense of the topic: The first discourse was one emphasizing efficiency, potential competitiveness increases, and traditional organising models and protestant ethics.

[13] The materials analysed comprise of 86 Finnish reports, produced between 2006-2017. More emphasis in the analysis was placed on the more recent reports. Although Finland is in many ways an outlier in international comparison due to its social welfare system, high level of educated workforce, and export based economy, these features also mean changes in working life are of high importance to decision-makers, and research on the topic follows closely international trends. For these reasons the results of this analysis are considered to be illustrative also of international discussions on the topic.

The second discourse offers new definitions for work, as for instance "meaningful interaction". It emphasizes novel forms of work, networks, and the disappearance of the distinction between the employer and the employee. Rote work is outsourced to intelligent machines, and humans are focused on demanding problem solving. The two discourses are found to exist in parallel, almost without any bridging elements that would make it possible to combine them in a joint narrative (Dufva et al., 2018).

The latter discourse identified by Dufva's and al.'s analysis can be seen as deriving from the intellectual tradition utilising *a network* as the key metaphor for conceptualising socio-economic systems (Eriksson, 2015). It may be argued that the shift from a hierarchical tree model to the use of a network metaphor is one of the most significant societal effects of advanced ICT systems[14],[15]. In a network, instead of focusing on individuals, structures or institutions, the interest is on their *connections*. Lakoff and Johnson (1980) have studied the use of metaphors in human cognition, and concluded they have an active role in shaping understanding, perceptions, and actions. Focusing on interconnectedness has been an inspiration both for theoretical work on understanding the society in the era of computer mediated communications (e.g. Castells, 2000), but also for novel forms of networked production (e.g. Benkler, 2006), based on a novel ethos that has been seen

[14] Other (related) societally significant consequences of ICT include compression of duration (to zero) and extention of presence to global, which are mentioned as societally the most consequential effects of ICT in Adam and Groves (2007).

[15] In social sciences, human systems as networks have been explored at least since 1920s, but a major breakthrough regarding network studies happened in the 1960s and 1970s. (Eriksson 2015). Within social sciences, there can be discerned two main approaches to networks. Based on the geographical origins of their main proponents, they can be here called the European tradition and the Anglo-American tradition. Neither is a unified school of thought, but rather they are clusters of individual intellectuals who approach the question of networks from a theoretically similar standpoints. The origins of the European network thinking can be traced back to a shared understanding that the basic models of western thought were hierarchical and derived their meaning from a greater principle: God or Nation, for instance. A possibility of describing phenomena as self-sustaining systems, where meaning is related to the place one occupies in relation to others in a network was a novel way to understand issues within the sociological sphere. One well-known example of a network theory within the European tradition is the actor-network theory (ANT), examining the relationship between humans, technology and nature as a network of interrelations, in which all are approach as unique agents. The Anglo-American tradition, in contrast, was occupied with the question of interaction, temporality and change. The approach fostered by individual Anglo-American thinkers is commonly called network analysis. The approach has been fuelled by the development of mathematical analysis tools, but especially by the rapid expansion of network technologies that enable detailed empirical studies on human networks and their properties.

as deriving from the culture developed by early programming enthusiasts (Levy, 2001; Himanen et al., 2001). The descriptions of the ethos emphasise intrinsic motivation, passion and sharing as key elements of the new work ethic. This "hacker ethic" is typically contrasted with the protestant work ethic (Weber 2003/1905), where work is conceptualized as a duty, requiring hard work and discipline, and rooted in a particular strain of Christian belief emphasizing modesty and linking wordly success to salvation in the afterlife.

Vartiainen (2018) discusses motivational factors in the digital working life. He concludes that the experience of autonomy is a key element of motivation in digital work. Autonomous motivation comprises of integrated regulation and intrinsic motivation. Integrated regulation means that the goals of the organisation are considered to be in line with the individual's goals and values, and thus the activity performed as work is considered to be an important part of one's identity. Intrinsic motivation means that the content of the work in itself is the source of motivation. Work driven by autonomous motivation is then at odds with the traditional notions of work as a duty and protestant ethics, as work driven by autonomous motivation is rather described by feelings of spontaneous and voluntary action. (Vartiainen, 2018). However, such form of motivation appears to be a central factor in new models for organising.

Without directly referring to technological factors, Laloux (2014) draws a historical overview of organisational forms, ending in a so called "teal" organisation, grounded on intrinsic motivation, non-hierarchical relations between members of the organisation, and a focus on the impact of the work. These elements ressemble the features presented as hacker ethics, and work in a teal organisation is often characterised by autonomous motivation. The three main components of a teal organisation are: 1) *self-management* based on peer relationships, without a hierarchical structure for command and control; 2) *wholeness* referring to accepting members of the organisation as their authentic selves without the need for specific working roles, and 3) *evolutionary purpose* meaning that a teal organisation mimics living organisms in its direction setting processes, which are based on collective decision-making and purpose as a set of values guiding the decisions taken (Laloux, 2014).

In this thesis the approach is to study pioneering (teal) organisations' practices and their accompanying ethos. The interest is in particular to find out the implications of this novel ethos on forward looking practices. Another related key theme in this study is exploring the potential consequences of the societal mind-set change (as indicated by the findings from the niche level pioneers) for the development of the socio-economic system.

1.2 Objectives and scope of the research, and research questions

Together, the different drivers presented in the previous chapter create a backdrop for the next wave. The objective of this study is to utilize tools from futures studies: the long wave framework (presented in chapters 1.1.1.2, 1.1.1.3, and 3.3), the anticipation framework (presented in chapter 2.), and pioneer analysis (presented in chapters 3.2), for understanding societal development. One contribution of this study is thus the combination of long wave methodology and pioneer analysis for understanding societal change dynamics (discussed in chapter 3.4).

Research on the Kondratieff waves takes often a pronouncedly techno-centric view of development, side-lining the potential societal causes and effects of shifts in the technological regime[16]. However, the societal changes and organisational changes are interlinked with the adoption of novel technology (e.g. Bennett 1996), and the changing mindset makes it possible to select to focus on certain opportunities that the technologies provide. The story of technological development is thus always a story of "domestication" of those technologies to serve human needs (Pantzar, 1996): The 20th century did not only witness extreme technological development, but also societal change on an unprecedented scale (Hobsbawm, 1994).

In this thesis, the niche level case studies are approached as instances of novelty, breaking existing patterns of structural development. The regime level exploration addresses the reception and effects of the pioneering practices. The regime level changes are understood as synonymous with societal transformation. The study aims to find answers to the following research questions:

- RQ1 What kinds of practices and values can be observed in the selected pioneer organisations?
- RQ2 Can the practices and values of pioneer organisations be identified also in more established foresight processes?
- RQ3 What is the relationship between the found micro-level practices and macro-level socio-economic dynamics?

Answers to *RQ1* are discussed in articles I (Organisations and the Sixth Wave: Are Ethics Transforming Our Economies in the Coming Decades?) and II ("Trust Makes this Organisation Unique". Looking at the Future of Work through Two Human-centric Organisations).

[16] Nonwithstanding, interesting work has been done on extending the analysis to physical infrastructure development (Marchetti 1986), and societal phenomena such as political instability (Spinney, 2012), where around 50 year fluctuations similar to the Kondratieff wave pattern have been detected.

RQ2 is the topic of articles III (The Long waves and the Evolution of Futures Practice and Theory) and V (Towards National Systems Level Foresight? Citizen Participation in two Finnish National Foresight Processes).

RQ3 is addressed in articles I (Organisations and the Sixth Wave: Are Ethics Transforming Our Economies in the Coming Decades?), II ("Trust Makes this Organisation Unique". Looking at the Future of Work through Two Human-centric Organisations), and IV (K-Waves, Reflexive Foresight, and the Future of Anticipation in the Next Socioeconomic Cycle), and in this Part one (summary and introduction) of the thesis.

2 Theoretical Framework

Anticipation is a relatively novel[17] development aiming at strengthening the theory base of futures studies. Originating in biological sciences, the approach has been offered as a general level theoretical framework for futures research and foresight, for understanding futures orientation across widely different phenomena (Miller, Poli & Rossel, 2018)[18].

2.1 The theory of Anticipatory Systems: how individual organisms anticipate the future

The mathematical theory of anticipatory systems was proposed by theoretical biologist Robert Rosen (1934-1998) as an answer to what distinguishes living systems from non-living things (Rosen, 1985). Rosen describes the anticipatory system as follows: "*Anticipatory system is a natural system that contains an internal predictive model of itself and of its environment, which allows it to change state at an instant in accord with the model's predictions pertaining to a later instant"*. (Rosen 1985).

Central in the concept of an anticipatory system is thus a modelling relationship between the anticipatory system and the world, whereby data based on sensory

[17] Developing anticipatory systems as a base for a theory framework for futures studies has been quoted in Miller, Poli & Rossel (2018) to have its roots in a series of Futures Meetings (FuMee) taking place since 2008. Particularly two sources of inspiration in this work were mentioned: the theory of anticipatory systems developed by Robert Rosen, and the research results from the European COST A22 programme (2004-2007: "*Advancing Foresight Methodologies: Exploring new ways to explore the future*").

[18] In the light of the variety of issues to be understood as manifestations of anticipation, Miller et al. (2018) propose establishing a distinct discipline for studying the topic. There, the term "anticipatory system" would be reserved for Rosen's concept, and the term "Discipline of Anticipation" to refer to the overarching disciplinary umbrella under which discussions about futures oriented issues can be held (Miller & al., 2018). Another way to conceptualize anticipation is to view it as a novel approach within futures studies, where the emphasis is on futures as acted on in the present (closely related to the "third paradigm" of futures studies (discussed in more detail in chapter 1.1.)).

observations about the present is transduced into predictions about the future (Rosen 1978a). An anticipatory system (AS) is a composite system, comprising of a predictive model M of the system S that is of interest to the AS, and effectors E that enable the manipulation of the parameters of the model based on real-time sensory input. (Rosen, 1985; Louie, 2010). Figure 3 presents a simplified version of an anticipatory system.

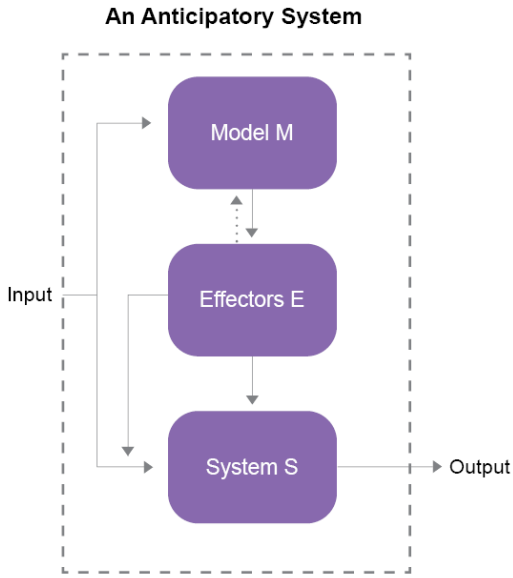

Figure 3. Rosen's anticipatory system (after Rosen 1985).

The anticipatory capabilities exhibited by an anticipatory system[19] can be either explicit or implicit models, i.e. models the system is aware of as opposed to models the system is not aware of (so called "weak" and "strong" anticipation (Poli, 2010a; Dubois 2003)). Thus, in the anticipation literature, strong anticipation means the basic level connection between an organism and its environment, whereas the weak form of anticipation is a much rarer occurrence in nature, and refers to cognitive tools and methods used for anticipation[20]. The strong form of anticipation is assumed

19 For Rosen an anticipatory system is a biological organism. However, for example Dubois (2000) argues for a wider definition to include also basic physical phenomena, and grounds his argument on examples of anticipatory features in electromagnetism.

20 By the framing of anticipation as a central characteristic of life-forms, and therefore a biological pre-requisite for cognition, the theory of anticipatory systems borders (among others) the concept of embodied cognition (discussed in the context of futures studies by Dufva & Dufva, 2019).

to be found in all life-forms (ibid.). Indeed, there is an accumulation of evidence about mental time travel, "*ability to travel backward and forward mentally from the present moment to remember specific past experiences stored in memory and to anticipate or plan future activities*"[21] (Roberts, 2012) in also non-human animals (Roberts, 2012). In Rosen's texts, examples of such futures orientation are found across life forms, for instance perennial plants that respond to day length as an indicator of an approaching winter are acting as if they would react to the future, and thus they can be assumed to possess an internal model for this environmental factor. (Rosen, 1978a). In the case of intentional agents such as humans who are able to use external tools for anticipation, the anticipatory systems approach means that the forward looking capabilities are understood not only as an inbuilt quality, but also as skills that can be improved (Poli, 2015).

Rosen's theory formulates the basic model of anticipation. However, it is not able to fully capture the effects and feedback loops of anticipation in the "weak" form. Intentional anticipation as such produces effects on the system. This issue is often discussed in the context of social sciences under the concept of reflexivity (e.g. Beck, Giddens & Lash, 1994), where it is used to explain the particular changes that have taken place in structures, institutions and individuals in the later phases of modernity (denoting a period roughly since the 1960s in the western countries). In economics as the question is present as the inherent uncertainty that characterizes social systems (e.g. Knight, 1923). In the field of futures studies for instance as self-fulfilling or self-defeating prophecies (e.g. Merton, 1936; Aligica 2009) are examples of the effects of reflexivity. In the context of the Anticipatory Systems - theory, Rosen addresses a similar issue in the problem of infinite regress (1985, p.12). There, continued efforts to reassess the internal model and modify actions to respond to changing environmental cues produces systems level instability. For Rosen, this is an undesired side-effect of the human capabilities for more advanced anticipation, and something Rosen sees could be counterbalanced by more sophisticated planning (ibid.). Yet, the issue needs to be addressed by a more nuanced understanding of the particularities of human anticipation:

Along with Robert Rosen's work, John W. Bennett's studies in the field of anthropology are quoted as central in the formulation of anticipation as a theory base for futures studies (Miller & al., 2018). Bennett (1976) proposes adaptation, rooted in anticipation, as the theoretical concept unifying different strands of anthropological study, and distinguishing anthropology from other social sciences. By adaptation Bennett refers to the ways in which individuals seek to *"realize objectives, satisfy needs, or find peace while coping with present conditions"*

[21] The concept of mental time travel has been utilised as basis of methodological development in the field of futures studies (Cuhls, 2016).

(Bennett, 1976). Goal setting is in itself anticipatory action. These activities shape the conditions in which subsequent adaptive behaviour takes place, and so adaptation is in Bennett's interpretation also inherently futures creating behaviour. Thus, he also suggests that by analysing the adaptation strategies, information about directions of change may be obtained. (Ibid.). Bennett's approach to anticipation complements Rosen's basic theory by focusing on the complexities of anticipation and adaptation in the human sphere.

From the perspective of this thesis an important notion in Bennett's work is the reciprocal relationship between humans and their surrounding nature as socionatural systems, and the role of anticipation / adaptation in ecological transitions (Bennett, 1996). For Bennett, adaptation results in novel ways to utilise nature by turning it into natural resources. The history of Homo sapiens sapiens' most recent 50 000 years can thus be decribed as a succession of transitions in the ability to use natural resources. Traditionally such transitions were credited to introduction of novel technology, but more recently data obtained by observing tribal people's ecological transitions is painting a more complex picture where changes in social organisation, symbolic culture and technology together are behind such leaps. (Bennett, 1996, ch. 1).

In this and following chapters, concepts that have bearing on anticipation and adaptation are explored. Structure of the discussion relates the concepts to the three levels of interest in the study: Robert Rosen's anticipatory system concept addressed the mechanism of anticipation on the level of an individual organism. Collectively shared anticipatory capabilities (Bennett, 1976, 1996) are discussed in the following in an organisational context as the discussion on learning, agility and resilience, and the concept of distributed leadership. These, along with concepts of entrepreneurship as foresight, constructive foresight, cultural foresight and rhizomatic foresight originating from within the field of futures studies, help to understand how practices in the organisations studied for this thesis can be understood as building anticipatory capabilities. Thirdly, networked foresight and the systems view of foresight expand the focus to the level of larger systems and networks, such as societies. A concept of Reflexive Foresight is presented as a conclusive synthesis of different approaches drawn from literature, and the empirical research conducted for this thesis.

2.2 Anticipation in organisations

In this chapter the interest is to understand organisational anticipation and learning. These questions have a long history, and recently they have been raised in the context of futures reseach by studies that have identified for instance sets of organisational practices that imply an inherent forward leaning culture (Rohrbeck, 2011), or by studies proposing the possibility of building systems level foresight capabilities (Dufva & Ahlqvist 2015).

The notion of shared capabilities that help in adapting to, creating, and making use of changes in the (business) environment has been developed at least under the concepts of a learning organisation (Argyris & Schön, 1978; Senge, 1990), knowledge-creating company (Nonaka & Takeuchi, 1995), intelligent organisation (Tuomi 1999), resilient organisation (Hamel & Välikangas, 2003; Välikangas, 2010), and agile organisation (e.g. Salo, 2017). These concepts differ in their emphasis, but all share similar ideas about complexity as requiring distributed working models and variety, making use of tacit, action oriented knowledge, autonomy, the importance of social structures, organisational learning, and the ability to quickly respond to disruptions. With the interest of understanding pioneering organisations that exhibit a specific way to address the future, extant literature is used as scaffolding upon which new findings are based. From this perspective, the concept of a resilient organisation (Hamel & Välikangas, 2010; Välikangas, 2010) comes closest to explicitly examining anticipation in organisational culture. Resilience, defined as "*the ability to dynamically reinvent business models and strategies as circumstances change*" (Hamel & Välikangas, 2003) is seen as stemming from constant anticipation, combined with organisational structures and mindset that enable responding to the findings from the anticipatory scanning process. The concept of a resilient organisation emphasises forward looking, but in other respects the approach echoes many of the key points identified already earlier in the literature about the importance of experimentation and diversity of views (Välikangas, 2010). Indeed, in light of the literature, it seems these features are key elements of an organisation that is able to navigate in conditions of constant change.

Laloux (2014, see also chapter 1.1.2.2 of this thesis) documents the practices of so called "teal companies". They are framed as living organisms, characterised by a non-hierarchical structure, evolutionary purpose, and strategy that emerges from collaborations between its constituting individuals. This direction setting is described as a process that is constantly refined and modified based on inputs from around the organisation, as individuals have the ability to act on their own anticipations. Described this way, the teal organisation (Laloux, 2014) can be argued to be a good candidate for representing a collective form of Rosen's (1985) anticipatory system.

Fuller (2017) discussed anticipation from the point of view of organisational foresight. He argues that in order to understand (any type of organisation's) forward looking processes, one must acknowledge the different, simultaneously active anticipatory systems at play. Fuller notes that the formal processes for foresight are unlikely to be the most effective of these, and encourages foresight practitioners to earnestly analyse whether the processes are in fact even at all an active part of the organisation's functional anticipatory systems. Many anticipatory systems that are

central for the organisation's strategic planning functions exceed the traditional boundaries between the organizational system and its environment, whereas for instance formal foresight processes can be perceived as external to the organisation's internal processes. (Fuller, 2017). For foresight and scenario processes to take into account the plurality of anticipatory systems, Fuller argues for the application of Funtowicz' and Ravetz' (1993) post-normal science methodology for organizational anticipation. There, scenario work would move from a centralized strategic planning process towards a more embedded and embodied anticipation, relying on strong internal communications.

One way to conceptualize the type of collective organisational behaviour described by Laloux and suggested for effective forward looking by Fuller (2017) in the context of non-hierachical teal organisations is distributed leadership (Bolden, 2011). It is a relational approach to organizational behaviour, rooted in cognitive anthropology. As a concept it is neutral to the actual structure of the organization as hierarchical or non-hierarchical. It is based on the theory of distributed cognition (Hutchins, 1995), which is applied to the analysis of leadership processes. In this view, knowledge and leadership within an organisation do not reside within any individual, but are spread across the people, their tools, and the context[22]. Thus leadership must be understood as a situated process that encompasses all the resources in the organisation, rather than as an individualised activity, in order to give an accurate description of how an organisation as an entity "knows what to do"[23].

Examples of such decentralised models as adapted to forward looking are often found at the intersection of futures studies and entrepreneurship. As in the case of any market actors, the success of entrepreneurs is subject to exogenous forces affecting the marketplace, to the extent that uncertainty has been argued to be the main reason for the existence of entrepreneurship (Knight, 1923). Yet, the systematic use of foresight for anticipating and preparing for surprises is rarely employed as a systematised practice in SMEs, and knowledge of technological and scientific opportunities is most often distilled to them from peers through self-organized networks (e.g. Höyssä, 2013). Therefore, by studying entrepreneurial practices, one can gain insights to forms of anticipation that do not rely on formalised foresight processes. In this line, Fuller and Warren (2006, also Fuller, 2017, see also Heinonen

22 Here, the approach has similarities with the Actor-Network Theory (Latour 2005), and with the *agencement* (assemblage) thinking based on French post-structuralist writings (e.g. Deleuze & Guattari 1987)

23 Empirically, such organisational capabilities have been examined in detail by Hutchins (1995) who applied the framework of a cognitive system to understanding the US navy ship Palau: the ship, its crew, and the tools and practices that carry the whole history of Western navigation tradition.

& Ruotsalainen, 2012) argue that forward looking activities are an inbuilt feature of entrepreneurship. Based on a study on organisational foresight in high-velocity business environments, Fuller & Warren (2006) develop a model for situated foresight by examining entrepreneurial processes taking place within communities of practice on different emergent levels of action (individual, firm, interfirm, and across levels). The approach is based on Complex Adaptive Systems -theory, and places the examined entrepreneurial processes at the root of novelty in the system. The suggestion is that what has often been interpreted as entrepreneurs' lack of ability and interest to engage in foresight can also be seen as a distinct form of foresight practice, developed to serve in conditions that require fast decision making, economic time utilization and optimization of knowledge acquisition processes. Entrepreneurs are aware of their specific historical context, and are able to exploit it to their advantage by disentangling and breaking it in creative ways. This kind of a capability has been seen as a specific expertise by Read and Sarasvathy (2005). Thus, by this argument, entrepreneurial action is the source of all foresight information as producing novelty. (Fuller & Warren, 2006). This argument links entrepreneurial foresight with the MLP model of socio-economic transformation, and emphasises the self-reflexive nature of human societal development by linking novelty to a constant monitoring of the surrounding system.

Forward looking as linked to production of novelty is also imbued in Ilkka Tuomi's (2012) view that takes a more ontological stance to the question of foresight. He underlines that the fundamental characteristic of the world is ontological unpredictability. Individuals have the ability to produce new entities to the world, which then interact, producing emergent new features that cannot be forecasted in advance. For Tuomi, futures can then only be communicated with through participation in this process of ontological expansion through experimenting and inventing novel futures in a process of *constructive foresight*.

The entrepreneurial logic to foresight described by Fuller and Warren (2006) can also be found among René Rohrbeck's (2011) studies on the maturity of foresight processes in companies and organisations. He identified four key factors upon which foresight is founded: *cultural features* of the organisation, such as attitudes towards knowledge sharing, *organizing factors*, such as the integration of foresight in the organisation's processes, sophistication of *foresight methods* used, referring to information, its sources and scope, as well as *people and networks*: internal communications, and integration of internal and external networks to knowledge streams. Among his cases, Rohrbeck described an informal mode of foresight as an outlier to the mainstream corporate foresight practices. He found that efficient foresight results can be established without the presence of a formal foresight process or sophisticated foresight methods, but based on strong internal and external networks and communication capabilities, culture of knowledge sharing, along with

a shared understanding of the importance of scanning the changes in the environment for the purpose of finding novel ideas for the company's development. (Rohrbeck, 2011).

A theoretical model apt to describing such informal foresight approaches can be found from Taylor, Heinonen, Ruotsalainen & Parkkinen (2015), who coined the term *Rhizomatic foresight* for explaining lateral interactions as basis for production of foresight knowledge. Based on the French post-structuralist network theory (Deleuze & Guattari, 1987), the rhizomatic model for foresight replaces the hierarchical tree model for knowledge production. Deleuze and Guattari (1987) argue that the tree metaphor for knowledge creation which implies unity, hierarchy, centrality, and rootedness has ruled over western thinking. This model is contrasted by a rhizome that can be visualised as a map with multiple entryways, where all the knowledge is interconnected, and where new entries open up while traversing the rhizome. Taylor and al. (2015) claim that all futures knowledge inherently is rhizomatic. It is a map that, at least to some extent, remains beyond tracing at the present moment, but it will open up new entries while one proceeds. Rhizomatic foresight has a parallel in the concept of serendipity (e.g. Malmelin & Virta 2017). In innovation studies serendipity is a way of generating knowledge randomly. The rhizome model offers explanations for unexpected outside forces and unorthodox couplings. The concept of a rhizome carries with it an analogy to Tuomi's Constructive foresight, as the notion that through engaging in a rhizome of foresight knowledge production one takes part in an active shaping of the world. The outcomes of such processes defy attempts to forecast. Rather, rhizomatic processes require a specific mind-set that has been described in the anticipation literature as Futures Literacy (Miller, 2003, 2018). The following quotation (Miller, 2003) captures key elements of the approach:

> Futures Literacy like language literacy, involves the acquisition of knowledge and skills required to imagine and use the future differently. FL is the basic knowledge and skills on how to use the future. FL assumes familiarity to tacit and explicit anticipatory processes (i.e. "optimization" (privileges causal-predictive methods and actively extrapolates the future with the past; amenable future), "contingency" (future is perceived and used to prepare an institution from possible and expected shocks) and "novelty" (making sense of emergence; the future is used to locate and create novel and innovative futures)). (Miller, 2003).

As illustrated by the quote, Futures Literacy is a capability based approach (see also Poli, 2015), emphasizing the difference between attempting to foresee events and developments in the future for purposes of preparation, and the ability to perceive

the present with an understanding of complexity, non-linearity and emergence, enabling a more conscious "use of future" as basis of value driven choices in the present (Miller, 2018). At its core, futures literacy means the ability to critically deconstruct and question one's anticipatory assumptions, for perceiving alternative possibilities and acting on them (Miller, 2018).

2.3 Learning anticipatory skills and creating systemic anticipatory capabilities

Returning to the framework of anticipation, Poli (2010a) identifies strong and weak forms of anticipation as a separation between innate and learned anticipatory capabilities. Although Poli does not specify the role of culturally accumulated and shared models in this taxonomy, it would appear logical to place shared anticipatory models to the realm of weak, learned models[24]. For instance literature referred to on shared organisational capabilities either present theoretical models on organisations that are optimised to operate under conditions of uncertainty (e.g. Senge, 1990; Nonaka & Takeuchi 1995; Tuomi 1999), or are practical guides to help a company achieve the benefits of a more distributed model (Hamel & Välikangas, 2010; Välikangas, 2010; Salo, 2017). Both types are produced with the intention to enable learning of new practices that are promoted as better from the perspective of organisational learning, resilience and / or agility.

Within futures studies the idea of developing models for futures thinking is embedded in much of the mainstream futures work, articulated for instance in Rhisiart's, Miller's and Brooks's (2015) article, where the process of developing anticipatory capabilities is examined through practice obtained by participating in foresight processes. This kind of an approach to spreading understanding of futures work has also been linked with the impact of foresight processes (Rhisiart, Störmer & Daheim, 2017).

Anticipation and learning are inherently tied in with one another both in Rosen's (1985) anticipatory system and Bennett's (1976, 1993) view focusing on the anticipation and adaptation processes in humans. Both concepts can be connected with a more general discussion on learning as a characteristic feature of human systems. As discussed earlier (in chapter 1.1.1.3), Pentti Malaska's conceptualisation of societal development relied on the concept of society as a learning system. There, human intentionality is assumed to be the driver in the process of selection of civilizational goals and means to reach them. This approach is close to Geoffrey

[24] Although also differing interpretations are possible, for instance from the perspective arguing that organisational culture is born with the organisation (Schein 1985, Smircich 1983).

Vickers appreciative systems model (Vickers, 2010), where societies are seen as ethical learning systems. In other words, in an appreciative system, societal learning includes a normative element. As such, the appreciative system approach is highly compatible with normative approaches in futures studies, and therefore has been used as a framework in a number of articles proposing different ways to see societal systems as moving towards forward looking systems (e.g. Marien, 2007, Burt, 2010, Turnbull, 2010).

The issue of how to make societies function as anticipatory systems is acute especially in the context of national foresight systems. Dufva's and Alhqvist's (2015) notion of a systems view to foresight means foresight that accepts the multi-faceted nature of foresight processes, practiced on many levels of the society, and with a number of competing approaches to using the future in the present (Dufva and Ahlqvist, 2015). Here key is the notion, emphasised in thinking on the systemic or networked foresight approaches (an approach to corporate futures inspired by open innovation approach, conducted in inter-organizational networks Heger & Boman 2015, van der Duin, Heger & Schlesinger, 2014) that by this multitude, a certain saturation of futures related information would enable it to permeate the society, producing a more sophisticated response to the perceived drivers. (e.g. Dufva, 2015).

Minkkinen (2019) takes this idea to a more pragmatic level in his analysis of anticipatory assumptions in two policy-foresight cases (the EU data protection reform and Finnish comprehensive security foresight). He proposes a practice of analysing inherent anticipatory assumptions through a three-layered structure of specific expectations, generic storylines and futures consciousness. Noting that currently, anticipatory assumptions are often left implicit, and possibly also unconscious, a recommendation is made for using a template, for instance the one proposed in the analysis, for enabling a more conscious and rigorous process, but also planning for complementarity between different forward looking exercises on a national / societal level, for building of societal, systems level futures literacy and coverage of alternative perspectives. (Minkkinen, 2019).

2.4 Conclusions on the theoretical framework and Reflexive Foresight

In this chapter the concept of an anticipatory system was presented and discussed for explaining anticipatory behaviour on the level of the individual. The discussion was then moved on the level of organisations for understanding how anticipation as a shared capacity could be approached through the existing concepts of a learning organisation (Argyris & Schön, 1978; Senge, 1990), knowledge-creating company (Nonaka & Takeuchi, 1995), intelligent organisation (Tuomi, 1999), resilient organisation (Hamel & Välikangas, 2003; Välikangas, 2010), and agile organisation

(e.g. Salo, 2017). Teal organisation (Laloux, 2014) was introduced as a concept describing a decentralised, value driven organisational form that is compatible with Rosen's (1985) anticipatory systems. Distributed leadership (Bolden, 2011) provides a way to theoretically understand decentralised organisational processes. The concepts of entrepreneurship as foresight (Fuller & Warren, 2006), constructive foresight (Tuomi, 2012), cultural foresight (Rohrbeck, 2011) and rhizomatic foresight (Taylor et al., 2015) each approach forward looking as a decentralised organizational or societal phenomenon, compatible with the anticipatory framework.

This thesis explores the emergence and consequences of practices constituting forward looking processes in decentralized organisations, meaning organisations that have low hierarchies and a fractal organisational structure (e.g. autonomous teams that are responsible for their own projects). In traditional organisations foresight is often done as part of strategy formation, and foresight is conducted by certified professionals in specialized units. Foresight also tends to be project-based activity, where the future of a given topic is explored as background for strategic decision-making. (e.g. Dufva, 2015). As decentralized organisations lack this structure, their relation to strategic planning is often elusive, and the future of the organisation is approached as organic evolution rather than a cognitive exercise. This type of "muddling through" (Alvarez & Barney, 2007) approach is akin to that perceived in entrepreneurial ethos. Yet, research has shown that entrepreneurs are acutely aware of opportunities that could emerge from technological and social developments (Fuller & Warren, 2005). In this thesis, the question of how the shared understanding of futures is created in our studied case organisations is answered through the analysis of their practices.

In this thesis, the studied organisations and individuals are viewed as pioneers of a certain kind of societal future. Therefore, approaches where societies have been conceptualised as learning systems (Vickers, 2010) with potential to becoming anticipatory systems (Dufva & Ahlqvist, 2015; Minkkinen, 2018) were explored as background theory for empirical investigation of the topic.

In this thesis, the Anticipation framework is employed for understanding forward-leaning organisations, and their implications for systems level transformations. A common complaint among foresight practitioners is that there is not at present a shared theory about the future (e.g. Poli, 2017) – and it has been argued to be suspect whether there ever will be one (e.g. Piirainen & Gonzales, 2015). The approach adopted in this thesis states that there may not be one theory of the future, but several anticipatory models, manifest on the level of practices, that function better or worse in navigating the complex environment. This line of thinking is compatible with the Anticipation approach.

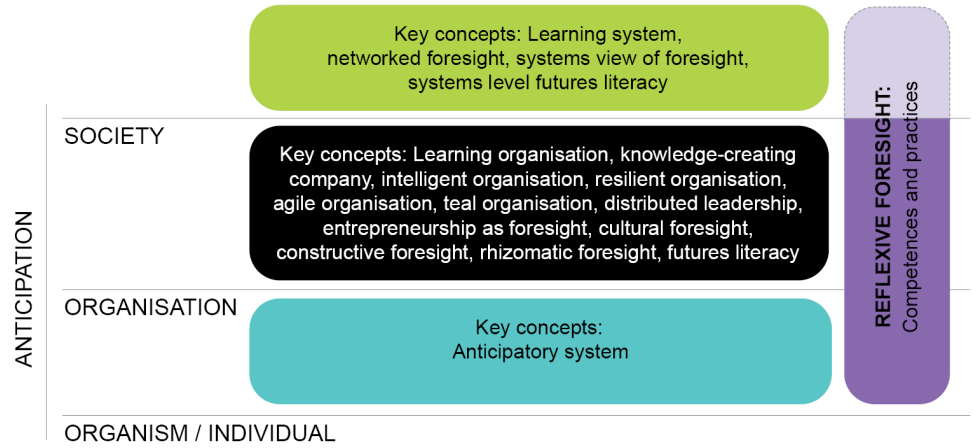

Figure 4. Nested hierarchy of theoretical concepts (own illustration utilizing framework based on Geels 2004).

In the literature, individual expertise about the future has been referred to as futures literacy (Miller, 2018). Based on the empirical findings of the research conducted for this thesis, a collective form of futures literacy, Reflexive Foresight, is presented as a theoretical contribution of this thesis:

Reflexive Foresight (Wilenius & Kurki, 2017) is a model based on empirical observation of network organisations. It describes the way a network organisation is orienting itself towards the future by using a unifying purpose combined with a constant day-to-day monitoring of the state of the organisation and its environments. The approach may be proactive (fulfilling a mission) or reactive (focus on survival and finding new opportunities). There are two main categories of this type of foresight: entirely networked organisations (like Reaktor in Finland) which operate based on networked principles or heuristics, and quasi-networked organisations, where non-hierarchical working model is organised around a vision set by the leader, typically the founder of the organization (such as Buurtzorg in the Netherlands). A particular feature of an organization practicing Reflexive Foresight is the decentralization of authority over strategic decisions to the individual level. Thus, the organizing model can provide a solution to challenges arising from the multitude of anticipatory systems operating within an organization simultaneously: measures, such as the obligatory negotiation procedure, which still leaves decision-making power to the individual initiating a novel idea, are in concordance with e.g. Fuller's (2017) suggestion of applying Funtowicz' and Ravetz' (1993) post-normal science approach for organizational anticipation.

Reflexive Foresight as a concept shares many elements with other approaches that analyse individual (or collective) capabilities for forward looking[25]. In the analysis connecting this novel form of forward looking to the sixth wave drivers, the role of an environment where the number of agents contributing to the complexity of the system has expanded is emphasised. Individuals powered by advanced communication technology have an enhanced capability to connect with an unprecedented number of their peers. In such an environment, for instance the scenario approach fails to capture all the relevant information that is needed to make informed decisions. Instead, one can argue that the foresight approach needs to match the level of complexity in the system by embracing a distributed model, where foresight is embedded in the system on the level of individual decision-makers (see Ashby, 1956 on the law of requisite variety, implying increasing complexity requirements for the controlling entity).

A complex, multidimensional environment favours the kinds of approaches that are able to genuinely embrace uncertainty as basis for rational decision-making, and strengthen an organisation's ability to make use of available information sources as richly as possible. There, more traditional ways of applying futures research methodology may seem to artificially narrow down the scope of uncertainty with pseudo-predictive tools (despite the intentions behind such methodologies). The Reflexive Foresight approach differs from the other approaches discussed in this chapter by describing the structured way in which the guiding ethos or purpose, observations and anticipations, as well as practices that are comprising the forward looking attitude, are used. Here, Reflexive Foresight connects with the normative approaches to learning systems, such as Malaska's theory of societal development (Malaska, 1999) or Vickers' appreciative society (Vickers, 2010).

Reflexivity is understood as key factor in adjusting the behaviour of an organisation to emerging changes. Bennett (1996) makes the argument that human adaptation and anticipation are always tied in with the natural environment so that they cannot be separated from one another. Reflexive Foresight emphasises this connection. In light of the sixth wave change drivers that affect the behaviour of the pioneer organisations, the traditional notion of an organisation's environment is broadened from the business environment to the whole surrounding environment of the organisation.

[25] Certain parallels can be drawn for instance between Reflexive Foresight and Deliberative foresight (Karjalainen & Heinonen, 2018b). In both, the individuals whose future is discussed are occupying a central position in the foresight process. However, the difference stems from the Reflexive Foresight being foremost an endogenic approach to forward looking, whereas Deliberative foresight is presented as a tool for foresight professionals.

3 Methodological Framework and Research Approach

This study is conducted as a multi-method design, motivated by the need to answer the research questions addressing how the pioneering organisation operate, and how are these pioneering practices contributing to the broader societal change framework. Data gathering techniques of thematic interviews, a group interview in a futures workshop setting, and non-participatory observation were used in the pioneer analysis of cases (niche level), and document analysis along with thematic interviews were used as methods in the case studies addressing regime level implications. Long wave analysis was used to make sense of the broader context which gives rise to the explored phenomena. In this chapter, the elements of the methodology are presented, and choice of methodology is discussed. Figure 5 depicts this structural spread of the methodology, pointing out the methodologies used in cases on different levels of the socio-economic system.

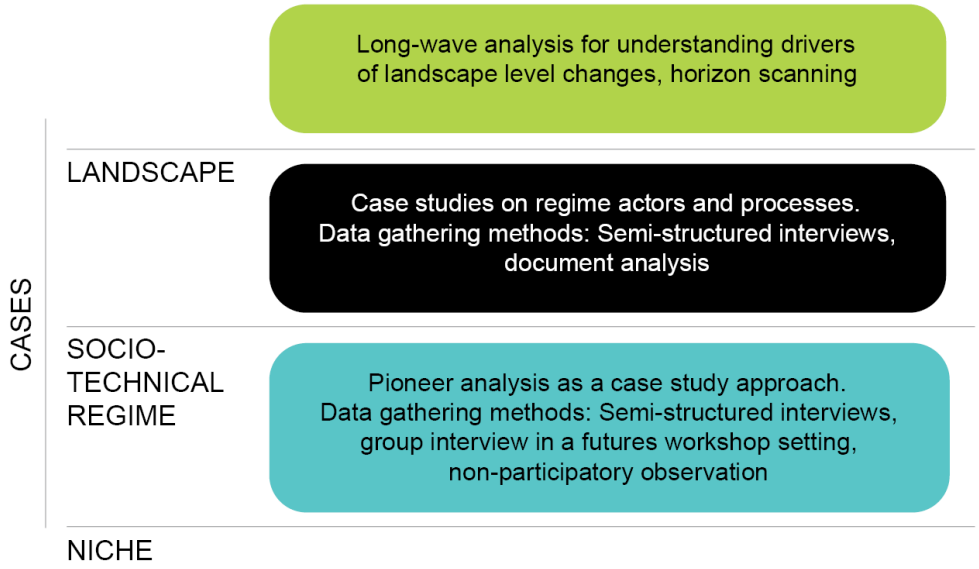

Figure 5. Methods in the context of the multi-level framework (framework from Geels, 2004).

3.1 The case study approach for research

A case study method is used as term for at least three qualitatively different purposes in academic literature: 1) a *teaching case* is a common pedagogical practice for instance within fields of law and medicine, used for illustrating a set of circumstances as bases for discussion and learning (e.g. Yin, 2018). 2) *A case history* is a descriptive tool for record keeping (Yin, 2018), and finally 3) *A research case*, is a methodological approach for studying processes in their social context. It differs significantly from the two previously mentioned forms of case studies. (Cutler, 2004). In this chapter, approaches, definitions and meta-theoretical aspects of research case study methodology are reviewed.

The case study method for research has a long history, and fluctuating popularity, in different fields from social sciences and humanities to education, and medicine. After being popularized in the 1920s and 1930s, the method's popularity waned (Yin, 1994). Only after the 1970s, efforts to formalize the method have brought about a more systematic use and progression of the method in the scientific realm, and a steady growth in the utilization of the design (Bennett, 2015).

Bennett (2015) defines a case as a narrowed down and defined aspect of a certain situation, so it is not understood as describing the whole situation. Definition of the case includes the selection of the data relevant for understanding it.

Lijphart (1971) and Eckstein (1975/2000) have both created typologies of different forms of research case studies found in the literature. In their typologies, similar kinds of types were identified, with the exception of a "deviant case" type which was identified only by Lijphart. The authors invented different descriptor terms for essentially the same categories. Bennett (2015) summarised the following typology of case studies as an aggregate of Lijphart's (1975) and Eckstein's (1975/2000) work (in Table 1).

Table 1. Typology of research case types (after Bennett 2015).

Lijphart's (1971) term and its key features	Eckstein's (1975/2000) term and its key features	Bennett's (2015) summary
Theoretical - single case - no theory - basic data gathering	*Configurative-ideographical* - aim to present depictions of the overall *Gestalt* of the case - "facts speak for themselves" or intuitive interpretation - summation or comparison across cases difficult, and often repudiated by referring to the idiographic nature of the case study method.	A chronological narrative telling about how something happened, without referring to any theoretical explanatory frameworks or tools.
Interpretive - driven by an interest in the case - utilises established theoretical propositions - "applied science"	*Disciplined configurative* - interpretation of a case must rest on theoretical generalizations - theoretical bases of interpretations should be explicit, and *ad hoc* additions to the interpretative framework should be treated as general laws - the application of theory is a complex process, often insufficiently considered in the process	These types of cases can fall into either a category that uses a case / cases for illustrating a theory, or one that explains a case narrative through using (implicitly or explicitly stated) theoretical propositions.
Hypothesis generating -starts with vague notions of possible hypotheses -attempts to formulate more definitive hypotheses for testing with a large number of cases -objective to develop theoretical generalisation in areas where no theory exists.	*Heuristic* - case study used finding important general problems and possible theoretical solutions - can be conducted as a series of case studies for analytic induction - the researcher is not committed to a set of variables, thus enabling new critical variables and relations to be found - case selection is critical	Here the aim is to use cases for producing novel hypotheses inductively from the study of particular cases. Heuristic case studies can also be used for testing the validity of outcomes and processes predicted by theories.
Theory confirming / infirming -study of one case within the framework of an established generalisation -Tests the established proposition	*Crucial case studies* - a particularly well-chosen case may act like the "experimentum crucis" in the natural sciences, and as such, the case "represents" the regularity described by a theory. - Alternatively, one can focus on 'most-likely' or 'least-likely' cases as substitutes for the ideal fit with theoretical assumptions required by the crucial case design.	Cases can be used for testing existing theories' predictive capability. A crucial case means that the case is exactly the situation that the theory describes, and thus the outcomes of a case are able to potentially falsify a theory. As such instances are rare, a most likely case is a situation that the theory makes a strong claim for explaining, and least likely case conversely is only at the border of the theory's predictive claims.
Deviant case: -Study of a case known to deviate from established generalisations - Asks why this is so.	-	A deviant case study analyses a case whose outcome is not predicted or explained adequately by existing theories.

The case approach adopted for this study is closest to the *interpretive* (Lijphart, 1971) / *disciplined configurative* (Eckstein, 1975/2000) case. Here, use of the long wave analysis functions as providing a frame for the cases (Rossel, 2012). Thus, the cases get their interpretation from the long wave analysis, in the theory framework of anticipatory systems.

The pioneer analysis as a specific instance of case methodology brings with it additional objectives, discussed in more detail in the next sub-chapter (3.2).

3.2 Pioneer analysis as a case study approach

The question of from where to seek for signs of emerging issues is a critical one for the field of futures studies. There, a popular view is to understand change as arising from the fringes of the society, first appearing in art, basic science, and in "*odd bits of insight in alternative information sources like the fringe media*" (Molitor, 2003). Thus, studying instances of novelty for understanding potential direction of change is one of the established approaches in futures research. These have been approached as weak signals (Ansoff, 1975) or, more holistically, futures signs (Hiltunen, 2008). However, weak signals as a concept to apply to all novelty is problematic: by definition weak signals point to fleeting phenomena with no history, and a very uncertain future. Their use has also been questioned from a more ontological position, addressing the concept of detecting signals as if sent from the future (Miller, Rossel & Jorgensen, 2012; Rossel, 2012; Fuller, 2017). Also concepts that are more rooted in historical development, like various forms of trends, are unsuitable as analytical tools for phenomena that are by nature rather singular than a part of a clearly recognizable group. Pioneer analysis as a concept and method has been proposed to address the above mentioned weaknesses in previous theory on novelty generation (Heinonen 2013; Lang, Karjalainen & Heinonen, 2016; Heinonen & Karjalainen, 2019; Karjalainen & Heinonen, 2018a).

Pioneer analysis builds on the idea originally presented in innovation studies that novelty is adopted by users at various stages in a curvilinear process (Beal, Rogers & Bohlen, 1957). There, the innovators themselves are the first to employ novelty, followed by early adopters, who take on the idea or innovation at a very early phase, and contribute significantly to its development. Both of these groups are what is meant by pioneers. The pioneer analysis targets not only technological innovations, but also developers of new forms of practices, and even countries or cultures: Heinonen (2013) gives the examples of ancient Roman and Greek cultures and societies as pioneers of their time. Although the pioneers, like weak signals, may not have a strongly emerging future, the key difference results from the nature of the phenomena depicted. While as weak signals we may consider any phenomenon that is not entirely in line with the mainstream practices, the pioneers are agents with an

intentional aim to shape history: to win over previous innovations or practices, and shift the development towards a direction that they consider desirable. It is this reflexivity of the historical context that provides one of the criteria for the selection of a pioneer. The theory of pioneers is rooted in the self-referential character of a system which enables pioneer initiatives to anticipate their surroundings. This framing shifts the focus from pioneers as individuals to the collective system.

In this thesis, the case studies[26] describe the case organisations and entrepreneurs as pioneers of novel practices for the purpose of learning about the dynamics of techno-economic and socio-cultural change (Lang, Karjalainen & Heinonen, 2016). A pioneer analysis as a method includes both the phases of identifying pioneers, and analysing their practices and motivations through both documented sources and through direct interventions, such as interviews and for instance observation.

The importance of pioneer selection is emphasized in the literature on pioneer or frontrunner (also forerunner has been utilized as a term) analysis (Heinonen & Karjalainen, 2019; Loorbach & Rotmans, 2010). Several criteria, ranging from desk study to interviews, to psychological tests (Loorbach & Rotmans, 2010) have been proposed. More specifically, in instructing the selection of frontrunners to form a "policy arena" for transition management, Loorbach (2010) presents the following criteria:

> "(1) ability to consider complex problems at a high level of abstraction, (2) ability to look beyond the limits of their own discipline and background, (3) enjoy a certain level of authority within various networks, (4) ability to establish and explain visions of sustainable development within their own networks, (5) willingness to think together, and (6) open for innovation instead of already having specific solutions in mind." Loorbach (2010)

In applying the criteria for policy planners considered as pioneers, Poustie, Frantzeskaki and Brown (2015) streamlined the list, and selected the following three as most relevant criteria: 1) willingness to view problems creatively, 2) ability to lead and influence, and 3) to seek solutions utilising cross-disciplinary input.

For this thesis, pioneer organisations were selected by a combination of expert recommendation and literature search on decentralised organisations. The organisational pioneer analysis case studies were performed on Finnish ICT consulting company Reaktor, which was selected for its emphasis on workplace

[26] The case based pioneer analysis is not the only possible approach to pioneer analysis: for instance Nygren, Kontio, Lyytimäki, Varho and Tapio (2015) conducted an interview survey on 54 pioneers, with the aim of forming a typology of pioneers based on observed motivations and aims.

wellbeing and employee empowerment, and a Dutch nursing organisation Buurtzorg, who is internationally renowned for its value-driven approach to organising homecare services. Although the selected organisation have received attention for the success of their model, at the time of research these studied organisations could be considered outliers in their fields of operation, representing a small minority of organisations that were approaching their work in their manner.

In the selection, organisations were selected as the unit of study because the interest was on understanding anticipation as a collective capability. The relevant features would have been difficult to access through a study focusing on individuals. Finally, case organisation's selection was defined by practical issues, such as access to conducting the research.

The selection of Silicon Valley entrepreneurs considered as pioneers in resource efficient practices[27] was facilitated by local informants from the Institute for the Future, an established futures research institute based in the Silicon Valley. A special point of interest was studying individual companies (through the views presented by their representatives) belonging to a same business ecosystem, for understanding similarities and differences between separate organisations belonging to the same loosely collaborative network.

The pioneer analysis is in this study combined with long wave analysis. The use of long wave theory as a methodological tool is presented in detail in the following sub-chapter.

3.3 Long wave analysis of societal change as a method for futures studies

The Kondratieff wave theory (K-wave theory) analyses macro-level changes in socio-economic systems, based on the finding that basic economic indicators appear to fluctuate on a 40-60 year cycle (see chapter 1.1.1.2 for a more thorough presentation of the long wave theories, and chapter 1.1.2 for an overview of the identified key drivers for the sixth wave) (Kondratieff, 1928/1984). The K-waves theory has been used as an analytical tool in futures studies for anticipating systems level changes, as it provides a recurring pattern and an interpretative framework for systems change. (For the use of the K-wave theory as a methodological tool, see Wilenius, 2015, 2017).

As a technique for analyzing futures information, long wave analyses often adopt a view on technology, where a novel technology regime emerges from a rather arbitrary combination of available technological solutions that serve as providing

[27] Understood broadly as not limited to a narrow natural resource definition.

solutions to problems produced by the previous socio-technical wave, and in turn creating issues to be solved in the future (e.g. Burnam-Fink, 2015). Moreover, as suggested by Ayres (1990), historical evidence seems to point to the direction that an innovation often does not have direct impact on the immediately succeeding wave, but rather to the subsequent ones. Table 2 illustrates the logic with two technology examples.

Table 2. Development of technologies in the long wave framework.

PIONEERS		**Mainstream**	**Becoming an issue of concern, building of the next platform**
Weak signal phase, revolutionary ideas	**Niche phenomenon**		
Nikolai Tesla, early pioneers of energy technologies, early 1900s (3rd K-wave)	Wind-, solar-, bio-technology pilots, 1970s (5th K-wave)	Wind and solar as mainstream technologies in the 6th wave	7th wave?
Charles Babbage, Ada Lovelace, Difference Engine, 1820s (2nd K-wave)	The work of digital pioneers, Alan Turing's Universal Machine, 1930s (4th K-wave)	Digital technology as the technology driver of the 5th wave	6th wave enabler of resource efficient solutions, growing concern over societal effects of evolving computational capacities

In this thesis, the K-wave analysis provides the key drivers (presented in the chapter 1.1.2) for the sixth wave, which in turn are used in analysis of the case studies. In a nutshell, the sixth wave, here estimated as having its beginnings in the financial crisis of the 2008, gathers its dynamics from the environmental damage mounting from the technological regimes of the past waves, and the technological innovations responding to them. The nature of environmental issues as drivers is non-conventional in comparison with technology drivers. However, they may be traced back to previous waves in a similar manner as technologies (as for instance done in table 2 for renewable energy and ICT). For instance the climate change as an issue has matured gradually since the first notions of it surfaced. A weak signal or revolutionary idea phase occurred in the 1930s when Thomas Edison raised concern for climate change, and argued for renewable energy (end of 3rd K-wave / beginning of the 4th wave). In the 1960s (4th wave) the idea was still in a niche phase, and despite growing evidence for the warming effects of carbon dioxide, there were also

speculations about the potential cooling effects of other kinds of aerosols that resulted from human action. Climate change entered mainstream in 1990s (5th wave), when scientific consensus formed on the effects of carbon dioxide on the climate. Since then, voices demanding action have grown stronger, but action itself has remained moderately ineffective in the face of mounting pollution levels.

As discussed, the Kondratieff-wave based long wave approaches typically consider the structural changes strictly from a capitalist techno-economic stance. However, the theoretical interest in this thesis is in understanding the causes and effects of structural change in the societal systems. Such effects are here studied by observing behaviour of pioneering organisations and individuals on the niche level, and established foresight processes and practitioner views on the regime level. For this interest, Pentti Malaska's theory of the long waves of societal change is used as it calls attention to the human intentions and needs that ultimately shape futures. In the combination of the two long wave approaches, the more traditional K-wave approach is used for understanding structural change drivers, and Malaska's analysis for outlining human factors and civilizational challenges driving such change. With the latter, questions of normative reflection, visionary thinking, and agency are opened up for analysis.

While sharing many mutual characteristics, the long wave framework differs from the MLP framework (Grin & al., 2010, discussed in more detail in the introduction, chapter 1.1.1.2) for example on the scope of analysis: long waves look at changes on the level of entire socio-economic systems, whereas the MLP is more focused on the forces affecting the development of individual technology trajectories (Lauttamäki, 2018). However, the two approaches are compatible to a degree allowing them to be combined. Haukkala (2019) has successfully combined the K-waves, and the MLP-modle for understanding change on the levels of structure and agency, in her policy oriented PhD thesis investigating low carbon energy transition in Finland through a case study design. In Haukkala's thesis, the three levels of the Multi-Level Perspective are applied in a similar fashion as in the thesis at hand. In both, MLP levels form a conceptual framework in which novelty emerges from the niche level, and the long waves approximate the landscape level changes. However, the approach in the thesis at hand differs from Haukkala's work as for Haukkala, the key interest is in understanding resistance to change resulting from tensions between forces driving novelty, and the old status quo. (Haukkala, 2019). In this thesis, the pioneers, professional actors, and governmental processes provide cases for analysing the process through which niche level initiatives and regime level responses together produce societal change.

3.4 Combining the pioneer analysis approach with long wave theory for anticipating effects of societal innovation

The methodological framework of the thesis is constructed by approaching the pioneer analysis from the temporal landscape of the long waves. In practical foresight, it is customary to adjust the timeframe to the speed of change of the studied phenomenon. For instance, anticipation of the futures of relatively novel, rapidly changing phenomena (such as social media) is difficult further than 10 years into the future, but changes in phenomena dependent on slowly changing infrastructure (e.g. cars and the futures of traffic) need a longer timespan for the changes to take effect. (P Tapio 2020, pers. comm. 23 January). Following this logic, pioneers, when taken as analogous to weak signals, would typically appear a topic that calls for a shorter time range for anticipation. However, the motivation for combining pioneer analysis with a multi-decade long wave framework is to produce a tool for anticipating socio-economic changes on a long range. Contemporary interpretations about the nature of the waves emphasise their systemic nature. In the cases, we find evidence supporting this view as many of the studied case organisations appear to draw their motivation not only from proximal cues in their immediately surrounding environment, but rather they seek to address grand challenges that are typically megatrends, or issues arising from the macro-level changes, such as the issues identified by the Kondratieff wave analysis. Thus, the niche level actions have intended consequences directly on the landscape level, and the landscape level motivates action on the niche level. The relationship is reflexive, contributing to the selection of the term to describe the foresight approach of the pioneering organisations.

In this thesis, the long wave analysis is used for identifying a) drivers for change as motivators of pioneering acts, as specified in chapter 1.1.2, and b) analyzing the type and timing of pioneering acts. The pioneer analysis method as such is neutral about the temporal context of the identified pioneers: agents bringing about systemic change can exist and be identified at any given time, in any historical setting (Heinonen & Karjalainen, 2019). Combining the pioneer analysis with the long waves adds an argument that the likelihood of an outlier practice becoming mainstream (changing the structure of the socio-economic system) intensifies, if it can be placed in a cluster of similar pioneers, in the temporal vicinity of a rising long wave (see also Lauttamäki, 2018 for a supporting finding).

3.5 Research approach

In this thesis, the object of study (societal and structural dynamics governing social change) is understood to be a human construction that however has implications on the world beyond the human sphere. The physical environment is assumed to affect

the actors by imposing pressures for adaptation (Bennett, 1996). In this research, the existence of a reality outside of human consciousness is thus assumed, but the actors are seen to have agency as shapers of the social systems, as reflected by an interest in studying pioneers and regime level actors as informants on systemic change. The assumption therein is that by examining the aforementioned actors, one gains access to information about how actors create and modify social systems. This line of enquiry is compatible with social constructionism, and related subjective or intersubjective epistemology. The latter has been argued to constitute the most dominant form of epistemology applied in contemporary futures research (Tapio & Hietanen, 2002).

Social constructionism has at least three points of origin in social sciences (Tapio, 2002 p.72): First, cultural anthropologist Mary Douglas, in her seminal book "Purity and Danger" (1966/1989) set forth an exploration of how societies construct the rules for taboos. Secondly, Herbert Blumer (1971) developed an approach to social problems as collective behaviour, where they are viewed as emerging from a collective process of defining certain phenomena as socially harmful. This view directly opposed a previously prevailing notion of seeing social problems as objectively harmful (Hilgartner & Bosch, 1988). Thirdly, the roots of social constructivism are often traced back to Berger's and Luckmann's book "The Social Construction of Reality" (1966) in which the very concept of social constructivism was introduced to the sociology of knowledge. There, key notion is that social reality, as beliefs and meanings held in a social system about itself, are produced in interactions between individuals and groups within a social system. Social constructivism, viewed through these lenses of origin, resonates well with an interpretation of the nature of futures thinking as an essentially social activity, aiming at producing both stability through a network of reciprocal commitments made by individuals in the social system thus reducing the space of uncertainty (de Jouvenel, 1967; Adam, 2004), but also creating change by anticipation and adaptation (Bennett 1976, 1996).

Fuller (2019) presents modal realism, an ontological position arguing for the reality of possible worlds (Blackburn, 2016) as a position consistent with alternative futures. He puts forward a proposition that in societies, structural change emerges through individual anticipations on the consequences of either adopting or not adopting emergent practices. If value is anticipated to be gained by adoption of novel practices, and if this anticipation is shared by a large enough number of individuals in the same social system, structural change, that is changes in norms, will occur (Fuller, 2019). In this thinking Fuller relies on Elder-Vass' notion that institutions are but properties of social groups, and that individuals either hold them together through their supporting actions, or vice versa are able to overturn them (Elder-Vass 2008 in Fuller, 2019). These ideas are well aligned with the research approach in this study.

3.6 Methodological limitations

Case study methodology is appreciated for its ability to convey authentic experiences (Stake, 1978 / 2000). However, while strong in emphasizing particularities of different cases and generating novel hypothesis for further research, a number of limitations have been identified for the case study approach.

Even though some of the limitations are under continuous debate, there are at least two relatively uncontested limitations that have been identified to apply to case studies. Firstly, case based studies are not suitable for assessing the frequency or representativeness of a given studied case. Secondly, correlations and causal effects (associations) between variables are difficult to establish by using the method. The last point however relates to the generalization of the results and using the results for theory building, which themselves are two classical debates among case study researchers. (Fitzpatrick, 2004). Fitzpatrick (2004) reviews central arguments presented in classical case study articles (collected in Gomm, Hammersley & Forster, 2000), for assessing if, and how, generalization or theoretical inference as based on case study results could take place.

The arguments against generalization stress the difference between hermeneutic and nomothetic approaches, where in the previous approach traditional generalization is not as important as deep understanding of the particular in its context. Nevertheless, even in hermeneutic designs, similarities and differences between cases can be noted, resulting in so called naturalistic generalisations. Also, case studies are argued to provide working hypotheses that can be used for theory building by using other research designs that are more suitable for drawing generalizations (Lincoln & Guba, 1979 / 2000).

Arguments for the view that generalization should indeed be the goal of case study research emphasize the assumption that case studies usually aim to lead the reader to draw their own (generalizing) conclusions. (e.g. Ayres et al., 2003, p. 881) Therefore, this process should be actively facilitated. There, careful and articulated selection of cases, and of the domain where the generalization would take place, are in a key role. (Gomm et al., 2000).

In this study, following the qualitative case tradition, generalization is to theory, in this case anticipatory systems theory. Case findings are also reflected against the long waves, which in this study are used as an analytical method for understanding systems transitions.

The limitations of the long wave analysis have to do with the imprecision of the long wave theory as a predictive instrument. The pattern of a rising and descending trend lasting around 50 years in the world economy is generally accepted. However, neither the duration nor the timing of the previous waves is defined to a degree that would make the Kondratieff wave theory serve a purpose of diagnosing the present phase.

The pioneer analysis shares limitations with weak signal analysis (Hiltunen, 2010). Despite attempts to objectively select the pioneers using pre-defined criteria, the selection process always includes a subjective component, which may give rise to bias in the results.

4 Data and Findings

In this chapter first the data gathering methods are introduced, and contextualised in the relevant studies. Next, the five research articles are presented with their findings as introduction to part two of this thesis.

4.1 Data gathering and analysis for the case studies

The data for the study is collected using a multimethod design, consisting of five individual studies that, when combined together and with this introductory article, form the argument of this thesis (Morse, 2003). The methods used in each sub-study are presented in detail in this chapter, and are summarised in Figure 5 (page 47). The main methods employed in the thesis were semi-structured interviews, conducted individually, and, for the study reported in the article I, "Organisations and the Sixth wave", as a group interview in a futures workshop context. Non-participatory observation was used as a method in understanding the organisational practices at Reaktor, reported in article II ('Trust Makes this Organisation Unique'). Results from the observations were also used as basis for conclusions driven in the article IV ("K-Waves, Reflexive Foresight, and the Future of Anticipation in the Next Socioeconomic Cycle"). Horizon scanning analysis was conducted as background work, independently of the individual studies presented in the research articles.

Horizon scanning method is a systematic process of identifying emerging issues, typically conducted as a desk study based on a variety of sources (e.g. Internet, official reports by public and private organisations, research institutes, databases, scientific journals and new outlets), with the aim to constantly assess signs of change and their potential consequences (e.g. Rowe, Wright & Derbyshire, 2017; Miles & Saritas, 2012). In this study, a horizon scanning process, combined with a literature search, was conducted at the outset of the research program for formulating a hypothesis of the sixth wave's key drivers. The results of the horizon scanning process are reported in the chapter 1.1.2.

Semi-structured interviews are a way to systematically collect informants' views on the research topic, following a pre-meditated interview guide outlining the questions and topics that need to be covered. There is an order in which the questions

ideally are posed, but the interviewer can make detours if the conversation leads to other topics the interviewer judges relevant for the research. (e.g. Koskinen, Alasuutari & Peltonen, 2005). Interviews in this research were used as the primary method for gathering in-depth information from the cases (Reaktor, Buurtzorg, foresight professionals, Silicon Valley entrepreneurs). In the cases focusing on pioneer organisations (Reaktor and Buurtzorg), theme interviews focused on the way informants describe the practices of the organisation: what they are, what kinds of values they are perceived as reflecting, and how do the informant compare the practices in their organisation with others in the same field. The interviews on foresight academics, practitioners, and researchers seeked out foresight professionals' views on the development and future expectations of the field of futures research and foresight: what they point out as key motivations and aims of the practice, development trends, and discontents about the current situation. All interviews were recorded, and analysed with qualitative content analysis methods (Krippendorff, 2004; Alvesson & Sköldberg, 1994; Alvesson, 2011).

Non-participatory observation refers to a field study in informants' natural setting. In this research design, the researcher adopts a position of a complete observer, meaning that the researcher acts as detached as possible from the studied situations (Angrosino, 2007). The aim of the research method is to enable identifying authentic behaviour, motivation, attitudes and perceptions, "*as nearly as possible as its participants feel it or live it*" (Ely 1991: 5). The researcher thus attempts to contribute as little as possible to the construction of the observed situations, with the ideal to be able to both document and empathise with the authentic situations. Advantages of the approach are that observation reveals both conscious and unconscious activity as it occurs in the everyday of the case organisation. It can lead to deeper knowledge about the construct of reality amongst the observed, unveil important details about the social interaction, and help to understand interaction and relationships. (e.g. Angrosino, 2007; Koskinen et al., 2005).

Document analysis by a scenario typology (van Notten, Rotmans, van Asselt & Rothman, 2003) combined with criteria for systems level foresight (Dufva & Ahlqvist, 2015) was the main method utilized in the article V: "Towards National Systems Level Foresight?", evaluating participatory elements in three Finnish governmental foresight processes. The use of checklists or templates for the analysis makes the approach adopted in the article different from more traditional document analysis methods, which often take the form of qualitative content analysis. (Bowen, 2009). This article adds to the thesis' analysis of the relationship between the studied niche level practices, and the regime level transition process. The transformation of the regime is key in socio-economic transformations, and the fifth article directly addresses change in this sphere.

4.2 Introduction to the research articles

In the following, the five research articles comprising part two of this thesis are presented, in the order of which they appear. Each article is based on a different set of empirical data, but all share a reference to the same broad theoretical framework, the long wave theory/-ies of societal development (with the exception of article V, where the K-wave theory is not explicitly referred to). The articles are presented by outlining the purpose and the thesis' research question it contributes to, the methods and data used, and the main findings and conclusions related to research questions in each article.

4.2.1 The research articles

Organisations and the Sixth Wave: Are Ethics Transforming Our Economies in the Coming Decades? (Article I)

Purpose and research questions

The article takes as its starting point macro-level changes in the world economy (scarcity, rising cost and globally increasing demand of commodities, rapid environmental degradation, and the effects of ICT on the changes of societal structures), and asks what will be their effect on organisations and the working life. The question is approached through an examination of attitudes, values and practices in a case sample of five Silicon Valley based resource efficiency oriented companies and entrepreneurs. The findings are considered as futures signs (Hiltunen, 2008), meaning phenomena appearing unusual or at odds with mainstream expectations (weak signals) that, combined with an interpretation, illustrate potential directions for the future. The article contributes to answering the thesis' Research Question 1: "What kinds of practices and values can be observed in the selected pioneer organisations?" by describing value-based operational models that the organisations employ, and the arguments they present for adopting them. The article also addresses Research Question 3: "What is the relationship between the found micro-level practices and macro-level socio-economic dynamics?" by contextualising the study in the Kondratieff wave framework, and deriving explanations for the found observations about the values and practices of the case organisations from the changes in the socio-economic structure and anticipations regarding the sixth Kondratieff wave.

Methods and data used

The Kondratieff theory was utilized as a method for organising the horizon scanning process that lay at the foundation of the research process. There, broad structural issues related to the environmental crisis, resource demand and scarcity, and the role of ICT in societal development directed the search for emerging issues, that in turn lead to the criteria for the selection of the workshop participants: Amazon Mechanical Turk and VineStove, two microtasking platforms with different approaches to resource efficiency; Shareable, a platform for sharing and promoting sharing transformation and solidarity economy; New Leaf Paper, a provider of ecologically sound post-consumer paper; and Give Something Back, an office supply company that channelled the majority of its profits to supporting local non-profits. The cases were not selected based on e.g. their social or environmental ethics but the main criteria was finding organisations that in their operations addressed resource efficiency through novel approaches.

The empirical data was collected as a group interview at a workshop arranged by Finland Futures Research Centre and the Institute for the Future (IFTF) at the IFTF headquarters in Palo Alto, 10th December 2012. The material was complemented with additional interviews in May 2013. In the group interview, the themes discussed were divided into three sessions:

1) The Why: Personal and Organisational Motivations, where the participants talked about the inspiration behind their personal and/or organisational approach to resource use. What drives the organization to create an alternative to traditional methods of productivity, either in the value chain, the labour force, consumption or business models?
2) The How: Examples of Practical Innovation, which concentrated on organizational practices: strategies or innovations, and even practice oriented visions and missions that have enabled each of the organizations to create new kind of value for their customers.
3) The Future: Barriers and Opportunities Five Years Out was targeted to identify some of the most exciting possibilities, as well as the key obstacles that could be anticipated looking five years out.

The workshops and interviews were recorded, and transcribed first on the level of topics, and then in more detail for the purpose of presenting the quotations about specific themes. Other material used in the analysis were the participating organisations' webpages that provided more information about the history of the organisations.

Main findings and conclusions related to research questions

A majority of the interviewed entrepreneurs / company representatives presented their motivations as grounded on arguments based on social change and ethics, as opposed to more traditional business arguments of economic necessity or opportunity. As this finding is not a necessary condition for a resource efficiency minded organisation, as attested by one case in the sample giving more traditional arguments as the economic rationality of the resource saving efforts, this finding is interpreted as a reflexive anticipatory action linking individual considerations to global issues. Globally, it has been estimated that time is running out on efforts to stop the dramatic consequences of environmental degradation. Value studies state that misuses of power by large companies are eroding trust towards all businesses. The entrepreneurs that comprise the sample of interviewees in this article display self-awareness in placing their companies in the position of power regarding systems level issues. The findings from the data were analysed as futures signs, where the weak signal of resource intensive, ethically driven companies was interpreted through the creation of shared value -theory. It claims that increasingly companies are striving towards win-win solutions. In the analysed cases the perspective of success is systemic rather than local.

"Trust Makes this Organisation Unique". Looking at the Future of Work through Two Human-centric Organisations. (Article II)

Purpose and research questions

The article is concerned with understanding the effects of macro-level technological change, especially automation, on the organisations and working culture. The article presents two case studies from two different fields (IT consultancy company Reaktor, and a home care foundation Buurtzorg). Their practices were presented, compared with one another, and then reflected against a conceptual framework depicting a society of intangible needs, as proposed by Pentti Malaska. The article provides material for answering the thesis' Research Question 1: "What kinds of practices and values can be observed in the selected pioneer organisations?" by analysing the value base of two human-centric organisations, and how these values reflect on the daily practices of each organisation. The article also connects to the thesis' Research Question 3: "What is the relationship between the found micro-level practices and macro-level socio-economic dynamics?" By by combining the K-waves approach and Pentti Malaska's theory of societal change, the role of human intentionality in social dynamics is discussed. In the analysis, the main focus rests on understanding the humanistic ethics guiding the practices of the case

organizations, and the resulting organizational resources that stem from the increased autonomy and trust that are the basic prerequisites of low hierarchy organizations. Connections with the main drivers of change in the working life are made, and discussed for potential to strengthen and generalize the observed findings also elsewhere in the society.

Methods and data used

The primary case is a Finnish IT-consultancy organisation Reaktor, where the data consists of three months of non-participatory ethnographic research. The observation period on site was from March to June 2015, during which audio-recordings and researcher notes were made of the observed situations: three different Reaktor teams were studied in client interaction, informal company gatherings and personnel interaction situations. Special interest was placed on understanding the dynamics between the individuals in the organisation, and understanding details about how the work is organised, and what factors appear as relevant in the organisational culture. The ethnographic data is supported by six thematic interviews with members of the organisation made during the same timeframe.

The secondary case data comes from Buurtzorg, a Dutch home care organisation, where eight employees and founders were interviewed in either individual or pairwise thematic interviews during one week in May 2016. The Buurtzorg data is complemented by an exhaustive literature review of extant research on the organisation. The two case set-up was employed to compare potential similarities across different fields, but also to offer examples of alternative practices within a general human-centric framework.

Main findings and conclusions related to research questions

The cases were evaluated in the framework of the society for intangible needs. From there, four key aspects categories were used to organize the case data.

The category of *Communication and technology* brings forward the central role technology and communications play in both organisations. At Reaktor, technology of course is the main deliverable of the IT consulting company, but also widely used as means for interpersonal communications, monitoring of work progress, and for extra-curricular activities. It can be argued that the social purpose and identity of Reaktor are inherently tied in with technology. For Buurtzorg, technology is perceived as an important enabler of concentration on the organisation's driving purpose: by freeing nurses from rote tasks, advanced, customized technology allows nurses to focus on face-to face interaction with the clients.

The category of *social vs. technical skills* comes from Malaska's observation that in more technologically advanced economies, social skills tend to be more important than technical skills. At Reaktor, technical skills are basic requirements for work, but social skills are key for fitting into the culture of the organisation and working with the clients. If the two skills are in conflict, social skills are prioritised. At Buurzorg, the only official requirement is to be a qualified nurse. However, to be able to function in a self-managed team requires social abilities, and it was mentioned that it generally takes about a year to learn such skills, if coming from a more traditional health care organisation. Not all are comfortable with the freedom and responsibility that come with the approach, and several nurses have left over the years for reasons related to social skills.

Family / organisational units. Malaska's theory proposed that organisational units in the society of intangible needs would move closer to kinds of ties family members typically have. In human-centric organisations, where people are encouraged to use their whole personality in their work, questions related to interpersonal relations are evident. At Reaktor, self-organised teams are composed for each project, but their members can fluidly be changed within the organisation. Reaktorians share a common culture which allows them to relate to others, even if in a large organisation not everyone knows one another. In teams, the atmosphere is informal and members feel like they can be their true selves amongst colleagues. Reaktor does not consider itself a family-like organisation, but boundaries between the working life and private life are fluid. There is however a clear emphasis, even a requirement to have hobbies and life beyond Reaktor. The risk of burn outs, and problems of too much dedication to work are recognised and a healthy work-life balance is seen as a countermeasure to this. Buurtzorg operates through self-organised teams that are geographically defined. Teams stay together as long as they don't exceed 12 members. After that, a general rule is that they should split into two smaller teams. A team has power over all the practical issues related to their teams functioning, and members have strong commitment towards the team, and the team members. Buurtzorg has also organisation-wide events and communication, but usually members identify very strongly with their own team and their clients. Clients are promised that they will only have a small number of people visiting their homes, so that a family-like relationship can develop between the clients and the nurses. At Buurtzorg commitment to the client overrides most personal life interests, and work-life balance is a chronic issue: for instance taking a vacation is difficult to arrange, because the clients need constant care by the people who have committed to taking care of them.

Progress, development and growth. In Malaska's society of intangible needs growth is presented as primarily non-material growth, emphasising mental and spiritual development, and being critical of the currently dominating paradigm

based on economic growth. Reaktor has grown rapidly as an organisation, measured both in its revenues and personnel. The reasons for growth are evaluated to stem from its good reputation as a working place, and good quality work. Growth requires special attention due to aims of maintaining the communal organisational culture, but on the other hand is seen as an enabler of progress through more interesting and challenging projects. Reaktor's development evolves organically through the interests and capabilities of its members. Reaktor maintains a low threshold for trying out and testing new opportunities and directions. Those that have potential are continued and can develop to becoming key areas of activity. Buurtzorg has grown very fast as a result of its model being attractive to nurses. Growth is not a goal as such, but it has made it easier to deal with other social entities in the system, thus developing the system to be more welcoming to other organisations like Buurtzorg. Among the personnel, development and progress are seen to relate to the way Buurtzorg is able to change the discourse on home care and elderly care on a societal level.

The findings indicate a similarity between the studied cases and Pentti Malaska's theory of a society of intangible needs. There, the idea is that with advanced technology, the focal point in human societies moves towards enabling value-based self-actualisation, resulting in reduced material concerns. The findings show a deep commitment to the organisations amongst their employees. At Reaktor, the organization structure allows for shaping and molding its activities according to individuals interests. At Buurtzorg, workers' professional identity as care taker takes priority over other considerations. This may be stressing from the perspective of work-life balance, but for the ones that stay this reflects their professional calling.

The Long Waves and the Evolution of Futures Practice and Theory. (Article III)

Purpose and research questions

The article seeks answers to how futures professionals see the development of the field. Twenty-three thematic interviews of futures professionals were conducted in three geographic areas: Finland, South Korea, and California. The interviews discussed three themes. Firstly, how the experts perceive the impact of futures: what should the aimed impact be, and what it in their view currently is. Second theme was the methodological approaches preferred by the informants, and how do they estimate the field to evolve in this respect. Thirdly, the interviews were concerned with what kinds of processes do the futures professionals think are most conducive to the aims of futures studies and foresight. These issues were explored with the aim of revealing implicit theoretical positions that affect the experts thinking about the

futures of the field. This notion bases on the observation that historically, futures studies approaches have been roughly in line with the overall mindset of each Kondratieff wave. Looking at the history of futures studies, methods and approaches have had their popularity's peak at a certain time. This article approaches the question of theory through examining futures practices in their historical contexts, and their relation to commonly shared ideas about the future in each time period. The article asks, why do certain ways of thinking and researching the future seem more plausible than others at a given time? Is there a relationship between the methods used, the prevailing societal mind-set, and the view of the future proposed? Thus, the article contributes to answering the thesis' Research Question 2: "Can the practices and values of pioneer organisations be identified also in more established foresight processes?"

Methods and data used

The data for the article exploring come from thematic interviews exploring themes related to the futures of foresight. The interview procedure contained elements of the argumentative Delphi process, as arguments from previous interviews were presented for comments. However, the method does not qualify as a Delphi interview process as the main approach in the interviews was traditional thematic interviewing. In total, twentythree foresight experts participated in the thematic interviews, of whom nine were from Finland, ten from the Republic of Korea, and four from the United States (California). Six interviewees were women. The selection of these specific geographic areas, each from a different continent, was done as a reflection on the historical phases of futures traditions.

The informants were selected by using a combination of help of a local informant and snowball sampling. Of the interviewees, five (four from Finland, one from California) are academics (A), nine (eight from the Republic of Korea, one from California) represent public or private sector research institutes (R), and eight (five from Finland, two from California, and one from the Republic of Korea) are from the private sector (P). One interviewee divided his time evenly between academia (A) and public organization (R). All interviewees in Finland and California had over ten years of experience from futures work, and all interviewees from the Republic of Korea were at the time of the interviews engaged in futures projects. The background information is coded according to interviewees' predominant situation at the time of the interview (the earliest interviews were made in the 2012, while the bulk of the data has been collected between 2014 and 2015, and two last interviews are from the spring 2016). Interviews have been conducted in English, except for the interviews with the Finnish foresight experts, in which Finnish language was used. The Finnish quotations have been translated by the researcher. Material from all interviews is not

quoted in the article. For the article, the interviews were coded manually by searching for references to impact of futures, methodological development, and nature of foresight processes regarding the futures of futures work, a framework adopted in a modified form from a typology presented by van Notten et al. (2003) (see also the methods section of Article V). The findings are presented as quotations, with key quotes selected that represent or encapsulate a view-point shared by several informants, or individuals with a view that is clearly different from the majority of views. Results in this study are not systematically analyzed by country or professional background, but rather the aim is the exposure of different views that are present in the foresight communities in the selected regions.

Main findings and conclusions related to research questions

One of the postulates of the long-wave theory framework is that organizational practices are subject to change as the socioeconomic system reorganizes itself around new technologies and a new emerging mind-set. Thus, the expectation was that the way foresight practitioners understand the direction of social change would be visible in their views regarding the future of foresight, and the methods they see as most fruitful. Based on the interview data the conclusion of the article is that foresight practitioners are divided between two competing paradigms: the expert-led quasi-predictive model that still dominates especially in the technology forecasting work and technical innovation policy orientation, and the systemic perspective, which questions the centrally organized process-view to foresight, and is more inclined to view foresight as a continuous, inclusive activity aiming to actively provide tools for influencing the direction of change. The scenario approach, encapsulating the key insight from the fifth wave regarding the multiplicity of potential futures, seems to be universally accepted as a method in the standard toolbox across the divide. The majority of foresight practitioners interviewed for this study see the role of foresight in decision-making as relatively unproblematic, either as information gathering and dissemination task, or as a role of a strategic facilitator whose aim is to involve the decision makers in the foresight process to support decision-making. Both of these views are focused on the expert–policy maker relationship, and the participatory element is assigned only a secondary role, mainly as a way to gather ideas and insights. In the interview data, there are traces of an approach that is more sensitive to the network logic of the social dynamics. There, the tendency is to think is that technology and innovation are essentially chaotic due to a qualitatively different mode we have entered since the digital technologies have started to effect societies. When discussing this, foresight professionals pointed to agility, robustness, and futures literacy as solutions to survive. Policy making in this situation is perceived as departing from

the need to retain a sense of control over an essentially uncontrollable reality. In such conditions, creativity, experiments, and approaches that encourage "making the future" are seen as forming the core of the activity for futures and foresight activities. From the perspective of answering the Research Question 2, the conclusion is that although the kind of thinking that is characteristic of the pioneering organisations' forward looking approach can be found in the data, more traditional notions as futures providing objective information about futures and facilitating expert lead futuring processes prevailed.

K-Waves, Reflexive Foresight, and the Future of Anticipation in the Next Socioeconomic Cycle. (Article IV)

Purpose and research questions

The article analyses the sixth wave drivers by using the Kondratieff wave framework as an anticipatory method. The K-wave theory builds a context to understand the emergence of novel forms of organisations, and draws together findings from individual studies. The article introduces the K-waves theory as an anticipatory framework, and connects anticipatory capabilities and key features of new forms of organising. In doing so, the article contributes to answering the thesis' Research Question 3: "What is the relationship between the found micro-level practices and macro-level socio-economic dynamics?"

Methods and data used

The K-wave (Kondratieff wave) theory is introduced as a method for anticipating socio-economic changes as two distinct approaches to use the theory for anticipation: first is to look at the previous waves' technological developments and to analyse their potential to combine with a humane need that is acute in the emerging wave. The second approach is to take a look at the problems generated by the previous waves: side-effects of the technoeconomic activities of the past waves.

Main findings and conclusions related to research questions

Climate change is identified to be the central challenge to be solved in the sixth wave, deriving from the K-waves analysis focused on identifying unresolved side-effects of past waves' activities. Novel forms of organising are seen as responding to a human need with technologies that have been developed in the previous waves. The two combined form the key drivers for the sixth wave.

Key features of the new organising framework are condensed as an analytical CARE-model, consisting of:

1. The level of quality in ways to share information and collaborate
2. Rethinking the key competencies necessary for thriving in the ecosystem
3. Continuous and inclusive focus on innovation
4. Passion for radical solutions
5. Commitment to long-term thinking

The model depicts the factors creating a particular form of futures orientation, in the article termed Reflexive Foresight, that enables the systematic use of futures in the present through a reflexive set of practices and ethos. Reflexive Foresight is introduced as a generalisation of prototypical behaviour of the studied case organisations. It is characterized by a systemic view of the organisation, positing it into the larger scheme of things, organising towards utilising all human potential available, and working in a social, not collective mode, resulting in adopting solidarity instead of competition as an approach in relations with other actors.

Towards National Systems Level Foresight? Understanding the role and future directions of citizen participation in the production of Finnish national foresight reports (Article V)

Purpose and research questions

The context of the article is the Finnish foresight system, and the systematic process of foresight that the Finnish government has implemented for understanding multidimensional and interdependent future challenges. The study examines three latest Futures Reports (2009, 2013, and 2017 / 2018) that represent key documents in the governmental foresight process. A Futures Report is produced once in each governmental cycle on the topic that the government has defined to be of key interest for the future of the nation. The article traces how the kind of ethos, ideals and practices found in the niche level case studies are reflected in the three high-level Finnish governmental foresight processes, thus contributing to answering the thesis' Research Question 2: "Can the practices and values of pioneer organisations be identified also in more established foresight processes?". The article addresses this question by placing a special interest on understanding in what ways could these processes be seen as contributing to building foresight competence as a systemic property in the society. There, especially the approach to citizen participation is central. The analysis concentrates on the approaches, methods, and aims used in the production of the reports.

Methods and data used

The three reports are analysed using a modified version of the scenario typology developed by van Notten et al. (2003). In addition, the systemic capacity building elements present in each process are analysed by using a six-point framework by Dufva & Ahlqvist (2015). Of special interest in the study is the relationship between the aims of each research project, and the methods used. What are the processes and methods that are expected to produce significant, policy relevant futures information?

The typology used (Van Notten & al. 2003) is divided into three main themes: project goal ("the why?") process design ("the how?"), and scenario content ("the what?"). The themes are interlinked so that the chosen goal influences the process design, which in turn directs the eventual contents of the scenarios. As the typology as such is not a tool for analysing the level of systemic capability building, Dufva's and Ahlqvist's (2015) elements of systemic foresight are used as a pragmatic analysis tool for assessing whether foresight efforts have longevity as systemic constructs, or if they remain on the level of singular processes. The analysis of the reports is done by content analysis performed by deep-reading the reports. The typology is applied to all three processes presented in the reports. An analysis based on Dufva's and Ahlqvist's framework was used for assessing the impact in terms of long-term effects on building futures thinking capacities in the system.

Main findings and conclusions related to research questions

By utilizing a scenario typology (van Notten & al., 2003) combined with an analytical model for assessing systems level properties of a futures process (Dufva & Ahlqvist, 2015), the main documents of each process were analysed for the level of citizen participation in each process, and the potential to generate systems level foresight capabilities.

Based on the analysis, it is quite clear that all three processes at their core were scientific expert lead processes, where constrained institutional conditions leave little space for genuine participation. It was noted that in the second report the systemic elements were elaborated much more fully than in the first one. However, the third report had the least participatory elements of the three analysed reports. As a conclusion, despite the difficulty of establishing clear change directions based on the report data, the tensions between two implicit goals are evident. On the one hand it is clear that there is an effort to increase citizen participation and move the emphasis in the processes towards networks and systemic understanding. On the other hand, the top-down, expert lead logic dominates in the processes, making the results of the participatory processes difficult to fully incorporate into the results. The use of Dufva's and Ahlqvist's (2015) systemic capabilities –framework as a tool

for analysis points out as results that especially in the 2013 report the systemic elements were elaborated much more than in the 2009 one, possibly indicating a growing understanding of the importance of the systemic aspect of foresight work. This resonates with findings from the pioneering cases, where decentralized and non-hierarchical practices are observed. The subsequent restructuring of the entire foresight system to enable a more networked national foresight practice supports this notion. However, the 2018 Future Report returned to a model where discussions were held among a rather limited elite group of experts and policy makers.

Although the material does provide hints to support the anticipation that the overall direction of the whole system is towards building foresight capacities as a systemic function of the society, based on the three cases analysed it is impossible to make definitive judgments about the direction of change in the system. The cultures of top-down governance and systemic anticipation are not a natural fit, and this uneasiness may be the reason for the uncomfortable integration of the citizen participation in the expert work. However, there is evidence of continued efforts to increase participation and mold the foresight system towards enabling a continued and communicative process, rather than focusing on atomistic processes (like the Futures Reports as symbolic tokens of national foresight).

4.2.2 Conclusions on the reseach articles

The five articles of this thesis illustrate currently existing, yet still marginal phenomena, which derive their importance as significant futures signs from the long wave frameworks. When trying to understand the nature of the systemic re-organising process, one needs to assess all the relevant drivers for change, including, but not limited to, the technological drivers. Here, paying attention to actors manifesting novelty – pioneers – can reveal emerging futures trajectories of societal development.

Together, the issues highlighted in the articles paint a picture of a world view and an operating model that may be understood as a response to the challenges faced by our societies, and the complexity of contemporary operating environments. The theory of anticipation is helpful in interpreting the documented changes, where attention in organisations has shifted from purely predictive aims to emphasise the use of future in the present (see also Adam & Groves, 2007). An organisation focusing on the present rather than the future may not self-evidently appear as a novel type of an approach towards the future. However, the cases analysed illustrate Riel Miller's (2018) idea of the difference between anticipating for the future and anticipating emergence. The CARE-model, elaborated in article four, identifies common factors in all studied cases that comprise the Reflexive Foresight mode, put forth as the theoretical contribution of this thesis.

5 Discussion and Conclusions

In this study novel ways to collective organising have been observed. The focus on their analysis has been the implications of the findings on forward looking practices and capabilities. From the perspective of mainstream organisational thinking the studied pioneer organisations are in many respects radical, for instance in the way the decision-making relies on individual expertise and responsibility of the members of the organisation, and shuns hierarchical structures.

The relationship between the novel emerging anticipatory practices on the level of individuals, collectives, and nations was analysed in the framework of grand societal transformations. This task was approached from three directions: first, Kondratieff wave theory and Pentti Malaska's theory for societal change were used as methods for understanding the landscape level. This process involved a horizon scanning process and an analysis of societal change drivers. Secondly, emerging practices as responses to the identified change factors were studied in a pioneer analysis case study design, by investigating practices in self-organised companies and individual entrepreneurs. Third, in order to assess whether regime level processes were affected by the combined trajectories of societal change drivers and emerging practices, two cases were selected for analysis: a loosely connected network of futures professionals, and three national level, government led foresight processes.

The kinds of practices and values identified in the pioneering organisations were characterized by a particular kind of societal ethos. Important features there were trust, and focus on the impact of the work. The observed practices can be seen as deriving from the organisations' shared assumptions about the social ethics of individuals involved. The organisations appear to rely on these ethics and intrinsic motivation as basis of the main organising principles. Common to the observed networked organisations is the shared culture that emphasizes long-term thinking while at the same time is focusing on making the most out of the immediately presented opportunities.

Although affecting the future has for long been one of the stated aims of futures studies, in foresight such thinking has been rarer. Even where it has been found, the focus has been placed on strategic thinking, emphasising primarily economic rationality as the motivation for affecting the future.

In the pioneering cases, economic rationality is present as a given precondition for being able to function as a market based operation. However, the real goals that the companies have are largely found elsewhere: Buurtzorg wants to change the discussion and paradigm on home care. It has chosen to function as a foundation precisely to not to let the economic rationality overtake this ambition. Reaktor was conceived as a reaction to other workplaces where its founders had worked. The idea was to create an environment that would allow IT professionals make the best use of their expertise without the organisational command-and-control structure that was felt as only burdening the employees. Ultimately, Reaktor is taking on a challenge to change the perception of a workplace from a hierarchical relation to a place where collegial relations and needs of the client define the structures and routines of the work.

Out of the sample of the Silicon Valley entrepreneurs, four out of five companies primarily defined their business through a purpose that in some cases was quite far removed from the actual business. For instance, GSB traded in office supplies, but actually was concerned with the social disintegration of communities, and wanted to use the majority of its profits to support local non-profits to counter the prevailing dynamics. Shareable was in the "business" of promoting an entirely different economic model based on sharing of goods, ideas, and work, whereas the New Leaf Paper wanted to change the paper industry from within, by offering environmentally sound, high quality recycled printing paper. VineStove took the idea of microtasking, a contested concept that has both negative and positive implications both in reality and more so in the potential scenarios on future work. VineStove turned microtasking into a form of helping others, thus leveraging the systemic potential of the technology. All these case examples indicate an internalised understanding and aim of changing the system's properties by working in a certain way within it. At the same time, the cases also can be seen as extensions of the founders' (and also employees) own values and aims in the larger society. While this may be true also of more traditional organisations to some extent, especially the organisational model adopted by Buurtzorg and Reaktor (explored in more detail in the article II) encourages such a connection. What the organisation does is deeply felt as both a shared outcome but also as a shared responsibility of each worker.

Increasingly, contemporary expectations towards the working life emphasise meaning and possibility to live out one's values, as discussed in chapter 1.1.2.2 of this thesis. The development of the kinds of organisations studied for this thesis can thus be seen as a logical consequence of these expectations, driven by individualisation and the need to have ownership to work, as it is affecting an important part of one's life choices.

In this study, implications of the operational models on forward looking are taken as the lens through which findings are interpreted. From the perspective of the theory

of anticipatory systems as an approach to forward looking, one may claim that forward looking is the key function of an organisation / organism. Thus, changes in approaches to forward looking indicate changes in the overall identity of an organisation / system.

The identified organisational practices have a resemblence to an approach called Futures Literacy (Miller, 2018). There, the emphasis is on a capability to use the future in the present for making more enlightened, value based choices. This set of practices, orientations, and capabilities identified in this thesis in the context of organisations and networks is called "Reflexive Foresight".

The concept of Reflexive Foresight, as derived from the observed case organisations, is presented in tight connection with the sixth wave, and many of its features are connected with the particular challenges and problems that are topical in this particular temporal landscape. In this regard, Reflexive Foresight may be interpreted as an instantiation of the sixth wave. It may also be argued that the characteristics of Reflexive Foresight are necessary conditions for the kind of organising as exhibited by for instance Reaktor and Buurtzorg. An open question remains whether the characteristics outlined for Reflexive Foresight would be possible in other settings.

In order to understand the fundamental elements related to the functioning of the case organisations, presented in this study as pioneers, and to understand the meaning of the concept of Reflexive Foresight, the term reflexivity needs to be discussed in more detail.

Reflexivity is a key concept for this study in many respects: first, it demarcates the main division between the forecasting oriented foresight and more constructive approaches (discussed in chapter 1.1, pages 19-21). Secondly, it was specifically presented as a problematic issue for the original anticipatory systems theory by its founder Robert Rosen (1985, discussed in chapter 2 on page 35 of this thesis) when applying the theory to a human context. The concept of reflexivity also resonates with the dynamics of systemic models, such as the MLP and the long wave theories, both applied in this study. They describe the development of socio-technical systems, where various feedback loops, also self-referential ones, are among the constitutive dynamics of the models. And finally, reflexivity has given the name to the approach that is proposed in this thesis as a novel kind of foresight, based on the findings from a set of case organisations.

Reflexivity is commonly defined as self-referential circular cause and effect. For the purposes of futures studies it is commonly illustrated in the form of self-fulfilling prophecies, first identified as a problematic phenomenon from the perspective of social science by Robert Merton (1936, 1948). In brief, the issue concerns predictions made about a state of affairs that, by the act of making the prediction known to the people affected by it, becomes false or true. A classic example that

Merton (1948) provides of a self-fulfilling prophecy is the effects of insolvency rumours causing individuals to withdraw their savings from thus far thriving banks, with the result of those banks ending up insolvent, therefore making the previously untrue rumours to become true. In other words, a prediction regarding human affairs affects those affairs, and in this, human systems are different from natural systems (see also the discussion on prediction on page 18, footnote 5, and the reference to reflexivity in chapter 2, page 35). In the context of futures studies, Osmo Kuusi (1999) discusses the difference between reflexive learning beings and not-learning beings, identifying this difference primarily with the language ability of the learning beings. Karl Popper has generalised reflexivity to be an issue all sciences, especially the social sciences, need to take into consideration (Popper, 2002).

The concept of reflexive foresight includes a reference to the way the concept has been employed in the theory of late modernity (see chapter 2, page 35). Late modernity, according to Giddens (1991) is a time period characterized by the fading of traditions that used to guide behaviour in the (much more slowly) changing world. With the fading of traditions, life decisions and choices have become exceedingly individual. Further, consciousness of different available options not only allows, but forces one to decide between them. Therefore, it has been argued that the life choices have become important building blocks of one's identity, and consequently life has become a self-conscious narrative, continuously reshaped by the self (Giddens, 1991). This description of the late modern condition has interesting parallels with the rationale given to forward looking in the writings of Gaston Berger and Bertrand de Jouvenel (discussed in chapter 1, pages 16-17). They encourage scanning potential futures for the reason that individuals (but also collectives) are in any case faced with the task of making decisions affecting their future. Thus, in the kinds of circumstances described by de Jouvenel and Berger, foresight is an inbuilt feature related to an internalized understanding of the plurality of futures -approach. There, futures are explored not only for simple strategic reasons, but more for the possibilities they open up for conscious decision-making about potential futures.

The Reflexive Foresight approach encapsulates the key characteristics that are needed for an organisation to be able to orient itself towards the future, and make use of the individual expertise and commitment for strategic direction setting. Here, key features are a systemic orientation, and an analytical approach to complexity that enable a structured and rational, yet fluid and adaptive way to operate in a complex world. However, it can be argued that the most important characteristic is to an extent shared identity across the organisation. This is intuitively understood also by the organisations themselves, and show for instance in the meticulous recruitment process (at Reaktor) or the understanding that learning to function in the organisation is a lengthy process (Buurtzorg). This feature enables the kind of approach to futures that is best described by the anticipatory systems theory.

This specific nature of the pioneering organisations may also explain the ambivalent results obtained when studying the success of this foresight approach in the regime level cases. Many among the foresight professionals interviewed for article III considered foresight primarily from the perspective of public sector foresight processes. Another regime level case, documented in article V, is devoted to examination of three national level governmental foresight processes. Forward looking on behalf of a nation is a very different process in comparison to a unified, value driven organisation displaying the characteristics outlined above. Therefore, it is relatively easy to understand why the role of an objective information provider would be more readily available for a professional futurist, or why arranging for meaningful citizen participation in the processes would be a challenge. Nations can be argued to be imaginary communities that are sustained by the beliefs and interpretations individuals have about them. It is unlikely that these overlap to an extent that would allow nations to be compared to close-knit communities, as the case organisations are. From this perspective it is on one hand to be expected that the mainstream approach to foresight differs somewhat from the observations in the pioneering organisations. On the other hand, findings from two cases exploring regime level foresight processes indicate that a cultural shift towards more reflexive and systemic practices may be underway, characterized by an increase in participatory elements in forward looking processes. Efforts towards increasing practices that seek to include a broader base in forward looking is a first step in changing the logic of the system into operating from the perspective of futures literate citizens. Although both studied instances (futures professionals and national forward looking processes) contain conflicting elements for making straightforward interprations about the future direction of foresight practices, a general tendency seems to point to an ideal of a networked, systems based forward looking, reliant on both processes and individuals that are able to approach foresight from a systemic perspective. This raises interesting questions.

Observations regarding decentralization of power, trust-based organising and individualistic yet to a degree communitarian ethos in the pioneering organisations could be considered curiosities among international trends in societal development (e.g. Putnam, 2000). Yet, the observed heterarchical designs to organisational behaviour may serve as indicators to how societies in general are changing. The tensions between top-down thinking and systems level models were present in both the analysis of national level foresight processes, and the foresight practitioners views. The crucial question for evaluation the futures of these systems then becomes who is the (foresight) system expected to serve: top-down level processes (hierarchical model), or system wide preparation for the futures (supporting citizen decision-making). The observations lend themselves also to speculation on big questions about new possibilities for democracy: what could be a model, analogous

to the observed organisational practices, that could be more efficient in navigating the complex, information rich environment, and make better use of the capabilities of the well-educated citizens?

One of the key issues addressed by this thesis is the relationship between individual level emerging practices, and landscape level transformations. There are essentially two kinds of hypotheses for the generation of the long waves. The first, more dominant discourse, views the waves as brought about by a prominent cluster of technologies that acts as a driver for the systemic change, leading other parts of the system to reconfigure around the novel technologies. Ilkka Tuomi (2009) has argued that technological development has already reached a speed that has resulted in this dynamics having broken down, mostly due to the slowness of institutionalization processes in comparison with the current speed of technological development. Instead of big waves, constant splashes would characterize the contemporary socio-technical landscape, as novelty after novelty is disrupting the technological regime. (Tuomi, 2009). However, there is another hypothesis that challenges Tuomi's argument. There, the waves are a result of intergenerational learning processes (Wenger, 1998), combined with a type of herd behaviour that feeds growth periods, and deepens depressions (e.g. Alexander, 2002). In this view, the waves are viewed as an emergent result of aggregate human behaviour. An open question then is, what would it mean for such phenomena if indeed people were less prone to herd behaviour and started to act more in line with purpose and values, as suggested by our sample of pioneering cases. The kind of collective intelligence in the form of development of more systemic capabilities for forward looking might pose a distraction for the mechanism through which the waves emerge, based on this hypothesis[28].

Therefore, one can postulate also a third possible explanation, where humanity is viewed as collectively anticipatory, instead of a reactive, force. This idea finds resonance in a classical theory of social change put forward by Pentti Malaska that, despite its direct relevance to the issue, has been underutilised as a framework for systems level transformations exploring the effects of technology on society. In this thesis Malaska's theory is presented as a framework for organising the findings, and also for its potential to rekindle alternative interpretations about the relationship between technology and societal organisation. Projections of rapidly advancing automation and artificial intelligence, and their potential for large-scale disruptions, detrimental to the use of human labour, are currently the dominating discourse regarding societal futures. The empirical findings presented in this thesis, especially

[28] On the other hand, knowledge of the existence of the business cycle and its adverse effects, and even practicing Keynesian counter cyclical economic policies, have not removed the business cycles from world economy.

the data based on an investigation of two organisations in two separate fields (IT consulting and home care) suggest a somewhat more complex relationship between advancing technology and its reception in a society. Instead of making human work obsolete, the cases offer evidence that information technology may refocus work in ways that not only are more productive, but make use of uniquely humane capabilities, such as communication and other social skills. This in our cases provides increased job satisfaction and meaningful experiences to workers, while being also very valuable work for the clients. In this discussion, Malaska's theory illuminates two important aspects of humans as anticipatory decision-makers: firstly, humans have the ability to imagine different kinds of futures, perhaps even a tendency to focus on the undesirable ones. Secondly, they also have the ability to use these futures for building other kinds of models, and acting on them. Considering this, what is interesting are the implications this suggests for sustainability, seen in this thesis as the most pressing challenge for humanity in the sixth wave. In previous waves, according to Malaska's framework, the system has reorganised around solutions that are adept at solving an acute need for the human kind. For the present moment, grand challenges regarding the sustainability crisis in all its dimensions demand solutions. The findings from the cases studied enable making an interpretation that a socio-cultural shift may be underway, towards practices, capabilities and ethos that would pave the way for the next socio-cultural transformation, where the need for establishing a sustainable way of living would be the primary need guiding systemic reorganisation. There are of course other possibilities. Well-documented cases from the past make it clear that not always have human systems succeeded in functioning as anticipatory systems, able to adapt their behaviour to signals from their environment. Instead, societies and entire civilisations have perished in environmental disasters that human action has failed to anticipate, and even attempt to mitigate (Diamond, 2005).

The role of futures studies is to produce alternative futures for understanding the possibilities, but also threats inherent in the present. All ecological transitions are cultural transitions (Bennett, 1996). This thesis brings forward elements of the present that may have a constitutive role in a possible trajectory towards an ecological transition to a less extractive future. The pioneering organisations studied in this thesis are offered for consideration as anticipatory organisms.

It may be that the only fundamental truth about any future is that they are only ever imagined. A capacity to imagine and aspire towards radically different futures has an effect on the human system's functioning. The result of this thesis point towards reflexive anticipatory thinking capacities becoming more central as individual skill set requirements in the emerging organisational models. They can also be features that form a crucial part of the socio-economic system of the sixth wave.

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